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Technical Education
*Issued Under the Auspices of the* New Zealand Manufacturers' Association
A Lecture on the Reports of the Royal Commission on Technical Instruction,
By Prof. Mainwaring Brown,
And *A Discussion on the Best Means of extending Technical Education in New Zealand*.
Dunedin, April 13, 1885.
Dunedin: Printed at the "Evening Star" Office Rond & Street.

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# Technical Education.

A lecture delivered by Professor Main-waring Brown on the 13th April, 1885; the president (Mr A. Burt) in the chair.

Professor Brown said: There is a general agreement that technical education is a very important thing, but unfortunately there is an equally general feeling of uncertainty as to what technical education is. The cause of this uncertainty is that the phrase is used to express two distinct systems—]. That of teaching handicrafts in schools, the pupils being taught the practical use of tools; and the necessity of apprenticeship being to at any rate some considerable extent done away with. 2. That of supplementing the practical knowledge gained in the workshop by instruction in the principles of drawing, chemistry, applied mechanics, and other arts and sciences, a knowledge of which is necessary to the thorough mastery of particular trades. In this paper I propose (1) to give a summary, drawn from the reports of the English Royal Commissioners on Technical Instruction, of what the most advanced nations have done in both these branches of teaching; and (2) to compare the facilities for learning trades in Dunedin with those that are offered by the leading centres of industry.

## The Growth of Technical Education.

The system of teaching in classes those arts of production which formerly could be learned only in the mine or the workshop was first adopted by Germany, when, towards the end of the last century, she commenced the establishment of schools of mines. To some extent France, under the First Empire, followed this lead, but the French schools, to use the words of the report, for many years "simply vegetated." The real beginning of technical education is marked by the Exhibition of 1851. Continental nations began at that time to recognise the fact that if they were to compete with the manufacturing skill and energy of England they must train their managers, foremen, and work-people; while England on her part began to perceive that with all her advantages she was seriously behindhand in taste and in that knowledge of principles which enables manufacturers to adopt their productions to changing requirements. Continental nations—Germany again taking the lead—now proceeded to institute elaborate technical schools for managers and evening classes for artisans; while England endeavored to supply her defects by the establishment of the South Kensington Science and Art Classes, the success of the English movement was by no means inconsiderable, for in 1857 there were 12,509 students instructed in the local schools of art, and 396 in the Central Training School; while 43,212 children in elementary and other schools were being taught drawing. From this good beginning the system grew till in 1882 there were 909,206 persons receiving art instruction in connection with the department, and 68,581 students in science, in 1,403 science schools. But, South Kensington not with standing, it is plain that the foreign manufacturers gained considerably on England during several years after 1851. They enlarged the sphere of their operations, dispensed with the English foremen and managers they had previously been obliged to employ, and, though hampered by the Protection established for their own benefit, began seriously to threaten Free trade England in neutral markets. England, on the other hand, still depended on foreigners for frist-class work in designing, dyeing, and other opera operations requiring taste and high technical knowledge. Within the last few years, however, England has made a new ad- vance of a most practical character, marked by the establishment of such great technical institutions as the City ana Guilds of London Institute, Mason College (Birmingham), the Technical School (Bradford), and hosts of smaller schools, evening classes, and technical museums spread throughout the manufacturing districts. The success of recent efforts has been such as will surprise most people: it has brought England nearer to perfection in the means of technical education than any of her rivals. The Commissioners state that though societies for extending technical teaching are very numerous in France, Belgium, Switzerland, and Germany, "their sphere of action is limited, and the facilities they offer for evening instruction in science and technology are inferior to those which are at the disposal of our own workmen. No organisation like that of the Science and Art Department, or of the City and Guilds Institute, exists in any Continental country; and the absence of such organisations his been lamented by many competent persons with whom we came in contact abroad."

## The Value of Technical Education.

The report shows that in the great majority of trades technical instruction should aim not at supplanting, but at supplementing the experience gained in the workshop. If a man is kept all his life performing no more than one or two operations, no amount of education will enable him to do them letter than he will do them after a reasonable amount of practice; while there are, as might be anticipated, cases in which men have been spoilt by spending over the study of principle a portion of their lives which ought to have been devoted to acquiring practice in details. "The weak point in the training of forein managers," said an engineer at Ghent, "is that they get too little practice in the shop, They go to the University or to the Polytechnic (school of applied science), and usually remain there till they are upwards of twenty. It is impossible for them at that age, and without experience in real work, to compete with practical men in the internal economy of the workshop." Another formidable objection to many of the schools is, that they do not study the art of cutting the coat according to the cloth. "There is," said a Belgian dyer, "a tendency in school teaching to aim at certain ends without considerations of economy in the means. A man may dye beautifully, but, if he cannot make the dyeing pay, his knowledge possesses no commercial value. In this respect the diploma men are often unsatisfactory." But allowing full weight to objections of this kind, which are amply set forth in the report, there is a great preponderance of opinion in favor of technical education for all classes of workers. Thus at Roubaix: "M. Delattre informed us that during the ten years that the technical weaving and dyeing school has been in operation great progress has been made in the dyeing industry. In every establishment where sons of employers, foremen, and workmen have attended the classes, good results have followed. In the dye works many of the young men can make their own preparations. There is less need of supervision; economy of production has, in many instances, followed attendance at school"; fewer mistakes have been made; and more reliable and more efficient work has been done." In Switzerland the advantages of technical knowledge seem to be still more firmly believed in. "When there was a movement in the Federal Council for lessening the grant to the chemical department of the Polytechnic, it was shown by undoubted evidence that within a few years the chemical laboratories had been the direct means of bringing capital into the country to the extent of millions of pounds sterling, and that their usefulness was crippled for want of better accommodation. The movement for lowering the grant was defeated, and a proposal was carried for the expenditure of L50,000 upon a new laboratory." The same importance is attached to elementary training, such as is given in the schools of industry, where boys are taught practically the use of tools, together with, so far as time allows, such sciences and languages as are likely to be most valuable to them. The English manager of a large engineering establishment says that several boys have come to him from the Industrial School of bis town and he has been delighted with them. "Instead of being raw, ignorant lads, unable to drive a nail or to use a file, they can begin work at once; they have been taught to use their hands, and most of them have excellent ideas about work. . . . He pointed to a youth under him now who makes sketches and drawings and calculations for him, and carries out his instructions like an experienced draughtsman; and this youth is no exception to the boys from the Industrial School." Where the experiment of technical education has been properly tried in England we find the same good results. The Oldham School of Science and Art, established by the late Mr John Platt, M. P., and other employers, was one of the earliest of such institutions; and in reply to a question about its influence on the industries of the town, Mr Taylor, engineer, said: "Very beneficial, I think. In the case of pattern-makers, for instance, they understand their work better than they did previously. It has caused the men to be more intelligent workmen, and to understand better the instructions given them, and the object had in view in the work performed, and they understand the working better. Our foremen draughtsmen are now all taken from the institution. Before the institution existed we used to get Swiss and French and Germans principally. Now there is hardly a foreigner in the town." Another employer added: "I can confirm this statement. The working mechanics are much more intelligent. Now a man can be sent out to work, and can transmit his views to the firm in writing, give sketches, and reason about matters. Formerly the man would have had to return to the works and get personal instructions in all cases of difficulty. The suggestions they make to remedy defects are more practical than before. Every man may now be equal in intelligence to what the master was before the school was established." This is all very well, but the best test of the value attached to technical education is the sacrifices that employers make to promote it and workmen to take advantage of it. Now, there are several striking instances of manufacturers who undergo considerable sacrifices for the purpose of training men, even when they cannot be sure of keeping them when their education is completed. The large sums expended on the Oldham school by the local employers are a case in point. At Bochum, in Westphalia, a school has recently been formed for the education of foremen in ironworks, and it is supported entirely by the iron manufacturers, who contribute in the ratio of the number of men they employ. In the engineering works of Messrs Hartmann and Co., at Chemnitz, in Saxony, it has long been a condition of the firm that apprentices should attend the classes of the technical school. On two evenings a week they are allowed to leave the works early that they may attend the night school, "which," the Commissioners observe, "in the light of English customs is a great concession, and an illustration of the advantages expected by this firm from the theoretical training of these operatives." In England itself, however, we have the most conclusive case of the value attached to technical teaching in at any rate one trade. Messrs Mather and Platt, engineers, Manchester, have established and bear the whole expense of a technical school for their apprentices. "Mr Mather," says the report, "stated that there were sixty-eight scholars in the school, which is designed to provide science teaching for the apprentices employed in the works. No strangers are admitted for instruction. The drawings are of work actually in progress in the works. The teacher lectures upon them, and explains and makes calculations, and the boys the next day at the works see the very thing they have heard about here. The teachers are draughtsmen in the works." These cases illustrate the interest taken in technical education by some of the most successful manufacturers. The next question is, what interest are the working classes likely to take in the subject? As a general rule, it appears that where suitable instruction is given there is no lack of learners. Many of the best institutions are overcrowded to such a point that it becomes almost as great a privilege to get admission to them as to one of the great English public schools. Throughout the report I do not remember one case in which a school once started has had to be given up owing to the apathy of those for whose benefit it was intended. There can be no doubt that there must have been such cases, but their un importance is very noticeable. The schools that are mentioned as insufficiently attended are, as a rule, either unsuited for popular requirements or beaten by the competition of other schools; the latter being frequently the case in Germany, where each small State used to start its own school, till the supply of highly-qualified men outran the demand —*A* fact well worth our notice, because when technical education obtains a footing in New Zealand we may expect the same results from interprovincial rivalry. The readiness with which the working classes have availed themselves of the technical schools is the more remarkable when we consider that the bulk of the students are working men, studying the principles of their craft after working hours—and hours that in many cases are half as long again as those of our own people. The hours of work on the Continent are from eleven to twelve and a-half a-day; about seventy-two hours a-week is the rule, and this allows for closing a little earlier than usual on Saturdays and Mondays. In English factories the average time is nine and a-half hours a-day. If, in the face of these long hours, European workmen avail themselves of evening classes, it is plain that the New Zealand workman may do the same if he finds it to his advantage. That he is prepared to do so is shown by the number of apprentices who at present attend our local drawing classes, and who have in the past attended the classes instituted by the Caledonian Society.

## Grades of Technical Education.

The classifications of technical schools adopted in the report are so numerous as to become confusing, but for the purpose of comparing what has been done in Europe with what we might attempt in this Colony I will divide the subject into three grades:—(1) Such teaching as has been attempted in, or in connection with, primary schools. (2) Instruction calculated to fit youths for doing high-class work, or for filling the position of foreman. (3) Training such as is required by managers.

## Teaching Trades in National Schools.

So far but little has been done to teach trades to children in school, and it appears doubtful whether, as a general rule, there is any economy in doing so. Boys can generally be making themselves useful in their trade while they are learning to become skilled workers, and when this is the case it is sheer Waste to teach them trades in a school. The Commissioners, however, though they do not overlook this fact, are of opinion that some technical teaching may advantageously be given in connection with primary schools. One of their recommendations is—"That proficiency in the use of tools for working in wood and iron be paid for as a 'specific subject'; arrangements being made for the work being done as far as possible out of school hours. As to the experience on which this recommendation was founded, the following cases seem to afford the best illustration 1. The School of the Rue Tournefort, Paris.—"This school is the only primary school in France, so far as the Commissioners are aware, in which rudimentary trade teaching is combined with ordinary elementary instruction. From the ages of six to ten the children have three hourly lessons per week in manual work, Boys of ten and eleven are taught drawing, modelling, Carving joiner's work, and smith's and titter's work; whilst in their twelfth year of age the instruction is specialised, some taking' as their principal study modelling and caring, others joiner's work and cabinet working, others again forging and fitting; but all nave to devote a certain portion of time each week to the other subjects comprised in the complete course of manual work. The school hours are from eight in the morning to six at night, and in the highest class eighteen hour's per week arc given to manual work." It will be observed that the working hours are very long, but when it is considered how many hours are spent in that manual work, which is healthy exercise for school children, it will be obvious that there is not necessarily any over-pressure. 2. The Ambachts School, Rotterdam.—This school is of a more advanced type than that in the Rue Tournefort, Paris. It is rather technical than a primary school, but since it admits boys as young as twelve, and devotes more than half the day to book work, it may be considered in connection with elementary teaching. The course at this school lasts three years. The hours are from 8 a.m. to 7 p.m. in summer, and from 8 a.m. to 5:30 p.m in winter. The mornings arc spent in the class-rooms, and the afternoons in the workshops. As soon as the boys have learnt the use of the various tools they begin to make small articles which have a marketable value, and thus realise that they arc working with a view to the commercial results of their labor. It has been found by experience that his being engaged on a *bonâ fide* piece of workmanship serves as a powerful stimulus to the pupil. The school has shops for carpenters, blacksmiths, metal-workers, fitters, and turners, cabinetmakers, masons, and stone carvers. At the time of the Commissioners' visit the young carpenters were carrying out a large order for the desks of a primary school; while the metal-workers were making locks, hinges, shovels, hooks, smiths' tongs, and coal scuttles. Particular attention is paid to drawing, which is made thoroughly practical. The boys begin with copying rectilinear and curved figures and simple ornament from casts. In the architectural course, as soon as they have acquired sufficient skill, they draw details of construction, and make measured drawings from actual work. In the advanced class they learn mechanical projection and simple perspective us applied to architectural details and parts of houses. The start consists of twenty-one masters and assistants, and there are 280 boys, the school costing about L2,500 a-year. It has been found that the lads on leaving school are readily employed, and generally earn more than apprentices who have been trained in the usual way. 3. Handicraft work in Manchester Board Schools.—In their first report the Commissioners recommended that exercises in the use of tools should be introduced into primary schools; and this suggestion has been already taken up in two of the Manchester schools, and is likely to be taken up by others. The teaching so far only extends to woodwork, and the system is so experimental that it is not entered in the time-table. The workshops are furnished with joiners' benches of the French type, costing L1 2s each. Two boys work at a bench, and the cost of the set of tools for each boy is Ll 2s 5d. Each school is provided with one lathe, procured from La Villette, at Paris, at a cost of Lg. The instruction is given before and during the usual school hours, and each boy works for one and a-half hours a day. There twenty-four boys engaged in one school and eighteen in the other, and it is found that they are eager to attend. The work is superintended by the School Board carpenter, who receives wages of L2 2s a week, and devotes about half his time to the instruction. The Commissioners seem satisfied that a good beginning has been made in Manchester, and declare there can be no doubt of the advantages of such a training in manual work. Probably the boys are better taught than they would be as apprentces; but whether these advantages outweigh the disadvantages of limited apparatus, the want of economy and of incentives to self-reliance inseparable from school teaching, to say nothing of the extra expense to taxpayers, will seem doubtful to outside observers. Except in cases where artisans cannot or will not instruct apprentices in the elements of their trade, it seems superfluous to teach these elements in schools. The proper function of technical education is merely to teach those things which, while necessary to make a man a good and intelligent worker, cannot be acquired in the shop. There is, however, one branch of technical education which may be introduced into all schools, and it is the most universally valued of all—drawing. In every technical school it holds a most important place. The high-class workman in almost every trade requires some knowledge of it. If properly taught, it has a high value for general educational purposes—a value that certainly should not be overlooked in these days when the tendency is to make memory count for all intellect, and the habit of observation for nothing. Under these circumstances, it is not surprising that first among the Commissioners' recommendations we find: "That rudimentary drawing be incorporated with writing as a single elementary subject, and that instruction in elementary drawing be continued throughout the standard . . . that drawing from casts and models be required as part of the work, and that modelling be encouraged by grant." Before leaving this part of the subject, it may be remarked for the comfort of teachers groaning under the multitudinous requirements of the syllabus that the report suggests a reduction in the number of subjects, to make room for drawing.

## Instruction for Apprentices and Young Workmen.

Instruction of this class required lor young men who have some practical acquaintance with their trade is given either in technical schools fully equipped with workshop apparatus, or in night schools, which supplement the knowledge gained in the shop or mill by teaching the scientific or artistic principles on which the trade is based. Technical colleges, it need hardly be said, are very expensive, and seeing that their training cannot be so practical as that of the manufactory, while the student has to be supported by others instead of earning his living, it would appear that they are only suitable for those who expect to take positions in which scientific and artistic knowledge will be of chief importance. This, however, is not the whole of the truth. There are cases in which the manufactory does not supply the requisite practical knowledge, and this is proved by the fact that many apprentices' schools have been established, not by doctrinaires dispensing other people's money, but by practical manufactures at their own expense. A good instance of this is the Royal Trade School, Iserlohn. Iserlohn, in Westphalia, is the centre of an iron and coal district. The school, which has only been established four years, was started to supply the want felt by the manufacturers of better preparatory instruction for the lads who enter their works. The pupils go through a three years' course, and are trained as designers, modellers, wood-carvers, moulders, founders, turners, and pressers, chasers, engravers, gilders, and etchers. The instruction is partly theoretical and partly practical. The theoretical teaching includes drawing of all sorts, modelling in wax and clay, the elements of chemical and physical science, mathematics, German language, history of art metal work, and technology. The practical instruction includes lessons in the different departments of work which the pupil is likely to follow, each pupil being required to state on entry what particular trade he wishes to be trained for. The school is well fitted with workshops having the necessary appliances, including a six-horse power gas engine, hydraulic press, a planing machine, a shaping machine from Chemnitz, as well as elaborate lathes for wood-tuning and metal-turning, made in Vienna, England, Scotland, and America. No particulars are given as to what the school cost, or how many students it contains, but the annual expenses are stated to be L850. A school at Remscheid, we are informed, cost L10,000, and there were eighteen students in it at the time of visitation. As, however, it had only been open ten days, we may assume that its classes were not filled up: otherwise the production of artisans in that neighborhood will prove an expensive process. The Antwerp Industrial School, which accommodates 150 pupils, costs L900 per annum, and is shortly to have new and presumably expensive premises. In fact all through the report there is a constant reappearance of expensive premises either recently erected or shortly to be erected; the costliness of bricks and moi tar being however counterbalanced by the extreme cheapness of teaching power. On the whole, the system is very costly, and since in a great many cases it only teaches what might be learnt in the course of ordinary work, while it keeps boys from, as a rule, fourteen to seventeen as a burden to their parents—some, though not all, the schools charging fees averaging L4 or L5 a-year—it seems questionable whether it is worth what is paid for it. In fact, in many cases I think English manufacturers would say it was worth nothing at all. In particular cases, it is true, there can be no doubt of the value of technical schools; but some of the most striking instances are found in industries carried on on a small scale and in backward districts. For instance, one remote district is mentioned which depended upon the lace manufacture. The fashion in lace changed, but the poor people went on making their unsaleable lace until reduced to the direst poverty. A Government school of lace-making was then established, and in a short time the industry was again in a satisfactory condition. Another curious instance of what may be effected by the judicious establishment of such technical schools may be found in the case of the olive turning industry of Arco, in the Tyrol. It was discovered by Dr Exner, the Government inspector of woodwork schools, that the uncultured inhabitants of this place were actually using valuable olive wood for fuel. At his instance a school of woodwork was established, equipped with five lathes, and provided with an instructor, by whom the children were taught drawing and modelling as well as practical work. The result of the school was that two factories were erected, all the workmen in which had been trained in the school, and the place is now the seat of a small but flourishing trade.

## Technical Night Schools.

The system of instruction for young men most generally adopted, and from which most is to be expected, is that of the night school. The apprentice or artisan, under this system, depends on the workshop for practical experience, and comes to the school to learn the theory of his trade and to generally increase his intelligence and power of dealing with those new processes which will from time to time crop up. The first objection made to the system will probably be that it will put too much pressure on the student. As I have, however, already pointed out, this objection loses much of its weight when we consider the numbers of men working longer hours than ours who find themselves able to go through such a course. It is plain that even on men working long hours the school does not put injurious pressure, for nowhere in the report is such a thing hinted at; and we may be sure that, supposing the men were overworked, if they did not give in themselves, their employers would see that their energies were failing, and would discourage evening study. If, then. Continental and English workmen profit by these night-schools, we may be confident that our workmen will profit more by them; and if they afford the best technical teaching in Europe, there can be no doubt that they will be incomparably the best for New Zealand. Commencing our survey of such schools with them as they exist in France, the Commissioners remark: "The system of evening instruction is one of the most striking features of the present condition of educational effort in France. The walls of the public buildings of Paris, as well as those of every French town which the Commissioners visited, were largely placarded with the announcements of evening lectures and classes, both for men and women. The subjects of instruction are of the most varied character, including modern languages, social science, physical science, biology, mathematics, applied science, astronomy, etc." From the facts which follow it appears that lectures are, at least in Paris, much more common than classes. At the Conservatoire, Paris, one of the principal schools, the instruction is entirely confined to free popular lectures. At the time of the Commissioners' visit, M. de Luynes, the Professor of Technical Chemistry, was lecturing on glass manufacture, pottery, and dyeing. "In his lectures he made use, as much as possible, of practical illustrations. He ex- hibited the potters wheel at work, and had glass-blowers from various works to illustrate the mode of blowing glass; for the lectures in dyeing, several firms lent workmen to show the practical processes. In the previous year a course of lectures had been given on "Wine." Beginning with the growth of the grape, treating the diseases to which it is subject (a matter now naturally attracting much interest in France), the modes of combating the spread of phylloxera, the methods of winemaking, the chemistry of fermentation, the processes involved in the preparation of various kinds of wine, the modes of testing wine, and, in short, the whole of its chemical history." The audiences at these lectures were very large, and chiefly of the working classes. M. de Luynes informed the Commissioners that in his opinion "the value of these Conservatoire lectures was considerable *as interesting the masses of the people in scientific subjects*." M. De Luynes probably spoke no more than the truth; but "interesting" people is not exactly the same thing as educating them. Lectures, even when rendered attractive by explosions, blue lights, or the visible growth of glass bottles, are no substitute for work in the laboratory. The French system of evening teaching does not, however, stop short at lectures. There arc in Paris alone no less than 65 Workmen's Art Schools, attended by 3,334 students, of whom 2,488 take ornamental and 846 geometrical drawing. Modelling is taught in almost all the classes, and in five of them the pupils study drawing from the life, anatomy, and artistic composition. The schools arc open on weekday evenings from seven to nine, and on Sunday mornings from nine to twelve. It is to be noticed, however, that though the system was especially devised for the instruction of workmen, and though the classes are attended by "stonemasons, mechanics, joiners, smiths, watchmakers," and, in fact, by members of all the mechanical trades of Paris, yet the course of instruction is not practical, but purely artistic. All the teachers of drawing, even those engaged in the schools supported by special trades, agree that it is not advisable to give specialised art instruction. The report does not explain what reasons the teachers have for their views, and the impression left on the reader's mind is that these views are the result of some natural repugnance to teaching anything useful. The truth probably is that men cannot design, etc., till they know how to draw, and that they do not learn enough in these schools to fit them to apply their skill to practical work. One of the dangers in the way of technical teaching is sure to be that young men will expect to learn how to apply arts without learning the arts themselves. It is, indeed, not improbable that the Parisian teachers aim at teaching more than the pupils have time to learn, and sacrifice usefulness to an unattainable ideal. At any rate it is certain that in Belgium, wherein the main French examples are followed, it is found practicable in at least one school to set apart special divisions "for constructive drawing for trade purposes. Thus architects, builders, stonemasons, carpenters, joiners, etc., have special teaching suitable to their respective trades, and draw from examples likely to be of service to them in their everyday work." The most extensive system of science classes on the Continent is that of Lyons, conducted by a local Society formed in 1864. The classes were opened in that year with an attendance of 1,359 students; by 1881 there were 131 classes, and the number of students had risen to 7,640. The whole expense of educating this army of learners was only L3,075, or less than 10s each. How the work is done on such an outlay does not appear. The subjects taught are—Reading and writing, grammar, arithmetic ana elementary mechanics, applied mathematics, applied geometry, ornamental design, figure drawing, linear drawing, machine drawing, drawing applied to carpentry, industrial chemistry, elementary mechanics, general hysics, applied physics, economic Botany, theory of weaving, stone-cutting, book-keeping, commercial law, English, German, Italian, Spanish, history, and geography, hygiene, and gymnastics. The lectures take place from eight to ten in the evening on week days, and on Sunday mornings, and there are two or three lessons upon each subject per week. The winter session lasts from October to April. Each course consists of from fifty to seventy-five lessons, varying from one to two hours in length. If the students desire it, a certain number of these classes are continued during the summer. The Society prints each year a programme of the courses, giving a full analysis of the subjects taught, of which the following syllabus of the course of instruction on fuel and the steam engine may serve as an example:—Special properties of the different fuels—wood, charcoal, turf, lignite, coal, coke, anthracite coal; volume of air necessary for combustion, heat absorbed by smoke, construction of flues, furnaces of ordinary construction, smoke-consuming furnaces, gas furnaces, factory chimneys, production and properties of steam, comparison of the various forms of boilers, boiler trials, comparisons of arrangements for ensuring safety of 1 boilers, incrustation, expansion, testing boilers; theory of the steam engine; high-pressure and low-pressure condensing and non-condensing engines, calculations of the dimensions of an engine; theory of the parts of an engine, piston, cylinder, valves, etc.; different kinds of valves, experiments with brake and indicator; gas engines. We have now considered, so far as time allows, the practical points in the report bearing upon the technical teaching of schoolboys and of apprentices. Into the question of technical education of the highest class I do not propose to enter. I would only remark that we have at the University high-class instruction in physics, in chemistry, and in mining, and that we shall shortly have a class in applied mechanics.

## Technical Training in Dunedin.

Comparing the opportunities our lads have of learning trades thoroughly with those which are provided in the most advanced countries, we take first the primary schools. These schools do not attempt the teaching of handicrafts, but they are expected, or rather allowed, to teach the rudiments of drawing. Very little time, however, seems to be devoted to this subject; the work done is not inspected by any trained examiner, and the overcrowded state of the syllabus apparently prevents the possibility of amendment. But now that the Minister of Education has turned his attention to the subject, we may hope for a reform. In the way of providing technical instruction in evening classes for apprentices, the Caledonian Society has done excellent work, and we may be satisfied if some of its old classes can be revived. For the teaching of drawing we have an excellent school and a most energetic and highly-qualified teacher. But teaching outside the workshop is only subsidiary to the teaching the young workman receives inside it. The question is very serious: Are our young workmen taught their trades? In some instances I am afraid they are not. They serve their time, and learn next to nothing. Now a most serious responsibility rests upon managers and foremen in this matter. If they do not turn out thorough workmen they are injuring not only the lads themselves, but the whole community, the country is poor in proportion as its members are ignorant and clumsy. Therefore public opinion ought to be directed most strongly against any employer who fails in this part of his duty. I am persuaded, however, that the practices I have referred to are exceptions; the rule is that lads have a better chance of learning their trade in New Zealand than they have anywhere else. Our mills and workshops are so well found as to attract the admiration of strangers; they are mostly under the direction of the men whose energy originally founded them, their foremen have been most carefully selected, and the variety of work which they all undertake affords such varied experience that we may heartily endorse the exclamation of a Scotch manufacturer who visited one of our workshops; "My lads, you don't know what grand chances you have."

The lecturer was warmly applauded at the conclusion of his address.

Mr G. M. Thomson said that some seven or eight years ago he had, in accordance with a suggestion from Mr Hislop and Mr Fitzgerald, established a chemistry class in connection with the Caledonian Society's evening classes, and given a course of lectures to his pupils. There were over twenty attending the classes, and three prizes, which took the shape of free certificates to attend Professor Black's class at the University, were offered. One of the winners of these prizes subsequently became a mining engineer. He thought that technical education could not be taught in primary or secondary schools, on account of want of time and the neces- sary funds; but that such instruction could be imparted in connection with the Manufacturers' Association and Universities after pupils had left school. Different trades could scarcely be taught, but a great want in the shape of the proper teaching of drawing could be supplied. Much good could be done by grafting on to the Caledonian classes some for teaching elementary science, and he might state that he had drawn up a course of lectures which might be delivered at such a class this winter. The lectures would be illustrated by experiments, and the cost of the whole, including apparatus, would not exceed from L50 to L100.

Mr G. M. Barr considered that children should be trained to the use of tools from the earliest age, so that their muscles might get regular training. He thought that technical education would not be carried out in the State schools, but in night schools or similarly isolated institutions, which might be subsidised by the (Government.

Mr G. P. Farquhar said that years ago a tradesman was taught his trade thoroughly; but now machinery was so much in use that the workman was taught only one special branch of the machine work.

Professor Macgregor agreed that the great tendency in these times was to specialise all kinds of industry, and a workman was compelled to concentrate his attention on a very limited area. It became, then, a question how much there was that they could teach in common applicable to the varied arts, and he held that there was nothing in common except what they were taught by mathematics, chemistry, and the other general sciences—all the rest being practical manipulation in the workshop. The cry for technical education was simply a cry for an easier way of learning than their forefathers had, but there was really no easier way—though in this Colony they had some advantages. The University classes were held at night, in order to supply the demand for technical education; yet the people would not attend them, and the same thing prevailed to a great extent with the Caledonian classes. The Manufacturers' Association should seek means to supplement from the present condition of trade what used to be secured under the apprentice system, for the fact must be faced that the organisation of industry was becoming so complex that anyone who was not master of scientific principles would become simply a hewer of wood or drawer of water.

Mr Shacklock did not approve of young children being taught mechanical work, as it tended to deform their bodies or limbs—pattern-makers, for instance, if taught too young, became bent over and unable to straighten themselves. For his part he would prefer to see boys at football and other healthy exercises.

Mr W. S. Fitzgerald, as one who had taken some part in technical education, thought that if the schools carried out their functions and developed the mental powers of the pupils manufacturers would find them fully fitted to learn trades. He considered that if the Manufacturers' Association would combine with the Caledonian Society, and ask the Government to arrange for the supply of apparatus, they might make a fair start at imparting technical education. The Caledonian classes had not hitherto been supported as they deserved.

Mr MARK SINCLAIR thought that advantage would result from the establishment of means for imparting technical education, inasmuch as boys would then have an opportunity of judging the business most suited to their taste and ability. If some means were provided by which a boy could find out the natural bent of his mind he would be a far more successful man than those they so frequently saw idle about their streets. Drawing schools were very necessary, for his experience was that if a man could draw anything he could make it.

Mr FARQUHAR moved a vote of thanks to the lecturer, and expressed regret at the small attendance; still the address would at all events give rise to earnest discussion generally, and thereby do great good.

The vote was carried unanimously.

Professor Brown, in responding, said that he had previously communicated with the Caledonian Society, and fully expected that Mr Robin or some of its members would have been present. Unfortunately, that was not the case. Still, they had had a most valuable discussion during the evening, and he was glad that his efforts had met with that success.

decorative feature

# New Zealand Manufacturers' Association.

# Objects.

- Encouraging the development of the natural resources of New Zealand, and diffusing information thereon.
- Fostering New Zealand Manufactures, and developing Industries, so as to afford increased and steadier employment of labour.
- Obtaining the removal of revenue duties from raw material, and also from goods which cannot be profitably made in this Colony, and placing moderate duties upon all articles which can be so made, that are now admitted free.
- Discouraging the suicidal policy of purchasing out of the Colony, whether by Government or by Municipal or by other bodies, goods which can be advantageously produced in New Zealand.
- Keeping before Government the advantage of giving their work to Firms provided with suitable plant, instead of expending revenue in adding to the Government Workshops and machinery, thereby needlessly increasing the present heavy burdens of the taxpayers, and hindering the due development of trade, a course which tends to the continuance of the present commercial depression.

Front Cover

Seventh Annual Report of the Proceedings of the Industrial Association of Canterbury.

(Incorporated.)

*Founded to aid, foster, and encourage the Industries and Productions of New Zealand*.

Established August 12, 1879.

August, 1886.

Patron: His Excellency Sir W. F. Drummond Jervois, G.C.M.G., C.B., &c.

Presidents: MR. F. Jenkins.

Vice-Presidents: MR. T. Danks MR. G. T. Booth

Hon. Treasurer: MR. J. R. Glanville.

Commitee: MESSRS. L. ADAMS E. C. ASHBY E. H. BANKS A. W. BEAVEN L. BERGH R. C. BISHOP R. BUCHANAN T. CROMPTON H. CURLETT P. DUNCAN Messrs. E. Ford B. HALE A. G. HOWLAND F.JONES E. JONES H. B. KIRK H. B. LANE T. PAVITT J. L. SCOTT J. WALLER

Secretary: H. ANDREWS.

Christchurch Printed at the Office of the "Lytteltok Times" Company, Limited. 1886.

# Notabilia.

## GENERAL MEETINGS OF THE ASSOCIATION

Will be held *At the Rooms, 210, High Street, Christchurch,*

On the Following Dates:— at which members are earnestly requested to attend.

Members who may desire to offer suggestions or information for consideration at any of these meetings (or any Committee meetings), are invited to communicate with the Committee or the Secretary.

Committee meetings for the new year will be held fortnightly, on Wednesdays, at 7.30 p.m., dating from Wednesday the 1st September, 1886.

RULE XVI., VISITORS.—Any Member may introduce visitors to the Meetings of the Association, personally or by order signed by himself; and any visitor may take part in the proceedings, but shall not be allowed to vote.

RULE XVII., MEMBERS MAY READ PATERS.—Members shall have the privilege of reading before the Association papers containing statistics, observations, and essays on subjects within the scope of the Association.

Members or visitors are requested to record any suggestions that may be of interest to the Association, in a Book lying on the table for that purpose.

A Scrap Book is also provided for newspaper or other clippings, affording information respecting manufactures and productions, for record and reference.

Manufacturers are invited to send small exhibits of their industries suitable to the rooms for display, with any information respecting them which may be instructive or interesting.

The Booms are open on Saturday evenings, from 7 to 10 p.m., for the use of Members and visitors.

Subscriptions for the current year were due on the 12th August. Members will oblige by forwarding the same to the Secretary as early as possible.

# The following are some of the Reports and Papers in the Rooms:

New Zealand Gazette.

New Zealand Industrial Gazette.

New Zealand Parliamentary Debates.

Report of Surveys of New Zealand, with Maps.

Report of Colonial Industries' Commission, New Zealand.

Report of Goldfields of New Zealand.

Report on Mining Machinery in Victoria and New South Wales, with Plates.

Report of Mining, State of California.

Report on Control and Inspection of Mines, New Zealand.

Report of Commissioners appointed to enquire into the preparation of the Phormium Fibre or New Zealand Flax.

Report of Committee to Establish New Industries.

Report on East and West Coast and Nelson Railway, 1886, with Maps, by W. N. Blair, M.I., C.E.

Report of Railway Commissioners.

Report of New Zealand Timber, Bark and Secondary Forest Products, by T. Kirk, F.L.S.

Report on Native Forests and the State of the Timber Trade, by T.Kirk, F.L.S.

Papers respecting Sericulture in New Zealand.

Papers relative to the Interchange of Colonial Products and Manufactures between the Colonies of Australasia.

Papers on Manufacture of Portland Cement, by Mr, Geo. Gray, of Canterbury College.

The Defence of New Zealand, an Address by His Excellency Sir W. F. D. Jervois, G.C.M.G., C.B., &c., Illustrated with Charts and Plates.

An Address on the Industries of New Zealand, by W. N. Blair, M.I.,C.E.

Three Prize Essays on the Industries of Now Zealand, by R. Winter, W. B. Haselden, and G. B. Hart.

East and West Coast and Nelson Railway—the League's Pamphlet—in X volunto, with Map.

Mines Statement, by the Minister of Mines, Hon. W. J. N. Larnach, C.M.G.

Public Works Statement, by the Minister of Public Works, the Hon. E. Richardson, C.M.G.

A large number of Maps and Exhibits are now in the Booms ready for inspection.

The Daily Papers-" Illustrated London News "—" Graphic "—and other papers are laid on the table.

Tho "Engiuoor," "Scientific American," "Iron," and the "Builder" will shortly be added.

Donations of Reports, Addresses, and Papers, or any Literature which will tend to promote Colonial lndustries and the development of the natural reaourcea of New Zealand, are earnestly solicited.

1st september, 1886.

E. Jenkins, *President*.

# Industrial Association of Canterbury.

# Annual Report.

*(From the "Lyttelton Times" August* 31, 1886.)

# Annual Meeting.

Last evening the Industrial Association of Canterbury held their annual meeting at their rooms, 210, High street. About 40 members were present, and the chair was occupied by the President, Mr H. B. Kirk. A novel feature at the meeting were some floral decorations on the tables.

After the usual formalities incidental to opening the meeting.

The Chairman said that before the report of the last year's proceedings was read there were 31 new members to elect.

The gentlemen nominated were then duly elected members of the Association.

## Committee's Report.

The Secretary (Mr Andrews) read the seventh annual report of the Committee, as follows:—

*"Your Committee have great pleasure in submitting their report for the year ending August 12, 1886—Since the last annual meeting, your Committee have held twenty nine meetings, one only of which lapsed for want of a quorum, besides numerous meetings of sub-Committees appointed to consider various special subjects. By this you will perceive that your Committee have been constantly and earnestly engaged in carrying on the work of the Association. In addition to the above, six special general meetings have been held in our own rooms, all of which have been well attended. It is satisfactory to notice that the present Government is displaying a strong desire to advance local industries, by stipulating in their contracts that both the material used and the work done, shall, where practicable, be Colonial, and the Association may fairly point to this as the result of repeated representations made with a view to obtaining this end. Many other public bodies are also following in the steps of the Government in this respect. But it must not, therefore, be assumed that the work of the Association in this matter is finished, as it will be found very necessary in the future to carefully and jealously watch all specifications so that no impracticable conditions may be allowed to creep into them, to the detriment of our Colonial manufacturers. It is also very gratifying to feel that the public are awakening to the urgent necessity which exists for purchasing goods made or produced in the Colony. Although the depression which prevailed at the end of our last financial year is still unabated, your Committee are able to point to several new industries which have started in various parts of the Colony, such as nickel plating, galvanizing metals, cardboard box-making, and ink in the Canterbury district, cement in Auckland and Dunedin, and cocoa and chocolate manufactured from the imported beans also in Dunedin, to which may be added a new departure in the boot trade, which has been mainly brought about by the action of your Committee in obtaining the remission of duty on the raw material used in the manufacture. Your Committee greatly regret that while cement is being successfully made in Auckland and Dunedin, Canterbury should fall bo far behind in the matter, although the largest consumer of the article in New Zealand. Is it to be attributed to apathy and want of enter- prise amongst those who should take a prominent part in such an industry? It will be remembered the last annual report recommended that more suitable premises should be obtained, and your Committee feel assured members will agree that the present rooms are in all respects a great improvement, being large, light and centrally situated, while the rent is considerably less than previously paid; but the question of obtaining a permanent Industrial Hall has not been lost sight of. Several interviews with Ministers have taken place during the year, with a view of getting an amount placed on the Estimates for the purpose of purchasing a piece of land for the objects of the Association; while individual members of the House have also promised to assist in obtaining the same, With better accommodation, it was felt that local manufacturers should be invited to send samples of their various products for display in the rooms. This was done, and fairly*

*well responded to. It is, however, hoped that many more will avail themselves of this privilege, which, while it serves to make the rooms more attractive, also greatly benefits the manufacturers, by bringing their productions prominently before the public who visit the rooms, and who are, in many respects, totally ignorant of what is being done here. It is very much to be regretted that little or no good has resulted to this district from the steps taken last year to send a delegate to the South Sea Islands. In order to disseminate the valuable information thus obtained, the Association printed, with the last annual report, Mr T. Pavitt's interesting and exhaustive report of his visit to those Islands. These were widely distributed amongst manufacturers and the commercial community generally, but although there appeared a good opening for some of our super-abundant stocks, with the prospects of remunerative prices, no advantage was taken of it, until at last the owners of the Janet Nicoll discontinued to run the steamer to the South Island for want of sufficient inducement in the way of freight. Your Committee deeply deplore the apathy and want of enterprise shown by this part of the Colony, as it is well known that a large and moat profitable business is now being done by the North Island, a great deal of which could equally well have been done from here; besides the large amount spent in obtaining the information has literally been thrown away. Tour Committee having been requested to open the rooms for the convenience of members and their friends on Saturday evenings from 7 to 10 p.m., decided to make the experiment. The attendance has hardly been as large as could be desired, but it is hoped, as it becomes more generally known, a large number will avail themselves of the opportunity of making use of the various reports and other literature. During the year the Wellington Industrial Exhibition has been held, and was visited by the President (Mr H. B. Kirk), one of the Vice-Presidents (Mr P. Jenkins), an ex-President (Mr J. L. Scott), and a member of the Committee (Mr B. Buchanan), who represented the Association; this was the first of a series intended to be held in the principal centres of population throughout the Colony with a view to showing what progress is being made in our manufactures and productions. Our Canterbury exhibitors were fairly successful, carrying off 32 silver and 12 bronze medals and 85 certificates of merit. These were presented to the successful exhibitors, at the request of the General Government, by the President of the Association at a special general meeting called for that purpose on June 16. In connection with the Wellington Exhibition, the Government offered three prizes for the three best essays on the 'Industrial resources of New Zealand, and the best means of fostering their development.' One of these was won by a member of this Association, Mr G. K. Hart, and was presented to him by the President at a special general meeting of members called for that purpose. Your Committee think that it is a matter for congratulation that a work which has always had our warmest sympathies, best assistance, and hearty co-operation, is now in a fair way of being carried to a successful issue—the East and West Coast Railway. This has always been looked upon by us as of paramount importance in its bearing on the future welfare of our local industries; it will develop our mineral resources, enable us to utilise our valuable timber forests, and open up a market for our surplus produce, which will be required to feed the thousands who will in all probability be shortly added to those employed in the mining districts of the West Coast. But while recognising the advantages of the East and West Coast Railway, your Committee have not lost sight of the fact that we have nearer home a district teeming with wealth. Their attention has repeatedly been drawn to the country between Whitecliffs and the Acheron river, and so satisfied are they that minerals in abundance, such as manganese, copper, ironstone, &c., &c., as well as anthracite coal of the very best quality, exist there, that they have asked the Government to place a sum of £10,000 on the Estimates to open up this district. There is also a large tract of agricultural land, unsurpassed in Canterbury, only requiring a moderate outlay to connect it with the present line of railway. As the financial year drew to a close, your Committee decided to make a determined effort to pay off the liabilities of the Association, and, if possible, give up their stewardship with a balance in hand. With this view it was resolved to hold an Industrial Arts Conversazione in the Tuam Street Hall, to consist of arts, science, music, local manufactures and industrial appliances in operation. So far as the conversazione is concerned, it may be considered as an unqualified success. The exhibits of local manufactures were deserving of the highest praise, and the general opinion of the public was not only unanimous approval, but extreme surprise at the excellence to which our manufactures had attained. The musical part of the entertainment also gave unbounded satisfaction. But your Committee are sorry to have to report that the financial success has not been so great as could have been desired. This did not arise from any want of interest by the public, but from the very unfavourable weather experienced, only two days out of the eight, during which the conversazione was kept open, being fine. It is greatly to be desired that the incoming Committee will, during their term of office, continue these gatherings, and that henceforth we may look upon them as part of each year's work. By this means greater interest will be taken in the Association, the objects for which it was formed will be better carried out, and the public will be able to Bee what progress is being made from year to year in our local industries. As a further proof of the sympathy of the public with the objects for which this Association was founded, a very large number of new members were enrolled during the conversazione. During the past year eighty-one new members have been elected, from which it will be seen that the general public are beginning to take more interest in our industries, and that the work of the Association is* *beginning to be properly appreciated. Appended is the annual balance-sheet, duly audited.*

*"H. B. KIRK,*
*President."*

*"August 18, 1886.*

The balance-sheet showed that the receipts for the year amounted to £160 0s 3d, expenditure £159 10s 2d, leaving a credit balance of 10s 1d. The outstanding liabilities were £16 3s 3d, leaving a deficiency of £15 13s 2d, but against this might be set the furniture, outstanding subscriptions, &c.

The Chairman, in moving the adoption of the report and balance-sheet, thanked his coworkers on the Committee for their kindness, sympathy and help during his term of office, and specially mentioned the valuable assistance he had received from the vice-President, Mr F. Jenkins. He also thanked the Secretary for the able manner in which be had carried out his duties; He recommended the incoming Officers and the Association to strive to obtain from Government the grant of a site on which to erect an Industrial Hall in Christshurch, where there could be a standing exhibition of the result of the industries of the Colony, a suitable hall for meetings, &c. He referred to the conversazione recently closed. The financial results he considered good, considering the extremely bad weather in which it was held. They would be pleased to learn that £63 had been netted, and the Association's deficit reduced to about £16. This small amount would soon disappear if members would pay up their subscriptions. The present was the first time the Association had held their annual meeting in their own rooms, and he was sure they all appreciated being surrounded by an exhibition of Colonial manufactures and products. One of the last things the Association had done was to send half a ton of New Zealand flax (green) to be experimented on by some Indian process at the request of Mr W. H. Packer. The sample should, if all goes well, reach London in time to enable Mr Packer to see the trial and bring back the result on his return to Christehurch. He strongly recommended every Colonist to use nothing but articles manufactured and produced here. By so doing they would help to maintain industries at which their children, as they grew up, would find employment. Indeed, an influx of population would be required to do the work, and the farmers would have an increased market for their produce. Colonists should do all in their power to foster and encourage local industries. He concluded his remarks by moving the adoption of the report.

Mr A. G. Howland seconded the motion. He hoped they would be able to obtain a grant towards the erection of an Industrial Hall. It was no more than right that they should have such a grant, not only for Christehurch, but for other towns of the Colony. He considered the report was a very good one, and had pleasure in seconding its adoption.

Mr J. Izett reviewed and criticised the report. He considered it matter for regret that though many new industries had been started in the Colony, none of these had been in Christehurch. He thought the Association should endeavour to foster specially the development of those minerals—iron, manganese, &c.,—which were said to be teeming in the district, so as to avoid the necessity for importation. He did not think the Committee had followed up the South Sea Island matter as they should have done. A meeting of merchants should have been called to give practical effect to Mr Pavitt's recommendations. He noticed that no mention was made of the action the Committee had taken with regard to Messrs Scott Bros. contract and the rejected material. Ble thought the Committee had acted precipitately in this matter. He questioned whether the Committee had done all they could do to secure a full and comprehensive selection of Canterbury exhibits at the Indian and Colonial Exhibition.

Mr T. Danks said Mr Izett had overlooked the manufacture of locomotives as a new industry. He did not think that we could yet start the manufacture of iron, but he thought much progress might be made in the way of galvanising iron, and improving crude imported metals generally. The Association had not the funds, though they had the will, to assist industries as some Associations did elsewhere, by sending trial shipments to new markets. In future years this might be done. Regarding the South Seas, he was assured that all the bacon required in Fiji was exported from Canterbury. This instance showed that the endeavour to extend trade in that direction had not been fruitless.

Mr C. M. Gray considered that the annual report should show the progress of existing industries, such as the woollen manufactures, the coal trade, ironfounding, &c. He believed that the Committee had worked hard, and done more than appeared on the surface, though the report appeared rather bare.

The motion for the adoption of the report was then put and carried.

## Election of Officers.

The Chairman said that Mr Frederick Jenkins was the only member nominated for the office of President, and he therefore declared him duty elected. (Applause.)

Mr Jenkins returned thanks for the honour done him, and promised to do his utmost for the Association's welfare.

Messrs T. Danks and G. T. Booth were declared duly elected vice-Presidents, and Mr J. E. Gianville, Hon. Treasurer, they being the only members nominated for the respective offices.

Messrs H. R. Webb and W. E. Mitchell were re-elected Auditors, and a vote of thanks accorded them for their past services.

The following were elected members of the Committee for the ensuing year:—Messrs H. B. Kirk, E. H. Banks, A. G. Howland, J. Waller, J. L. Scott, B. Hale, R. Buchanan, T. Pavitt, F. Jones, A. W. Beaven, H. Curlett, E. Ford, E. C. Aahby, P. Duncan, Luke Adams, E. Jones, H. B. Lane, T. Crompton, L. Bergh, and E. C. Bishop.

Mr T. S. Weston moved—"That the *Lyttelton Times* report of the recent conversazione be published, with the account of the proceedings of this meeting, and the Association's rules." He considered it was a disgrace to the merchants of the city that they did not take a more active part in the Association's work. He saw always the same faces of those who had borne the burden and heat of the day for years past. It would increase the value of the pamphlet if some statistics of the progress of manufactures, &c., as suggested by Mr Gray, were added.

Mr F. Jones, in seconding the motion, referred to Mr Izett's remarks, and said one thing had been done towards opening the mineral fields of the Waireka Valley through the efforts of the Association. He referred to the bridge erected by Government over the Selwyn. It was intended by some of the Committee to organise an expedition to that district shortly, and again bring the matter of opening up the valley before Government. He felt pretty sauguine that as the necessary works would cost comparatively little, Government would undertake the work. He was sorry to say that our exhibits at the Colonial and Indian Exhibition were not nearly so large as they should have been.

Mr E. Ford referred to the fact that valuable manganese existed in the Malvern hills.

Mr A. G. Rowland, as a Committeeman, took blame to himself for not working harder to secure a better representation of Canterbury at the Exhibition.

Mr J. L. Scott thought that the manufacturers, and not the Committee, were most to blame for not making a display at the Indian and Colonial Exhibition. He endorsed Mr Danks' remarks with reference to the manufacture of iron. It was preposterous to suppose that the smelting of iron oreB could take place in the Colony for some years to come. The fuel required would cost more than the cost of the imported iron. The coal fields would require to be very much more developed than at present before iron Bmelting could be attempted.

On the motion of Mr Howland, seconded by Mr T. Pavitt, a hearty vote of thanks was accorded to the retiring President, Mr H. B. Kirk.

Mr Kirk acknowledged the compliment.

A vote of thanks was passed to Mr H. B. Kirk, Mr F. Jenkins. Mr T. Pavitt, Mr E. H. Banks, Mr J. Waller, Mr D. Bell-house, and others, for their services in promoting the Industrial Arts Conversazione; also to the Committee and retiring officers of the Association.

This was all the business.

A motion of Mr F. Jones, referring to the preserved meat industry, and another by Mr Danks, thanking the Board of Governors of Canterbury College for providing lectures on technical education, were referred to the new Committee, owing to the late hour at which the meeting adjourned.

# Industrial Association of Canterbury.

Receipts and Disbursements for Year ending August 12th, 1886. RECEIPTS. 0 s. il. e p. To Balance, August, 1885 ... ... ... 10 o 3 Subscription ... .. ... tilt U ti Loss Coiwnizsion Collecting ... ... 3 12 9 ------------83 7 9 Salo Ono Copy Blair's Addross ... ... 0 1 i, Ciwh for UbonrKuoin (Sundry Meetings) .. 6 0 0 u Ditto do. (H. Aurircws, Secretary) 15 0 0 ------------S3 0 0 i, Cash from Conversazione Committee ... 01 0 3 ——? filiO 0 3 IHSBUBSEMENTS. e 8. d. £ e. d. By lient for Year 1881-5......... 2113 4, Ditto do. 1885-G ... ... ... 37 1U 0 -----------69 3 4 lato Secretary (W. Jameson), on account 1884-5 ... ... ... ... 8 0 0 Secretary (II. Andrews), on account 1885-0 25 10 0 -----------33 10 0 Printing and Advertising, 1884-5—Times, UU AUa. 8d.; Press, M 5s. Id. ... 13 1 9 Printing and Advertiame, 1885-6—Times, £5 lus 4il.; Press, £h 178. lid. .. 10 8 3 li Printing Sixth Annual Report ... ... 5 10 0 29 0 0 Less Cash from Mr. E. H. Banks, South Sea lalanu Fund .?? ... ... 3 0 ------------25 17 0 Expanses Moving and Kitting-ui> New Room 18 15 3 II. Fisher ami Son, Mounting Maps ... 15 12 U f Hire of Chairs tor 3 General Meetings ... 3 15 6 Stationery, ail 8. lid.; two-third coat oF Cyclostyle, ij2 ... ... ... 3 8 11 n Gaa ... ... ... ... ... 3 14 0 lf Postage ... ... ... ... 18 4 Sundries ... ... ... ... 3 15 10 -----------40 19 10 pi Balance ... ... ... ... 0 10 1 gig) 0 3 JOHN WALLttK, lion. Thkasubsb. N.B.—There in a eoutsitloi'nlilr Aiwet consist hitf of Furniture, Filling, find Outstanding Suhsorijitiona, wlrioh 1 consider it bent not to ho valued in the yeurlr HiiIbhoo Shvift.—J.W. Audited and found correct. Vouchors coniparod with coah book utid all receipts examined. W.B. MITCHELL, additom. 30th Aujpiat, 1880. £ . WlSUU, J auito.

# Industrial Arts Conbersazione.

*(From the "Lyitelton Times," August 6th,* 1886.)

A Conversazione was held at the Tuam Street Hall, on the 5th, 6th, 7th, 9th, 11th, 12th, 13th, and 14th of August, 1886, in aid of the Funds of the Industrial Association of Canterbury, established 1879. (Founded to Foster and Encourage the Industries and Productions of New Zealand.) Music, Science, Art, Exhibits of Local Manufactures, and Industrial Appliances in operation.

THE TUAM street Hall last night was crowded, and no doubt will be again crowded to-night and to-morrow, with visitors to the Industrial Arts Conversazione, organised for the purpose of raising funds for the Industrial Association. The number and excellence of the collection brought together provoked general admiration, and the tasteful arrangement of the hall and stage greatly enhanced the general effects. All concerned may be congrattilated upon the success which has crowned their efforts. A detachment from the City Guards had been told off to do honour to the occasion, and their bright uniforms in no small degree added to the *coup* [unclear: dievl]. Shortly after half-past 7, Mr. H. B. Kirk, the President of the Association, appeared on the stage with his Worship the Mayor, and was received with applause. Mr. Kirk then spoke to the following effect: In asking the people to come to the conversazione, the Committee had thought it desirable that he should say a few words, which ho would make as brief as possible, to explain the history and work of the Industrial Association. First of all, a few gentlemen had banded themselves together in the year 1879 to consider some plan by which the industries of the community could be increased, so as thereby to create more employment for the people. The result of their deliberations had been the formation, on August 12, 1879, of the Industrial Association, the object of which was to foster and encourage the industries and productions of the country in every legitimate manner. The first President had been Mr. Robert Allan, under whose management the Association had done a fair amount of good work. From that time to this the Association had been working Bteadily in the endeavour to get the Government and public bodies to have all their work done in the Colony. The Association had worked so successfully that the present Government were having made, over and above the locomotives, £100,000 worth of articles, for which previous Governments had been in the habit of sending out of the Colony. This, of course, had created a large amount of work, and, therefore, the Association felt justly gratified that their work had not been in vain. But the grand object of the Association was to educate the people of the Colony to consume nothing but what was made or produced in the Colony. (Applause.) As soon as the people could be got to depend upon nobody but themselves, they would then, and then only, become a prosperous Colony. The Committee of the Association thought that such exhibitions as the present were lessons whereby they could teach the people what the object was they had in view. The exhibition showed what wort was being done, and showed some industries actually in operation. This last was a great inducement to people to use what they saw actually made. Before concluding he would say that the Committee wished him to convey their thanks to the ladies and gentlemen who had so generously come forward to their assistance. With these few words, he had very much pleasure, on behalf of the Association, in asking his Worship the Mayor to declare the conversazione open. (Applause.)

His Worship the Mayor was sure all present would believe him when he told them that it afforded him the very greatest possible pleasure to comply with the President's request. It gave him the greatest pleasure, because what he saw before him was a very remarkable instance of what could be done in a young country. Not that ho thought it as remarkable as it ought to be. It was remarkable, notwithstanding, if considered under all aspects. That the Province had not made greater progress was due to causes easily explainable. That it had made vast progress was self-evident. A number of the ladies and gentlemen present could call to mind the struggles of what were termed local industries, and what had been tor some distance back their chequered career. The reasons for that had been, on the one hand, the very prosperity of the place. From its first history the community had not been called upon to be as self-reliant as it might have been. Here, in the early days, riches had been inherent, so to speak, in the place, and could be gained almost without effort. The land revenue had taught the people to feel rich without any effort, and all were prepared to send their wealth away to buy what they required. The people, however, had now come to a period of stern necessity, when it was the duly, and should be the privilege, of every citizen, to put his shoulder to the wheel to obtain wealth to he produced by himself. He thought he could congratulate the community on having come to the dawn of a better doy. The position their exhibits had taken in London was an augury of future prosperity, provided they did their utmost to deserve it. He agreed with the President that it was the duty of every citizen to use everything that could be produced in the Colony, eveu if called upon to give a little more for it, for it was a most foolish policy to send out of the

Colony for what could be produced here, and so to rob our children of the wealth that was ours by right. He was quite satisfied that those present had not come there to hear a speech from him. He could say much more on the subject if his feelings were the gauge of the length of his speech, but the inspection of the vast array of specimens of local industry would better occupy their time. Those specimens reflected the highest credit upon some of the producers, who had spent almost their last shilling in producing them. He had now very great pleasure in declaring the conversazione opened, and in wishing it the utmost possible success in every sense of the word.

During the evening an attractive programme o£ music, &c., was given. The Garrison Band contributed a number of well executed instrumental selections; the Misses Wood played nicely some pianoforte pieces; Miss Button and Messrs. Meares, Reid, M. E. and A. W. Woodward, sang some popular songs, many of which were encored; Messrs. Ingleson, Scott, and T. Williams gave humorous, and Mr. Davidson declamatory, recitations, which were loudly applauded.

## The Exhibits.

Never, perhaps, has so large and varied a collection of "specimens" been got together in so short a time as that occupied by the Committee of the Industrial Association in getting up the conversazione opened with so much *éclat* last night. Never, either, has such a heterogeneous mass of material been arranged with better effect For this the credit is due to Mr. F. Jenkins, the energetic *"major domo"* as he was jocularly styled by certain of his fellow-Committeemen. The appearance of the interior of the hall is certainly effective. The exhibits are disposed upon large tables, so placed as to leave a wide central promenade and two narrower passages, or aisles. The tables, covered with white cloth, relieved by a broad band of scarlet around the top, are well calculated to show to the best advantage the articles displayed upon them, and the manner in which the articles in question have been grouped enhances the general effect. The eye of the visitor, however, will, on his entering the hall, be almost surely first attracted to

## The Stage,

Brilliant with many colonred lights, it scarcely needs the illuminated device "Gas Company," which appears above the proscenium, to tell him to whom this display is due. The proscenium is surrounded with gas huniers of divers sorts, many of thorn fitted with globes of coloured glass, and all ablaze with light. On the stage a fountain, erected by Mr. J. Fleck, and surrounded by ferns, throws a jet which reflects the brilliant rays of the limelight placed above. The scenery belonging to the hall has been skilfully used to complete a very effective picture.

## The Exhibits.

The visitor, however, who takes, as all visitors to the conversazione should, a lively and intelligent interest in local industries, will on entering the room at once turn to the right, and begin a systematic examination of the specimens thereof, shown for his edification and instruction. Here it may be remarked that last night the knowledge he would have gained would not in all respects have been complete, inasmuch at one or two exhibitors had omited to attach their names to their exhibits. However, the first thing to attract our visitor's attention is a case of hand-sewn boots, neat and well finished, and shown by Messrs. R. Nieholls and Co. Adjoining are specimens of an industry of quite another kind, the strong, well-made galvanised iron watering pots, and other articles from the works of Mr. T. Crompton. The *Lyttclton Timen* Company's "model" printing press, in charge of a smart and smiling "devil," will furnish him with a leaflet which, in prose and verse, advertises the conversazione, and extols industry. Mr. Luke Adams' potter's wheel, type of one of the most ancient of all industries, fitly heads a long array of "clay goods," ranging from firebricks and drain-pipes to vases of classical form, made of white terra cotia. Messrs. Fard and Ogdon, L. Adams, and the New Zealand Brick and Tile Company are the exhibitors.

## Copper and Brass.

Cheek by jowl with the exhibits of the "men of clay" is an imposing display of copper articles, dominated by an enormous boiler, sent by Messrs Mercer and Duekmanton, who have every reason to be proud of their handiwork. The brass-work of Messrs. J. and T. Danks, whose exhibit conies next in order, is too well-known and appreciated to need more than a word of advice to all visitors not to miss inspecting it. Messrs. Scott Bros., on the samo table, show a set of brass fittings for one of the locomotives they are at present building for the Government. Some of the articles are in the rough, others completed and polished. The style and finish of tho latter are beyond all praise. On the watt behind the table the firm have hung drawings of some of the machinery turned out of their works. The processes of electro-plating in nickle and copper are illustrated practically by one of their employees, with the aid of a couple of Bunsen cells and the necessary baths.

## Native Woods and Native Arts.

A representative of an entirely different, but not less important industry, is Mr. H. Atkinson, who, alongside Messrs. Scott Bros.' exhibit, shows a chest of drawers, an inlaid table, and other articles of furniture made of native wood. His exhibit is interesting as illustrating not only the skill of our cabinet-makers, but the beauty of the materials Nature has placed at their disposal in these islands.

At the upper end of the hall, and on either side of the stage, are a number of gas cooking stoves, shown by the Christchureh Gas Company. In front of the stage is what may be termed a small flue arts gallery, oil paintings, and albums of fine engravings, being disposed around the group of marble statuary recently imported from Italy by the Mutual Life Association of Australasia. In curious contrast with this group are the fantastic griffins destined to adorn the front of the new municipal buildings. The exhibitor of the pictures, it may be noted, is Mr. T. R. Attwood.

If our visitor, somewhat fatigued by his studious examination of the many objects of interest above enumerated, is inclined for refreshment, let him turn to the table placed in convenient proximity to the gas stoves, where he will be served with a dainty little cup of Hudson and Go's cocoa, the product of one of the newest local industries of Dunedin.

Passing down the western aisle towards the entrance, a case of photographs, taken by Messrs. Standish and Prcece, should detain the visitor a few moments. They are worth inspection as creditable specimens of local work. Of greater interest are the capitally executed maps, published by the Government, showing the population and physical character of the country affected by the West Coast and Nelson Railway. Messrs. Gamble and Co. occupy the adjoining space with a large and excellent collection of photographs, plain and coloured, among them a set illustrative of dignity and wisdom, as exemplified in the countenances of the City Fathers of Christ-church.

## English and Local Industries.

The adjoining exhibit, though not one of local production, is, nevertheless, of interest. It consists of samples of spring hinges for swing doors, and of contrivances for opening and closing fanlights, made by Mr. R. Adams, of London. A thorough-going believer in local industries is Mr. W. H. Price, of Sydenham, whose exhibit is the next to claim attention. He shows costings of brass and German silver—bells and medallions, as sharp in their lines and edges as could be desired. One of his small and convenient hand fire-engines is also on view. The exhibit of the Globe Ink Company represents an industry well worthy the support of the public, especially of the members of the "Association for the Encouragement and Fostering of Local Industries," whose record, it is to be presumed, will never henceforth be written in imported ink.

## Sauces and Provisions.

The tomato sauce made at Winchester by Mr. J. A. Young must not be overlooked, and Mr. Knowsley, of "Pain Destroyer" fame, has taken care that his productions should not be overlooked either, if a goodly-sized pile of bottles of that specific can prevent it. Mr. Munnings' jams have won tor themselves a good name, and a passing look at his effectively arranged pile of jars and bottles is, therefore, all that is necessary. We are now at the western side of the central promenade, and the first object to attract one's attention on proceeding along the table on our right hand is the fine dispaly of pickles, sauces, and preserved fruits from the factory of Messrs. Dallas and Co. (late the Maclean Fickle Company). Like many other exhibits, they are too well known to need commendation. A neat little case on the same table should be irresistibly attractive to the juvenile visitors, for it contains specimens of Mr. D. H. Christie's lollies, well-made and wholesome-looking. An even smaller case, adjoining, is filled with biscuits from the factory of Messrs. Anlsebrook Brothers, of Sydenham. Of their quality, as of that of the lollies, the visitor can only judge by look, unless, indeed, he chooses to encourage local industry by extending his patronage to the manufacturera. A sheaf of corn on this table is part of Mr. E. H. Banks' instructive exhibit which comprises, in addition samples of pearl barley, peas, and linseed, very nicely prepared.

## Models.

In a neat little show-case adjoining, the *Press* Company have a number of specimens of fancy printing.

Decidedly worth inspection is the beautifully-finished model elevator shown by Messrs. Andrews and Beaven, and as much may be said of the models of Morten's block, the Cathedral, and other well-known edifices, sent by Mr. G. Peterson.

## Nails and Nailrod.

The few leaves and roughly-prepared cakes of tobacco shown by Messrs. W. Pleasance and J. Tinker may, let us hope, be the first fruits of a local industry destined to become of vast importance in the future. Every patriotic New Zea lander, with a true love for his country and his pipe, will re-echo the hope. From "nailrod" to nails the transition is more violent than would—to those uninitiated in the language of smokers—appear; yet close to the tobacco is placed a neat little trophy of the "cup-headed roofing nails," made by Mr. W. Stokes. These, intended for fastening corrugated iron, arc ingeniously contrived to prevent rain-water from entering the holes made in the metal by driving them in.

## A Very Interesting Exhibit.

A considerable portion of the space on this table is occupied by the very interesting collection sent by Mr. C. Mardon. One of the most Noteworthy features is a ease of autographs, including those of Miss Florence Nightingale, Mr. Goschen, and the "Grand Old Man "himself. Well worth careful examination is a case of specimens of turned work in Native woods, from the lathe of Mr. II. Mardon, whose skill, judging from the delicacy and finish of his work, must be of no mean order. Those who have given attention to the development of trade with the Pacific Islands, will look with interest on the models of the hulls of the vessels employed in the Mediterranean trade by the London firm of Barter and *Co.* These vessels, swift schooners, are said to have an average speed of 200 niles a day, and Mr. Partridge, who exhibits the models, pertinently enquires, m the attached descriptive ticket, whether they would not be suitable for the South Sea Island trade. Close to the models are a couple of excellent water-colour drawings *by* Miss Budden, and a specimen of flower-painting by Miss Partridge.

## Extra Attractions.

Under this head may be included the four rooms on the upper floor of the hall. One of these, the door of which is ticketed "Single Bliss Apartment," is supposed to be a true representation of a "bachelor's hall." "Whether it is bo or not visitors can judge for themselves. The adjoining room—which is not ticketed—is splendidly furnished as a bod-chamber, with double bedstead, chest of drawers, table, and other appointments of the best that Mr. A. J. White's establishment can supply. This, we suppose, is emblematic of married bliss. The third room is devoted to science, as exemplified by the Hebden telephone—in communication with the hall below—and microscopes and collections of minerals exhibited by Messrs. J. B. Stansell, E. Ford and M'Connell Bros. A fourth apartment is utilised as a refreshment room, whore tea, sandwiches, and other light refection may be obtained by visitors, for a consideration, and where the Committee entertain those Ladies and gentlemen who have generously given their assistance to curry out the musical programme.

## *August 7th*.

The conversazione in aid of the funds of the Industrial Association affords a striking exemplification of the trurth of the adage, "nothing succeeds like success." It began well—the opening night was a success. Its continuance last night was a greater success. The attendance on Thursday evening was estimated at from 800 to 900; lust night it was probably twice as many. The Tuam street Hall is a spacious building; by the excellent arrangement of the exhibits, as much space as possible has been left for the accommodation of promenaders; yet, with a central passage 18ft in width, and aisles of 10ft, the floor of the hall was, at one time, inconveniently crowded. Later in the evening the visitors bethought themselves of the gallery, which was speedily filled, thus relieving, in some degree, the crowded floor. The latter, however, was the very reverse of deserted, and around the machinery (in motion) and other objects of special interest, the throng was so dense, that to pass those particular spots was a matter of impossibility. The attractions of the gathering, great as they were on the opening night, were yesterday evening enhanced by the addition of several fresh exhibits, and by the enterprise of the Gas Company, one of whose cooking stoves, under the direction of a charming cook, was utilised in preparing viands of various kinds, which were distributed among those visitors who were fortunate enough to be near the apparatus. The programme submitted for the entertainment of the visitors last night was an excellent one, and comprised songs, instrumental selections, and recitations, by Misses Danks, Brown, Jones, Wood, Messrs. Maitland Gard'ner, Meares, Herman, Ingleson, T. Williams, and Davidson, and selections by Mr.

Corrick's string band and the Stanmore brass band. Mr. R. T. Searell acted as conductor. The various items were rendered in a style that deserved and obtained hearty applause.

# The Exhibits.

As the exhibits have been arranged solely with an eye to effect, and not with any idea of classification, objects of the most diverse kind are to be found on the same tables, or in the same corner of the room. Hence it is that Messrs. Ballantyne and Co.'s display of ladies' ulsters is side by side with the Hebden telephone, and the case of silversmith's work shown by Messrs. B. Petersen and Co. This case is decidedly one of the features of the exhibition, the articles within it being made of New Zealand silver, artistic in design, and of admirable workmanship. Some exceedingly creditable specimens of flower-painting by Misses Banks and Budden are placed next to the every complete and interesting exhibit of oculists' materials and appliances shown by Mr. T. R. Procter. Mr. Gager's case of chest expanders is worth more than a passing look, and the visitor will doubtless linger for a considerable time over the fine collection of drawings sent by Mr. J. F. M'Cardell. Messrs. John Anderson and Sons display a number of photographs of the huge steam cranes and boilers made at the Canterbury Foundry, together with drawings of other machinery turned out from the same establishment. Of special interest to the antiquarian should be the collection of *facsimiles* of famous documents, among them Magua Charta, and the warrants to execute Mary Queen of Scots and her luckless grandson, Charles I. The next case adjoining these papers is exhibited by Mr. N. Wolfe, and contains an interesting collection of engravers' appliances and workmanship. Visitors of a mechanical turn will find much to interest them in the set of standard drawings of locomotives, prepared by the Government for the guidance of the contractors for the construction of the engines, and other drawings and models exhibited by Mr. D. Blair of the School of Art.

# Leather and Wood.

Close to these Mr. Earnshaw shows a well made side-saddle and gentleman's saddle, the former of colonial pigskin. The well-finished harness hanging up alongside was made in the workshop of Mr. W. H. Hosking, mainly by apprentices born and trained in the Colony, and is, therefore, a true local production. On the other side of the passage-way, and near the main entrance, are some admirably constructed wheels, in various stages of manufacture, from the carriage factories of Mr. A. Q. Howland and Messrs. Curlett and Freeman. Perhaps of moro interest to the numerous class known as "wheelmen" will be the strong and well-Onished bicycle, made by Mr. R. Kent, who may be congratulated on his plucky efforts to establish what may be considered a new industry among us.

# Ingenious Mechanism.

As an example of ingenious, yet simple and effective, mechanism, the little machine exhibited by the *Lyttelton Times* Company, and used for wire-stitching pamphlets and books, will amply repay examination. Close adjoining, is a "model" printing press, lent by the proprietors of the *Referee* whereat are printed, by the *Press* Company, the programmes for the evening's entertainment. Behind this is a case of hats, exceedingly well made, from the establishment of Messars. Ballantync and Co. Though not a local production, the ingenions machine employed by Messrs. Milner and Thompson for covering the bass strings of pianofortes with copper wire, is well worthy of inspection. Its method of operation will be fully explained by the courteous assistant in charge of it. The slabs of rimu knot, shown by Messrs. Johnston, Wood and Co., would surely be handsome enough, when planed and polished, to be used in the cases of locally made pianofortes.

# A Miscellaneous Collection.

Mr. W. Robinson, bootmaker, makes a very effective display of well made boots, from which the visitor passes on to inspect a large model schooner, exhibited by Mr. A. Crook. Of peculiar, and even melancholy, interest is the small case lying under the stern of this vessel, for it contains mineral specimens from the scene of the late frightful eruptions in the Hot Springs district. An exhibit of a totally different nature is the tobacco cottage, constructed of *u* the weed," mainly in the form of cigarettes, and shown by Mr. Jubal Fleming. More acceptable to æsthetic tastes will be the handsome little vases and the model of Eddy-stone lighthouse, in Cornish serpentine, exhibited by Mr. J. Goodman. Some pictures sent by the same gentleman aro also worth inspection. Ladies learned insuch matters will doubtless find much to admire in the fino work of the two counterpanes shown by Mrs. F. Harvey. The skirt of painted satin, with its pattern of birds and flowers, designed and painted by Miss K. A. Baker, reflect no little credit on the taste and skill of that lady.

## More Attractions.

One of the best and most attractive features of the exhibition is Mr. A. J. White's display of furniture. There is no need to specify the various article?, which give evideuce of work-manship and taste of a very high order. The Kaiapoi Woollen Company, ever alive to the advantages of judicious advertising, have a button-hole machine, and a manufacturer's sewing machine, in operation, under the care of two of their employees. Appropriately enough, Miss Vervall's exhibits of corsets and tastefully trimmed pinafores are placed next to the table at which Mrs. J, R. Davidson and a young pupil illustrate practically the process of making Honiton lace. A couple of frames containing specimens of this lady's skill are desorving of high praise. The manufacture of cardboard boxes at the factory of Mr. J, Forrest is illustrated by two young ladies at an adjoining table, which bears a tastefully-arranged trophy of the boxes made by Mr Forrest. A case of statuettes, the work of Mr. W. L. Smith, will well repay inspection. The figures—copies of well-known statues—are executed with no small degree of artistic skill. In front of the case is a collection of fine specimens of turning in wood and bone, sent by Mr. W. Graham, of Lyttelton, whose lathe was one of the at tractions at the last Christchurch Industrial Exhibition.

## Electeical Appliances.

Two of the most popular exhibits in this hall are the displays of electrical appliances, shown by Mr. O. Hull and Mr A. Smith. The former gentleman exhibits and explains a collection of electrical apparatus, most of which was made by Mr. Cunnington. His object is to demonstrate that the most elaborato electric appliances can bo success-fully produced in local workshops. The exhibit comprises models of various kinds of phybiological and other coils, a storage battery with incandescent lamps attached, and a miner's electric safety-lamp of four standard candle power, shown by Mr. Cederholm, and placed side by side with an old fashoned safety (?) lamp found on the scene of the disastrous Kaitangata explosion in 1879. Mr. Smith's exhibit illustrates electricity as applied to the purposes of commercial and social intercourse. He has electric bells, hotel, and office indicators, telephones, switches and an elaborate battery for medical purposes. The gem of his collection is, perhaps, an exquisitely made coil of the Rhumkorff type, by means of which an electrical illumination is displayed. Mr. Smith also exhibits a motor, patented by himself, and capable of driving a sewing machino or other small mechanical contrivance. Mr. W. Partes also exhibits electric coils used for medical galvanism.

## Taste and Skill.

The taste and skill to be found in the community are well illustrated by the exhibits in the neighbourhood of the display of electrical apparatus. The fretwork sent by Master F. J. Jenkins is beautifully executed, and the same may be said of that exhibited by Mr. T. O. Johnson. Considerable skill, too, is shown by the lads, who, under the direction of Mr. H. J. Shaw, demonstrate practically the process of making brushes. A good representative collection of the productions of Mr. Shaw's factory is exhibited, and he points out with pride how, as far as possible, Colonial hair is used in their manufacture. The excellent twine made by Hale, Throp & Co, is well represented, and the firm also show an ingenious contrivance for rolling up twine into balls. Among the exhibits added last night, the most prominent were a case of cork models sent by Mr. Toomer, and a case of tempting-looking biscuits and confectionery, made by Messrs, Clarke, Decombe and Co. Mr. Luke Adams has set up a second potter's wheel, at which Mr. Adams, junior, exemplifies the mode of pressing pottery with moulds.

## *August 9th*.

## The Industrial Conversazione.

THOUGH the weather on Saturday was about as unfavourable to the success of the Industrial Conversazione as could well be imagined, a moderate number of persons visited the Tuam street Hall in the afternoon, when Mr. Cor rick's string band played several pieces in very good style. In the evening the attendance was much better than the most enthusiastic member of the Industrial Association could have ventured to hope, the number of visitors being at least as large as on the opening night. Por their entertainment a capital programme was gone through, consisting of songs, instrumental selections and recitations, by Misses Button, Wood, Bush, Scott and Dewsbury, and Messrs. Cronin, Withers, Millar, Sinclair, Price, Ingleson, Scott, and Arbuckle. Mr. G. H.

Normington acted as accompanist. The Addington Workshops Brass Band, under Mr. Pooley, played several selections very creditably. The audience were so well satisfied that they re-demanded the great majority of the items, and in each case the encores, which were certainly deserved, were good-naturedly complied with, though, the programme consisted of no fewer than twenty numbers. Great credit is due to the sub-Committee which has been entrusted with the work of getting up the entertainments, especially to the Chairman (Mr. T. Pavitt) and Mr. D. Bellhouse, who performed most efficiently the duties devolving upon them. In consequence of the success which has attended the conversazione, the Committee has decided to open it to-night, to-morrow afternoon, and Wednesday night. Arrangements have been made for concerts to be given equal in every particular to those of last week.

## *August 10th*.

## Industrial Arts Converdsazione.

THE large attendance at the Tuam street Hall last evening, in the face of the bad weather, fully justified the Committee of the Industrial Association in their decision to keep the conversazione going for a longer period than was originally intended. There were several additions to the exhibits, notably a fine collection of ostrich feathers, with some eggs, from Mr. J. T. Matron's "Ostrich Farm." Messrs. H. Hjorth & Co., of Helensville, Auckland, sent a nice exhibit of fancy soaps, which attracted a deal of notice; alongside of this were exhibits from two Wellington manufacturers—Messrs. J. Kitchen and Sons, soap and sperm and parrafine candles; and Mr. Creese's coffee, spices, and flavouring essences. A set of harness and horse clothing, made by Mr. Fawcett, of Christchurch, showed very creditable workmanship. The visitors were not loth to regale themselves on the fragrant cocoa dispensed gratis from Messrs. Hudson and Co.' stall by the fair stall-keepers. The entertainment was a capital one. Mr. Corrick's string band played selections in their usual good style. The Addington Workshops brass band performed their best pieces, and pianoforte and vocal ducts and solos were performed by the Misses Bush and Button, Messrs. Price, Meares, Francis, Arbuckle, and Sinclair. The programmes were again printed in the hall, at the *Lyttclton Times* Company's "model" press, and were, indeed models of elegance and neatness.

## *August 12th*.

## Industrial Arts Conversazione.

THE attendance at the Tuam street Hall last night showed that the Industrial Conversazione is still as popular as ever, for the hall was literally crowded. A very good musical programme was rendered by Misses Dale, Button, Forrest, Wood, Scott and Dewsbury, and Messrs. Cronin, Dougall, Ogier, Price, Reid, Williams, Arbuckle, Sinclair, Master Kelley, and the members of the Stanmore Brass Band. Mr. E. E. Wright acted as accompanist. A number of new exhibits were added yesterday, including a fine sample of Colonial cement, mixed last Saturday, made by Mr. J. M'Donalti, of Dunedin; a very neat riding saddle, shown by Mr. W. H. Hosking, and some excellent photographs of Tarawera and the surrounding country, before and after the eruption, taken by Messrs. Wheeler and Son. During the evening, Mr. H. B. Kirk, President of the Industrial Association, stated that owing to the liberal patronage of the public, the conversazione would be open every night this week, and also on Saturday afternoon, an announcement which was received with applause.

## *August 13th.*

## Industrial Arts Conversazione.

THERE was a good attendance last night at the Industrial Arts Conversazione. An excellent concert was given for the entertainment of the visitors, the various numbers being rendered by Miss Scott, a little lady of some twelve summers, who sang exceedingly well, Miss Forrest, Messrs. Bateman, Maitland Gard'ner, Meares, T. Williams, J. Carder, J. R. Davidson, H. Atkinson, and the members of the Garrison Band. Mr. A. Landergan played the accompaniments in a most artistic manner. Additions continue to be made to the exhibits, among the most noticeable being some fine carbon photographs on porcelain, the work of Mr. P. Schourup, and a number of very good photographs taken by Messrs. Donovan and Meares.

## *August 14th*.

### Industrial Arts Conersazione.

The elements, or one of them at least, fought against the conversazione last night, and had the effect of diminishing the attendance of visitors. Still, there were a good few present, and those who did come had the pleasure of listening to a capital entertainment Selections were played by the Stanmore Brass Band. Miss Carl played two pianoforte solos with taste and expression; Mr. Herman contributed violin solos, and was encored. Songs were given by Miss Scales, Messrs. Adley, Mussen, Parker, and Reid, all of which were well received. The intervals between the music were employed in inspecting the exhibits, which seem never to lose their charm for the visitors. An addition was noticeable in two fancy tables with natural leaves pressed in the tops, exhibited by Mrs. Boulton.

## *August 16th*.

### Industrtal Arts Conversazione.

The fact that some 300 persons went through the rain on Saturday night to be present at the closing of this Exhibition, showed that the Industrial Association's venture has been in favour with the public. The visitors had a capital entertainment provided for them, and many found pleasure in speaking and hearing others speak at the Hebden Company's telephone, which was in charge of the engineer, Mr. Fralk Hebden. Perhaps the best item of the programme was the excellent pianoforte playing of Miss Doubleday, who showed that she is an accomplished pianist by her rendering of "*Sans Souci*" and variations of "Home, Sweet Home." Miss N. L. Bowler also played piano-forte solos with her accustomed taste. Mr. Cor-risk's string band and the Addington Work- shops brass band performed selections during the evening, and songs were given by Misses Hopper, Hill, E. Scott, Messrs. G. T. Booth and Pooley. Mr. A. Landergan acted as accompanist. Mr. T. Williams supplied the place of a gentleman who was absent by giving a humorous lecture. During an interval Mr. H. B. Kirk, President of the Industrial Association, appeared on the stage (supported by several prominent members of the Committee) and addressed the audience. He said that the Industrial Association had endeavoured to please their visitors by giving them what was really worth half-a-crown for one shilling. He thanked the public for their patronage, and returned special thanks to the ladies and gentlemen who had assisted at the entertainments (not omitting the bands); also those who had attended every evening, and added to the attractions of the conversazione by displaying their manipulative skill, and those who had so generously provided refreshments for the visitors. Mr. Kirk concluded by Baying that as the conversazione had been so successful, the Committee of the Industrial Association had decided to make it an annual affair; an announcement which was received with applause.

# Rules of the Industrial Association.

*Established August 12, 1879*.
*Revised at a General Meeting of Members held at Christchurch, Thursday, August* 14, 1884.

## I.—Name.

The Association shall be called "The Industrial Association of Canterbuey."

## II.—Objects.

The objects of the Association shall be to aid in the Fostering and Encouragement of Local Industries and Productions in every legitimate manner through New Zealand.

## III.—Members.

The Association shall consist of ordinary, honorary, and life Members, who shall be proposed by two Members and elected by ballot at any Meeting, one black-ball in three to exclude.

## IV.—Officers.

There shall be a President, two Vice-Presidents, and an Honorary Treasurer, who with twenty other Members, shall constitute the Committee, all of whom shall be elected annually at the General Meeting held during the month of August; and the Committee shall have power to employ or dismiss a Secretary, who shall be paid, but shall not be a member of the Committee.

## V.—Management.

The Committee shall, during their term of office, have the management of the business and such of the funds of the Association as may be placed at their disposal.

## VI.—Election of Officers.

The President, Vice-Presidents, Honorary Treasurer, and Committee shall be elected by Ballot, in the above-named order, at the Annual Meeting. Those Members only shall be eligible for any office whose names, together with their proposers and seconders, shall have been posted in the Association's office one clear week before the Annual Meeting. In case no such nominations, or an insufficient number of such nominations, shall have been made, the outgoing Committee shall nominate members to the offices not provided for. Two Auditors shall be elected by a show of hands.

## VIII.—Subscription.

After election (see clause 3) the payment of an annual subscription of not less than five shillings shall constitute membership, and entitle to vote at all General Meetings during the year for which such subscription is paid, dating from the 12th August; provided that no Member vote an any question till the following meeting after reception. No Member whose subscription is three months in arrear shall be entitled to vote. The subscription for Life Members shall be £5 5s.

## VIII.—Vacancies on the Committee.

If any vacancy occur among the Officers, intimation shall be given thereof at the next meeting of the Association, and the vacancy shall be filled up by Ballot at the next meeting thereafter, nominations being previously made as in the case of the annual elections. If any other vacancy occur on the Committee, the same shall be filled by the Committee, the vacancy being notified at the first ordinary meeting thereafter, and the electiou held at the following meeting; provided that, if at any time the number of the Committee is reduced to one half or less, the vacancies shall be filled up at a special meeting of the Association, in the same manner as vacancies among the Officers.

## IX.—Meetings of Committee.

The Committee shall meet at least once in every month, at such day and hour as they may deem fit, seven forming a quorum. Any member of the Committee who shall be absent from three consecutive ordinary monthly meetings (without leave from the Committee) shall thereby be disqualified, and his seat shall be vacant.

## X.—Duties of President.

The President shall take the Chair at meetings of the Association and of the Committee, regulate and keep order in all their proceedings, state questions and propositions to the meeting, introduce newly elected Members, and carry into effect the regulations of the Committee. In the absence of the President, the Chair shall be taken by one of the Vice-Presidents, and in the absence of the Vice-Presidents by any ordinary Member of the Association who shall be elected Chairman by the members present.

## XI.—Duties of Committee.

The duties of the Committee shall be—To carry into effect the objects and directions of the Association, to form subcoinmittees for any purpose out of their own number, or from the general body of members, and to prepare any business to be considered at General Meetings.

## XII.—Duties of Secretary and Treasurer.

The duties of Secretary shall be to conduct the correspondence of the Association and of the Committee, attend all meetings of the Association and of the Committee, take minutes of their proceedings and enter them in the proper books; he shall inscribe the names and addresses of all Members and their proposers in a book to be kept for that purpose, which shall lie on the table for consultation, and from which no name shall be erased except by order of the Committee; he shall collect and arrange all statistical information that may be deemed valuable; he shall issue notices of all meetings of the Association and of the Committee; and shall have custody of all papers and books of the Association, and act generally as the Committee may direct. The Hon. Treasurer shall receive all moneys paid to the Association, and shall deposit the same to the credit of the Association at the Bank to be named by the Committee, all cheques against which shall be signed by himself and the President, or one of the Vice-Presidents; he shall make all payments ordered by the Committee or for the ordinary expenses of the Association; keep a detailed account of all receipts and expenditure, prepare a balance-sheet, duly audited, to be laid before the Committee, and included in their annual report, and produce his books, if called upon so to do by the Committee.

## XIII.—Ordinary Meetings.

The Committee shall have power to call General Meetings of the Association at such times ana places as they may deem fit, and the President, upon requisition in writing, signed by twenty-five Members of the Association, shall call a meeting forthwith.

## XIV.—Annual Meeting.

The Annual Meeting of the Association shall be held in the month of August, when the Committee shall present a report of the proceedings of the Association during the past year, embodying the balance-sheet, duly audited, and a statement of the then present position of the Association. The Officers of the Association for the ensuing year shall also be elected at this meeting.

## XV.—Order of Business.

At the ordinary meetings of the Association, business shall be transacted in the following order:—

- Minutes of the preceding meeting to be read, amended if incorrect, and confirmed.
- New Members to be introduced,
- Vacancies among Officers, if any, to be filled up.
- Business arising out of the Minutes.
- Correspondence.
- Reports from Committees.
- Motions of which notice has been given to bo considered.
- Consideration of motions, notice of which has not been given.
- Notices of motion for the next meeting to be given in, and read by the Secretary.
- Papers to be read.

## XVI.—Visitors.

Any Member may introduce visitors to the meetings of the Association, personally or by order signed by himself; and any visitor may take part in the proceedings, but shall not be allowed to vote.

## XVII.—Members May Bead Papebs.

Members shall have the privilege of reading before the Association papers containing statistics, observations, and essays on subjects within the scope of the Association.

## XVIII.—Altebation of Rules.

No new rule or alteration, or repeal of any existing rule, shall be made except at the Annual Meeting in August, or at a Special General Meeting summoned for that purpose. Notice of any proposed alteration must be posted up in the office of the Association at least four weeks prior to the meeting at which such proposal is to be considered; and notice of any amendment on any proposed alteration must be posted up at least three weeks prior to the meeting.

## XIX.—Cases Not Provided for.

Should any circumstance arise not provided for m these rules, the matter shall be left to the Committee.

## XX.—Members Bound by Rules.

All Members shall be considered to have subscribed and assented to, and be bound by, these rules.

# List of Members

- Adams, Luke
- Allan, Robt.
- Anderson, J.
- Anderson, J., jun.
- Andrew, J. C.
- Andrews, Hugh
- Andrews, S. P.
- Andrews, W.
- Arenas, F.
- Ashby, E. C.
- Atkinson, R.
- Atkinson, J. C.
- Atkinson, H.
- Attwood, W.
- Attwood, W., jun.
- Ayers, A.
- Bakewell, R. H, M. D.
- Ballinger, W. J.
- Balliu, B.
- Banks, E. H.
- Banton, H.
- Bartram, D. W.
- Bashford, J. E.
- Bates, C.
- Bates, W., jun.
- Beadley, M. E.
- Beattie, R.
- Beattie, J. A.
- Beauchamp, A.
- Beaven, A. W.
- Beck, A.
- Bellhouse, D.
- Bennetts, H.
- Bergh, L.
- Bickerton, A. W.
- Bigwood, J.
- Birdling, W.
- Black, R. W.
- Blackwell, G. H.
- Blake, L. W.
- Bonnington, G.
- Booth, G. T.
- Border, W. R.
- Bowlker, Jas.
- Bowman, J.

- Bowron, Wm.
- Bowron, G.
- Brightling, J.
- Brooks, W.
- Brown, J. K.
- Brown, E. C.
- Bruce, J. C.
- Buchanan, R.
- Buggy, J.
- Burns, Jno.
- Button, B.
- Cahill, J. A.
- Calvert, W. H.
- Carl, Jno.
- Caro, D.
- Chinnerv, C.
- Chisnelf, G. T.
- Chrystall, W.
- Clark, C.
- Clark, J.
- Clarke, H. G.
- Clarkson, S.
- Clephane, A.
- Cochrane, D.
- Coe, J.
- Cohen, S.
- Coles, Jno.
- Coster, J. L.
- Craig, D.
- Crompton, T.
- Cross, F.
- Crowe, W.
- Crowley, J.
- Cuff, C.
- Cunningham, P.
- Curlett, H.
- Danks, T.
- Dauber, R.
- Davis, H. A.
- Davidson, E. W.
- Davidson, J. B.
- Dawes, B.
- Dawson, B.
- Deacon, E. B.
- Deans, Jno.
- De Veaux, A. F.
- Dick, B.
- Diffen, W.
- Dobson, A. D.
- Douglas, G. M.
- Drummond, H. D.
- Duckmanton, T.
- Dunbar, A.
- Duncan, P.
- Duncan, David
- Dutton, J.
- Eagle, J.
- Earnshaw, W.

- Effey, C.
- Elerig, L. A.
- Elmsly, T.
- England, K. F.
- England, R, W.
- Evans, A.
- Federli, G. F.
- Ferguson, Jno.
- Fisher, G.
- Fisher, C. W.
- Fisher, Hy.
- Fisher, J. H.
- Flesher, W.
- Fletcher, F.
- Ford, E.
- Forrest, C.
- Forrester, J.
- Forster, W.
- Foster, C.
- Fountaine, T.
- Freeman, F.
- Gabites, F.
- Gager, Thos.
- Garforth, S.
- Gee, T. J.
- Gee, G. F.
- George, Eden
- Gimblett, W.
- Glanville, J. R.
- Glanville, James
- Godfrey, H.
- Goodman, Jno.
- Goss, Jas.
- Gough, F. J.
- Gould, G.
- Gould, J.
- Gray, C. M.
- Gray, Jas.
- Green, Edmund
- Green, T. H.
- Greig, Thos.
- Griffiths, D.
- Grogan, D. S.
- Guinness, F.
- Guy, F. A.
- Hale, B.
- Hale, B. J.
- Hall, C. D.
- Hancock, A. H.
- Hamilton, J.
- Hamilton, R. M.
- Harper, L.
- Harris, M.
- Hay ward, F.
- Hemminge, B. H.
- Hebden, Frank
- Hepburn, H.
- Hepworth, J.

- Hill, C. J.
- Hill, J.
- Hitchens, F.
- Hobbs, F.
- Hobday, H. S.
- Hollis, W.
- Holmes, J.
- Hooper, J. H.
- Horsley, T. N.
- Howell, C. S.
- Howland, A. G.
- Hulbert, C. P.
- Hull, C.
- Hurt, Thos.
- Hyndman, P.
- Ingram, J.
- Ivey, W. E.
- Izett, Jas.
- Jackson, Ed.
- Jameson, J. P.
- Jameson, W.
- Jamieson, J. S.
- Jenkins, F.
- Jewell, W. H.
- Johnston, J. R.
- Jones, E.
- Jones, F.
- Jowett, N.
- Keane, H.
- Kelly, G.
- Kelsey, T. O.
- Kent, Rd.
- Ker, T. H.
- King, W. S.
- King, J. R.
- King, G.
- Kirk, H. B.
- Kirk, A. R.
- Kirlin, L.
- Kiver, C.
- Klingenstein, C.
- Lake, W. T. M.
- Lambert, T. S.
- Lane, H. B.
- Langdown, W.
- Loughrey, A.
- Lucas, W.
- Macpherson, J. D.
- Malet, P. B. W.
- Manning, S.
- Mardon, W.
- Marriner, J.
- Martin, W.
- Mason, F.
- Matson, J. T.
- McCardell, J. F.
- McClatchie, G.
- McClenehan, R. L.

- McConnell, R.
- McCutcheon, Geo.
- McDevitt, P.
- McDonald, R.
- McDougall, W. E.
- McDowell, J. C.
- Mcllraith, J. A.
- Mcintosh, T.
- McLaren, D. B.
- McNamara, J.
- Meyers, N. P.
- Miller, J.
- Mills, Jas.
- Mills, W. T. C.
- Mitchell, G.
- Mitchell, N.
- Mitchell, W. R.
- Monson, J.
- Montgomery, W.
- Moore, R.
- Moor, W.
- Morton, J. W.
- Mouldey, W.
- Mouldey, E. C.
- Munday, C.
- Murphy, M.
- Nashelski, S.
- Neighbours, W.
- Nelaer, C. A.
- Nelson, L. H.
- Newby, R. N.
- Noble, A.
- Ollivier, J.
- Oram, C.
- Parker, O. G.
- Parnham, E.
- Partridge, J. T.
- Patterson, J.
- Pavitt, T.
- Peppier, A.
- Perceval, W. B.
- Plaisted, J.
- Potts, A. E.
- Pratt, W.
- Price, W. H.
- Procter, T. E.
- Prudhoe, W.
- Prudhoe, J. C.
- Prudhoe, W., jun.
- Rantin, Jas.
- Rastrick, R.
- Ravenhill, E.
- Reece, E.
- Reese, D.
- Reeves, W.
- Restell, G, P.
- Reynolds, A.
- Rbodes, Jabez

- Richardson, R.
- Richardson, Hon. E.
- Robb, A.
- Robinson, H.
- Robinson, W.
- Roskruge, T. H.
- Ross, H. J.
- Ross, W.
- Rowe, M.
- Rowe, J.
- Rountree, Jno.
- Ruddeuklau, J. G.
- Russell, T.
- Russell, R.
- Rutland, J. B.
- Sandstein, M.
- Sansom, W.
- SapSford, P. B.
- Scarlett, W. H.
- Schourup, P.
- Scott, J. L.
- Scott, G.
- Seager, S. H.
- Shanks, E.
- Shaw, H. J.
- Sheath, J. B.
- Sims, J.
- Smart, S.
- Smethurst, E.
- Smith, W. S.
- Smith, J.
- Smith, W.
- Smith, E.
- Smith, H.
- Smith, F. J.
- Stead, G. G.
- Stewart, H.
- Stephens, R. E.
- Stinson, J.
- Stocks, W.
- Stokes, W.
- Storey, C.
- Strange, J. T.
- Strange, E.
- Swanson, A.
- Symes, Dr. W. H.
- Taylor, E. M.
- Taylor, M. T.
- Taylor, J.
- Templer, E. M.
- Thomas, E. D.
- Thomson, H.
- Thomson, W.
- Thompson, J. M.
- Thompson, E.
- Thornton, John
- Throp, B.
- Tillman, Thomas

- Tombs, G.
- Tombs, W.
- Toomer, E.
- Toomer, H., jun.
- Travis, W. H.
- Tregear,—
- Twentyman, J. H.
- Urquhart, A.
- Vincent, W.
- Waddell, T.
- Wakefield, J.
- Waller, E.
- Waller, J.
- Ward, P. N.
- Warner, W. F.
- Watters, T. J.
- Webb, H. E.
- Weston, T. S.
- White, A. J.
- White, W., run.
- Whiteman, W. T.
- Wilkin, J. C.
- Willis, H.
- Willoci, W. B.
- Williams, C. R.
- Williams, T.
- Williams, J. B.
- Williams, H. Wynn
- Williams, W. J.
- Williams, T. C.
- Wilson, N.
- Wilson, Isaac
- Wilson, A. C.
- Wilson, W.
- Wood, R. H.
- Woodman, G. B.
- Wright, F. E.

Printed at the "Lyttelton Times" Office, Gloucester Street, Christchurch.

WELLINGTON GIRLS' HIGH SCHOOL.
1886.
EXAMINERS' REPORTS and Prize List.
Wellington, N. Z. LYON & BLAIR, PRINTERS, LAMBTON QUAY. 1887.

# Wellington Girls Hight School.

# Visitor:

- His Excellency the Governor.

# Board of Governors:

- J. R. Blair, ESQ. (CHAIRMAN).
- H. Bunny, ESQ., J. P.
- HIS WORSHIP THE Mayor.

- C. J. Johnston, ESQ., M.H.R.
- G. Fisher, ESQ., M.H.R.
- DR. Hector, C.M.G., F.R.S.
- DR. Newman, M.H.R.
- REV. J. Paterson.

# Staff:

- LADY PRINCIPAL: MISS Hamilton.
- MR. John Innes, M.A.
- MISS E. H. Searle, M.A.
- MISS Gillon.
- MISS Richmond.
- FRENCH, GERMAN, AND ITALIAN—MR. A. F. Merlet.
- CLASS SINGING—MR. R. Parker and MISS Richmond.
- PIANOFORTE—MR. R. Parker, MISS Black, and MISS Swainson.
- DRAWING—MR. F. DE I. Clere, F.R.I.B.A.
- DANCING—
- DRILL INSTRUCTOR—MR. DE Mey.

# Course of Instruction.

THE course of instruction includes English Language and Literature, History, Geography (Physical and Political), Elements of Physical, Natural, and Social Science, Latin, Arithmetic, Euclid, Algebra, Trigonometry, French Language and Literature, Writing, Drawing, Vocal Music, Needlework, and Calisthenics.

Pupils are prepared by the regular course for the Matriculation and Junior Scholarship Examinations of the New Zealand University.

All pupils on admission must have a fair knowledge of Reading, Writing, and Elementary Arithmetic.

# School Year.

The School year consists of forty-two weeks, divided into three Terms, the first Term commencing on the 1st February of each year.

Hours of Attendance, from 9.30 to 12.30, and from 2 to 4.

# School Fees.

In addition to which a charge of 12s. per annum is made for Stationery.

All Fees must be paid in advance.

Chas. P. Powles,
Secretary.

# REPOPT OF THE EXAMINER.

WELLINGTON,

16*th Dec.*, 1886.

The Board of Governors, Girls' High School, Wellington. Gentlemen,—

decorative feature

We have had the honour of conducting, according to your instructions, an examination of the pupils in the

Girls' High School, a task which has been to us one of peculiar pleasure, because of the high state of efficiency in which we found the several classes examined.

The large majority of the girls have done so exceptionally well that we did not see our way to single out any by name for special commendation, for fear of doing injustice to others almost equally as good. The marks earned by the girls speak for themselves, and do not require to be explained or enlarged upon by more than general comment. Suffice it to say that they show in all classes most satisfactory progress, and in some surprising proficiency.

The examination was conducted partly in writing and partly orally.

Of the work of the Fifth Form in English we can speak in terms of high commendation. The papers set for this Form in History, Geography, and Grammar were equal in point of difficulty to the University Matriculation papers, and were quite as severe as any set this year for the Fifth Form boys of the Wellington College. The whole of the Form came up to our requirements for a pass, and a large number obtained a very high percentage of marks in the several subjects. The answering, for fullness and accuracy as well as the method and style of the work, was in very many cases excellent. The English Literature paper was well answered, and showed upon the part of the pupils a good knowledge of the history of our literature throughout the period studied.

Some of the essays submitted are above average merit, and show independent thought as well as grace and felicity of expression. We congratulate the Lady Principal on the work done by the Fifth Form, and we fully expect that when the results of the Matriculation Examinations are known, the members of this Form who presented themselves will take a good place.

Of the work of the Third and Fourth Forms we can speak in favourable terms. The answering of the Fourth Form in Geography, Grammar, History, and Literature was very good, and the Third Form did excellent work in the same subjects. A few of the pupils in each of these Forms show weakness in spelling. The writing and style of work was all that we could desire.

The answering of the First and Second Forms in History, Geography, and Grammar was both intelligent and accurate. A few of the First Form showed weakness in Arithmetic and an imperfect knowledge of their tables, and a few in the Second Form did the question in Numeration poorly; also we note that the spelling of some of the pupils in each of these Forms was weak. However, a large majority of the girls did their work well, and showed that they had been thoroughly drilled by their teachers in the essentials of each of the subjects. The writing of the candidates in each of these Forms is fairly good, and we were pleased to see the neatness with which their exercise and copy books are kept. The piece given as a reading exercise was read fairly well, and the girls showed that they had been taught to read with their minds awake as to the meaning of what they read.

In French, the two divisions of the Fifth Form and the Fourth Form were examined by paper, and acquitted themselves most creditably, although the questions are acknowledged by the Examiner to have been of a searching nature. The Fourth Form succeeded in scoring an average of over 80 out of possible 100 marks, the highest being 92 and the lowest 73. In one or two instances the marks allotted do not do justice to the pupils, who had been at a disadvantage through their absence from the class. Notice has been taken of these cases in memoranda appended to the lists of marks, which fact should be taken into consideration.

The remaining Classes were examined orally, and displayed equal excellence. In the Third Form (a large one of 23), three girls gained 90 marks and over, five girls 80 and over, six girls 70 and over, and only one got less than half marks. A similar result attended the examination of the Second Form and Form 1A. The best marks of all were gained by Form 1 b, in which one girl gained 100 marks, another 90, and all the remainder 85, giving an average of 88. The "Preparatory" section of Form I was also fortunate in showing most successful results.

Three pupils were submitted to examination in German, and acquitted themselves satisfactorily. We would wish to point out the advisability of encouraging the study of this language, which opens up a literature of great wealth and sterling value, and which is at the present day (next to English) the most important and widely spoken tongue of the world. We recognise with approval the commencement of its study in this School, and would strongly recommend its diligent pursuit in this and other cognate institutions.

In Latin, the two highest Classes have gone through a large amount of work during the session, and withal have done it very carefully. The passages from the authors read—Virgil, Horace, Livy, and Cæsar—were translated with great accuracy and in very good style. The same may be also said of the unseen passage which was set them. In the Grammar and Composition paper the answers were on the whole satisfactory. The rendering of some English sentences into Latin was very fairly done by both Forms, and shows that they have been taught to appreciate the niceties of the language. There were, however, inaccuracies in the grammar that one could scarcely have been led to expect from the general correctness of the translation. In the Junior Classes the girls are being carefully grounded in the rudiments, and show a very creditable knowledge of the accidence, and considerable facility in turning easy sentences from Latin into English and from English into Latin. It struck us they were better up in their conjugations than in their declensions, and we notice this in order that the matter may be attended to next year; for we believe, and it cannot be too often reiterated, that in a thorough knowledge of its grammar lies the great secret of attaining high proficiency in any language.

Coming now to the Mathematics of the School, it affords us much pleasure to be able to report, that although this is usually considered to be a subject for which girls have not much aptitude, the result of the present examination does not bear out or justify that view. The whole School was examined in Arithmetic, and, excepting in one Class, the work was very satisfactorily done. The pupils generally displayed an intelligent acquaintance with the principles underlying the various rules, as well as the best methods of solution. The Third Class alone failed, with a few exceptions, to come up to our requirements.

Three Classes were examined in Algebra and acquitted themselves to our entire satisfaction. The two higher Classes show a thorough mastery of the work they profess; while the lowest Class has made a very fair and promising commencement with the subject. 'The Classes examined in Algebra were like-wise examined in Geometry, and in this subject, as in the former, the more advanced pupils showed very considerable proficiency. The highest Class has done all the work in this subject, and in Algebra, required of candidates for the Junior Scholarships in the University. The lowest Class has got well through the first book of Euclid, though some of the girls are not as yet able to reproduce any save the very simplest propositions. They have now made a fair start with the subject, and are beginning to understand the nature of mathematical reasoning.

In conclusion, we beg to congratulate the Governors on the high state of efficiency of the Girls' High School, as shown by the recent examination. The methodical manner in which the work was done, and the neatness and tidiness which characterized it, proved to us the careful training which the pupils had undergone. At the same time the high state of discipline in this school, and the enthusiasm of the pupils for their work, showed to us how well the staff had succeeded in establishing their authority over the girls, and interesting them in the subjects taken up.

The kindly relations existing between teachers and pupils particularly impressed us, as evidence that the former are admirably suited for their respective posts, and that the latter do not find their studies irksome, and that both are fond of their work. It is, we are assured, entitled to rank in the first class among Girls' Schools in the colony, and well deserves the encouragement and impetus which its projected removal to a larger and more commodious abode will give it, by enlarging its resources and widening its scope.

We have the honour to be, Gentlemen,
Your most obedient servants,
W. H. West, B.A., LL.B.
J. W. Middleton, B.A.
A. Macgregor, M.A.

# Dr. Hutchinson's Report.

Wellington,

6*th January*, 1887.

To the Board of Governors of the Girls' High School. Gentlemen,—

I beg to lay before you the results of an examination in Physiology I lately held at the Girls' High School. The class was a junior one, the number of pupils 18. The paper I set was, while elementary, designed to educe the intelligence of the scholars rather than their memory for names, or even for bare facts. The results are gratifying. Out of 18 papers 11 were awarded more than half marks, and 5 more than 70 per cent. The highest marked paper of all was excellent. The subject has evidently been very accurately taught. What the girls know they know well.

I may venture to express my surprise when I found that the examination was to be confined to a junior class, for I reasonably expected to find so important a subject as Physiology taught, and more extensively taught, to the seniors. It is surely a truism that it could not be exhausted by a junior class, but rather that only with more advanced age and intelligence could it be adequately taught and learned. It is also one of the most necessary of the subjects for a modern school course; it is intensely practical. Only by an adequate knowledge of the structure and functions of the human body can our women learn to discharge properly their duties as wives and mothers, and educators. At present the ignorance of women about matters it is so important for them to know is pitiable, and the results disastrous. They enter upon the most serious duties of life without the guiding instinct of the animal or the half-instinct of the savage, while they lack the scientific knowledge which in this stage of the world's history ought to supply the deficiency of instinct.

I hope the study of Physiology will be promoted to a leading position in the school course of the future, and thus some share be carried out in the school of the great and most needful work, that of arresting the decline of the race.

I am, Gentlemen,
Yours very faithfully,
FRAKOIS B. HUTCHINSON.

# REPORT OF EXAMINER IN RECITATION AND READING.

AT the request of the Lady Principal of the Wellington Girls' High School, I have awarded Mr. FitzGerald's prizes for Recitation and Reading. In the highest Class I had some difficulty in awarding the prize. The pupil to whom I awarded it recited with less force and expression than the two to whom I accorded honourable mention. One of these two adopted a tone somewhat too grave for the subject ("The Skylark *"—Shelley)* and the other was not quite perfect as to memory. All three deserve much credit for purity of intonation, and for manifest appreciation of the spirit of the poetry.

The best recitation in each of the other classes was very good indeed. Below the best there was too much exaggerated emphasis, and too little of sustained expression; too much stress put upon a word here and a word there, instead of an even tone adapted to the sentiment of a sentence or phrase. But all the competitors showed a good comprehension of the theme, which in each Class was an extract from "childe Harold."

W. Jas. Habens.

At the public distribution of prizes, the Venerable Archdeacon Stock, who had examined in Scripture, expressed himself greatly pleased with the accuracy and aptness oi the quotations written in answer to questions set by the Lady Principal.

# Gold Medallists.

- 1883.—No Medal awarded.
- 1884.—Ernard Krull.
- 1885.—Mary E. King.
- 1886.—May C. Morrah.

# Prize List, 1886.

Gold Medal, for highest aggregate of marks in all subjects: May Morrah.

Richmond-Fell Prize, for next highest aggregate of marks in all subjects Ella Allman Marchant. (This prize is given by Dr. Fell; value, £10.)

### ENGLISH.

## (Including Grammar, Literature, History, Geography, Composition Writing, &c.)

- Upper. E. Marchant, i.; M. Morrah, ii.
- Lower. E. Wilson, i.; R. Smythe, ii.
- Upper. E. Zohrah, i.; B. Riddick, ii.
- Lower. A. Sloan, i.; S. Fraser, ii.; A. Holdsworth, iii
- E. Broome, i.; L. Baird, ii.
- B. Knight, i.; Q. Eliott, ii.; A. Rose,
- F. Chatfield, i.; E. Meek, ii.; A. Johnson,

### LATIN.

- M. Morrah, i.
- A. Ranwell, i.; E. Marchant, ii.
- J. Nairn, i.; R. Smythe, ii.
- E. Zohrab, i.; L. Littlejohn, ii.
- E. Broome, i.; I. Morrah, ii.

## French.

- Upper. M. Morrah, i.; E. Wilson, ii.
- Lower. M. Blundell, i.; M. Paterson, ii.
- E. Zohrab, i.; H. Harding ii.
- I. Morrah, i.; J. Nairn, ii.
- A. Sloan, i.
- Upper. L. Blacklock, i.
- Lower. M. Greenfield, i.; H. Samuel, ii.

## German.

- M. Paterson, i.
- Mr. Blair's Special Prizes.—M. Paterson, R. Moeller, E. Wilson

## Algebra.

- M. Morrah.
- E. Marchant, i.; J. Nairn, ii.
- M. George, i.
- E. Wilson, i.; F. Sanderson
- J. Brock, i.

## Euclid.

- J. Kebbell, i.; M. Morrah, ii.
- E. Marchant, i.; F. Sanderson, ii.
- G. FitzGerald, i.; B. Riddick, ii.

## Arithmetic.

- J. Kebbell and J. Galloway, equal; J. Nairn, ii.
- Upper. A. Meek, i.; F. Sanderson, ii.
- Lower. J. Brock, i.; May Kebbell, ii.
- E. Broom, i.; M. Wilson, ii.
- M. Hales, i.; B. L. Johnson, ii.
- N. Wiggins.

## Physiology.

- B. L. Johnson, i.; E. Broome, ii.

## Botany.

- J. Bethune. Equal.
- B. Riddick. Equal.

## Music.

- Mr. Parker's pupils.—M. Blundell, i.; F. and L. Johnston, ii.
- Miss Black's pupils.—Upper: K. Henry, i.; Margaret Kebbell, ii. Lower: Ida Kenny.
- Miss Swainson's pupils.—Q. Eliott, i.; H. Hamerton, ii.
- Miss Hamilton's Special Prize for Essays and Class Composition.
- M. Morrah.

- Miss Searle's Prize for COMPOSITION.
- Class III.: B. L. Johnson.
- Special Prizes for RECITATION, given by Mr. FitzGerald.
- Form V. E. Wilson. Honorable mention: G. FitzGerald, C. Smith.
- IV. B. Luckie.
- III. M. Shannon. Honorable mention: E. Broome.
- Mr. West's Prize for ENGLISH.
- Form III., A. Vennell; II., D. Knight.
- Lady Jervois's Prize for SCRIPTURE KNOWLEDGE.
- E. Young and I. Morrah, equal.

## NEEDLEWORK.

- Girls over 15: F. Sanderson, i.; M. Gillon, ii.
- Girls under 16: E. Glover.

## BEST CAKE.

- Kathleen Blundell, i.; Jessie Seed, ii.; May Palmer, iii.

## GENERAL PROFICIENCY IN DRILL.

- Upper Division (given by M. de Mey): M. Shannon.
- Lower Division: M. Rose.
- Running.—Girls under 14: E. Hutchinson.
- Diving (Long and Deep): M. Pownall.
- Swimming (Distance and Style).—Girls over 14: M. Pownall. Under 14: H. Tringham.

The prizes for Needlework were awarded by Mrs. and Miss E. Dransfield; those for Recitation by the Rev. J. Habens; for Scripture by Archdeacon Stock; and for Swiming and Diving by Mrs. Merlet.

The first prizes in English were given by Mr. Blair, Chairman of the College Board, and the second by Mr. Kirkcaldie.

The prizes for Cooking were given and awarded by some of the girls in the Upper School.

# SYLLABUS FOR 1886.

## ENGLISH GRAMMAR.

- V. Upper. Morris's Historical English Grammar (omitting pp. 187 to 202). Dr. Abbott's "How to Write Clearly."
- V. Lower. Smith and Hall's Grammar, including historical introduction, and omitting Prosody. Parsing and Analysis.
- IV. Upper. Same as Lower V., omitting historical introduction.
- IV. Lower. Smith and Hall, large print only. Etymology. Parsing and Analysis from "Samson Agonistes," and Gray's "Bard."
- III. Morris's Primer (the whole). Full Parsing and Analysis of easy sentences.
- II. Full Parsing, and Analysis of simple sentences.
- I. Abbott's "How to tell the Parts of Speech."

## LITERATURE.

- V. Upper and Lower. From writers of reign of James I. to 1832 (notes dictated, with illustrative readings from authors, and biographical notices) from Morell's Literature, Nichol's Landmarks of Literature, and Morley's Library of Literature. Reading of "Macbeth."
- IV. Upper and Lower. From beginning of literature to Shakespeare inclusive, as in Class V. Critical reading of "Tempest," with composition on "Enoch Arden," "Tempest," &c.
- III. Reading of "Tempest," "Enoch Arden," and Longfellow's "Skeleton in Armour," "Norman Baron," and "Robert of Sicily."

## RECITATION.

- Shelley's "Skylark," and Burke's "Marie Antoinette."
- Byron's "Apostrophe to the Ocean," and passages from "Tempest."
- Byron's "Field of Waterloo," and extract from "Prisoner of Chillon."
- Poems selected from Palgrave's "Children's Treasury of Song."
- Easier poems from "Treasury of Song."

Writing in copy-books is taught in Forms I. and II.

Girls who do not learn Latin are taught the derivations of words.

## HISTORY.

- V. Upper. Outline from Elizabeth to William III., and Green's Short History of the English People, William III. to the end, with Notes.
- V. Lower. Green's Short History of the English People, William III. to the end, with Notes.
- IV. Epochs of English History, Tudor and Stuart Periods.
- III. Edith Thompson's History, William I. to Edward II.
- II. Curnow's History, to end of Henry VIII.
- I. Chambers's Historical Reader, Part 2.

## GEOGRAPHY.

- V. As for Matriculation, with special reference to England and New Zealand.
- IV. Nelson's Royal Geographical Reader, No. 5, Asia. Mss. notes on New Zealand Geography.
- III. Northern and Central Europe, and British America, in detail.
- II. Nelson's Reader, No. 3, with special reference to the British Empire.
- I. Use of Geographical Terms; Europe.

In each Form composition lessons are given in class, and in the highest Form essays on standard works have been written at home.

## LATIN.

### *Translation*.

- Virgil, "Æneid," Books xi. and xii. Horace, "Odes," Book ii., Odes i. to xii., omitting v. and xi. Livy, Book i., preface to end of chap. 30.
- Bennet's "Easy Latin Stories," pages 1 to 37. Cæsar, "De Bello Gallico," Book i. Virgil, "Æneid," Book i., lines 1 to 334.

### *Grammar, &c.*

- Smith and Hall's Latin Grammar, the whole subject except Prosody and Appendices, also omitting pages 130 to 146. Bennet's Latin Exercises, page 1 to Exercise 69 in Part ii.
- Principia, No. 1 (whole); Principia, No. 2, pages 1 to 4.
- Principia, No. 1, to end of Accidence.
- To end of Conjugation of Passive Voice, with exercises to end of No. 25.

Preparatory: To end of Conjugation of Verb "To Be."

## GERMAN.

- "Hermann und Dorothea," to end of Clio. Dr. Aue's German Grammar, to end of Pronouns, p. 107, and all Irregular Verbs.

## FRENCH.

- V. Upper. "L'Avare" (whole); "Lazare Hoche" (whole); Merlet's Grammar (whole).
- V. Lower. "L'Avare" (whole); Merlet's Grammar, Accidence.
- IV. Hachette's Reader, selections of most difficult passages. Bués Second French Book, with special

reference to translation of English into idiomatic French.

- III. Hachette's Reader, selections. Bné's First French Book (whole).
- II. Bué's First French Reader (whole), including Translation.
- I. Bué's First French Reader, first half.

Preparatory: Bué's First French Reader, about 25 ages.

## ARITHMETIC.

- V. The whole subject, chiefly from Hamblin Smith.
- IV. Upper. Barnard Smith. Unitary method applied to Simple and Compound Proportion, Simple and Compound Interest, Discount, Profit and Loss, Stocks.
- IV. Lower. Barnard Smith. Vulgar and Decimal Fractions, Reduction, Weights and Measures, Decimal Coinage, Reduction of Fractions and Decimals, Practice.
- III. Hamblin Smith. Vulgar Fractions, Reduction, Weights and Measures, Simple Problems on the Unitary Method, Practice.
- II. Colenso. Weights and Measures.
- I. Simple Rules, and Money Rules.

## EUCLID.

- Books I., II., III., IV., and VI., with Definitions of Book V.
- Books I. and II.. with Deductions. (Todhunter.)
- Book I., Definitions and Propositions, 1 to 26.

## ALGEBRA.

- To end of Quadratics, with miscellaneous examples.
- To end of Simultaneous Equations of more than one unknown.
- To end of Simple Equations of one unknown.
- To end of Fractions inclusive.
- To end of Simple Rules.

## TRIGONOMETRY.

Work required for Junior Scholarship Examination.

## CLASSIFICATION.

The basis of Classification is fourfold—English, Mathematics, Classics, and Modern Languages. All the girls are classified according to their proficiency in each of these four divisions, without any reference to their rank in the other three, and so it frequently happens that a girl is in a high class in one of these departments, while she may be in a low one in the others. She may, for instance, be in the fourth English Class, the second Mathematical, and the third Classical.

Botany is taught in Form IV., and Physiology in Form III., the text-book for the latter being A. Buckton's "Health in the House."

Plain Needlework is taught in all Forms except the highest.

A Scripture Class, which is very largely attended, is conducted by the Lady Principal every morning, before the School opens. Lady Jervois offers a prize for Scripture annually.

During the Second Term Miss Marsden gave lectures on Nursing, which were much appreciated.

Instruction in Drill and Calisthenics is given twice a week, in lessons of half an hour's duration.

A report is issued to parents at the close of each Term, stating each pupil's Class and position in the subjects taken up.

The following pupils have passed the Matriculation Examination:—

- 1884.—Ernard Krull, Rosamond Rolleston.
- 1885.—Mary Kino, Elvina Dransfteld, May Morrah.

This year we have sent in eight girls for the Matriculation Examination, and one as a candidate for Junior University Scholarship.

BOARD SCHOLAR, 1886.—Ethel Wilson.

CALEDONIAN SCHOLAR, 1886.—Emily Broome.

Of the two candidates from the Girls' High School who sat for scholarships, one headed the list of Board Scholars, and the other the list of Caledonian Scholars.

The Governors hope that the New High School Building will be ready for occupation at the beginning of the Third Term of this year.

decorative feature

LYON & BLAIR, Printers, Wellington, N.Z.

Educational Institute of New Zealand. The Report of the Third Annual Meeting of the Council of the Institute

Held at DUNEDIN, JANUARY, 1886.

decorative feature Dunedin: Coulls, Culling & Co., Printers and Stationers, Crawford St. MDCCCLXXXVI.

# Educational Institute of New Zealand.

# Officers of the Institute.

decorative title

# President:

- Mr W. S. Fitzgerald, Otago.

# Secretary:

- Mr D. White, M.A., Otago.

# Treasurer:

- Mr A. B. Thomson, Napier.

# Members of the Council.

- Mr Henry WorthingtonAUCKLAND
- Mr C. F. Bourne, M.A.AUCKLAND
- Rev. T. FlavellAUCKLAND
- Mr A. B. ThomsonHAWKES BAY
- Mr George ReidTARANAKI
- Mr J. ThomsonWANGANUI
- Mr A. Wilson, M.A.WANGANUI
- Mr A. Purdie, M.A.WELLINGTON
- Mrs FrancesWELLINGTON
- Mr T. S. Foster, M.A.NORTH CANTERBURY
- Mr C. Chilton, M.A.NORTH CANTERBURY
- Mr J. G. L. Scott, B.A.NORTH CANTERBUBY
- Mr John BaldwinNORTH CANTERBURY
- Mr J. WoodSOUTH CANTERBURY
- Mr J. B. ParkOTAGO
- Mr W. Milne M.A.OTAGO
- Mr W. J. MooreOTAGO
- Mr James ReidOTAGO
- Mr John NicholsonOTAGO

# Education Institute of New Zealand.

decorative title

The third annual meeting of the Council of the Educational Institute, was held in Dunedin in the Normal School on Wednesday, the 6th January, when there were present: The President, Mr W. S. Fitzgerald, Otago; the Secretary, Mr D. White, Otago; Mr H. Worthington, Auckland, Acting Treasurer for Mr A. B. Thomson, Napier; Messrs A. Macarthur, Auckland, G. Reid, proxy for Taranaki, J. Thompson, Wanganui, A. Purdie, M.A., Wellington, A. Wilson, M.A., proxy for Wanganui, C. Chilton, M.A., Christchurch, T. S. Poster, M.A., Canterbury, J. G. L. Scott, B. A., Canterbury, J. Baldwin, North Canterbury, J Wood, South Canterbury, J. B. Park, Otago, W. Milne, M.A., Otago, James Reid, Otago, W. J. Moore, Otago, J. Nicholson, Otago, Rev. T. Flavell, proxy for Auckland, and Mrs Frances, Wellington.

Mr WHITE said that Mr Thornton, of Greymouth School, was present, but could take no part in the proceedings as there was no branch of the Institute at Greymouth. Still the members were very clad to see him present.

The PRESIDENT formally welcomed Mr Thornton.

# President's Address.

The PRESIDENT, Mr W. S. Fitzgerald, then delivered the following address:—Gentlemen,—Before beginning the business of our session, allow me to assure you of the great pleasure with which we of Otago welcome you to Dunedin. We happily are not wholly strangers to each others—some of us have sat at the council table in Christchurch, others at that in Wellington, and more of us took part in the somewhat premature general meeting of the Institute in Auckland. We of the South were received in the North with exceptional courtesy, cordiality, and good cheer, and we hope we shall be able to receive the men whom the Northern Branches of the Institute delight to honour in a manner which will clearly show our appreciation of their reception of our representatives. Gentlemen, I have to thank you for the honour you have done me in calling me to preside at this Council table—the highest honour which the Institute has in its power to confer on any of its members—an honour to me particularly grateful.

I am to-day taken back to the time when the thoughtful among New Zealand's colonists were anxiously awaiting the development of the national scheme of education, which they knew must make or mar the future of their adopted country; to the evening when the scheme of the New Zealand Educational Institute gradually unfolded itself before me. Sitting in the quiet of my room, I could calmly write how the honoured Otago Schoolmasters' Association should merge itself in the Otago Institute, with its branches embracing every corner of the land south of Waitaki and the Lakes. I could describe how my old brethren of Canterbury should hold out the right hand of fellow-ship to my new brethren of Otago, and jealousies born of the Waitaki should perish as in her deadly waters. With some excitement I ventured on the unknown North, and, judging that our fellow workers there must be of like fashion with ourselves, embraced it also in the wide-spreading scheme; but when my imagination pictured the men of Auckland, and her sister provinces of the North, meeting those of Canterbury and the South—meeting in this room, No. 9, Dunedin Normal School—to form just such a representative Council as this, the daring idea took such possession of me that I could write no more, and for some time gave myself up to one of the pleasantest waking dreams of my life. In that council of the imagination the meanest place contented me; judge, then, of the pleasure you have done me in thus calling me to occupy in reality the most honourable position. Gentlemen, this room, No. 9, Normal School, Dunedin, should be a place honoured in the history of New Zealand's education. It was the birthplace of the Otago Educational Institute—the eldest sister of all our Branches—for here in 1877 an enthusiastic gathering of educationists filling the room to overflowing, passed the resolutions which created her. In 1878, the constitution upon which all others have been moulded was here adopted. It was here that the educationists of Otago bade "God speed" to Dr Hislop when he was called to the North, that his well-known wisdom, tact, and experience might be available in directing New Zealand's new phase of educational development; it was hero that the Dunedin Branch discussed with me the draft constitution which the Institute last session adopted in Auckland, and under which we now sit. These, and many other events of interest have been witnessed within its walls, and we considered it a fit place for the first meeting of our council in Dunedin. May our work within it surpass in importance and success all that has gone before.

Gentlemen,—The position which we occupy is one of no slight importance and responsibility.

The Educational Institute has provided a platform on which educationists of all kinds may meet and discuss whatever questions are of interest to them. On this platform the practical educator may meet the theorist; the teacher may meet the parents of the taught; the administrator on Education Board or School Committee may meet the taxpayer and the teacher; the member of Parliament may meet his constituents; all are welcome to speak or to hear of educational questions. The Institute has provided the platform of breadth sufficient for all parties, and throughout the Colony it has been occupied to a greater or less extent by all—an extent greater than was at first anticipated, and steadily increasing, but still falling far short of what we desire. It is largely in this occupation of our broad platform that our influence lies, and it is with regret that I notice within the Institute "Teachers' Associations," "Teachers' Institutes," &c. These Dames maybe reporters' mistakes, but their repetition in the same connection suggests the necessity for a committee to examine and report on the regulations of the District Institutes sent to the Secretary of the Council in accordance with Clause 12 of the constitution.

Under the peculiar circumstances of Now Zealand it was necessary that the Education Act should leave the details of administration almost entirely to the District Boards of Education. The educational conditions of Districts were, and continued to be, widely different; and it has thus been necessary to leave with District Institutes full power of independent action in connection with local questions. It is with pleasure we notice these speaking and acting with an authority that must influence public opinion; and those who during the last few years have watched the course of public opinion on education must have noticed that the District Institutes have again andagain influenced itsdirection, and are thus performing effectually one of their most important functions.

In some of the more important Districts there is a growing inclination on the part of Education Boards to consult the Institutes on practical questions, thus affording evidence of the ability, prudence, and success, with which these are managing their affairs, and the good sense of those who, seldom being educationists, recognise the value of the practical experience to be found in the Institute. But the importance of position and consequent responsibility to which I allude are especially those of this Council. In the earlier days of our existence the results of our dealings with the Education Department were frequently most discouraging. As District Institutes we had comparatively little influence on national administration, but as soon as we had completed our organisation our position was fully recognised, and our proposals were received with all the respect and consideration we could desire. Our Auckland proposals were submitted by the Minister of Education to the Inspector General of Schools and District Inspectors, for their reports. These reports were considered and analysed, the whole of the papers were printed, and were presented to both Houses of Parliament by command of his Excellency the Governor. This, gentlemen, is a position which, so far as I know, has never been accorded to any similar body. I have laid these papers on the table, and to those who have not already seen them, I have no doubt but they will prove most interesting. It will be seen that our proposals were received with a general approval; that difference of opinion existed on several details; and that the new syllabus of instruction is largely the result of our Auckland proposals.

The Department has used its influence with the New Zealand University to secure for us the privileges we asked in connection with the higher grade certificates, and we are indebted to Mr Habens for the efforts made on our behalf, both in his capacity of Inspector-General and member of the University Senate.

To carry out our proposals with regard to the Inspectorate would necessitate an amendment of the Education Act, and the wisdom of attempting that in the present position of parties in the House is at present questionable. It will be our duty to acknowledge the consideration which has been given to our proposals and the measures of reform which have been granted by the Department.

The strength of our position as a Council lies largely in the assumption that we represent the District Institutes of New Zealand, that the questions we discuss here have been already discussed by them, and we are here to represent them on these questions. It is to be regretted, then, that several of our District Institutes are not represented by their own members. It is true they may have given full instructions to their representatives, and we know they have given us the influence of names well known in our educational world, and the help of wisdom and experience that will be most valuable; but still the fact remains that Auckland cannot speak for Otago, nor Canter, bury for Wellington. We regret it, but we are not discouraged. It is not the first time in the history of representative institutions that the burden of representation has at first lain heavily on the weaker constituencies. Seven years ago we looked forward to such a meeting in Dunedin as the present, and we are safe in predicting that if we guide our affairs with discretion when it falls to Dunedin again to receive the members of the Council of the Institute every chair will be filled by men who have well earned the honour and privilege of representing their own district in this our educational parliament. It would be a matter for regret should the representation be confined to the larger District Institutes, and in them to those whose incomes can bear the cost of travelling. The smaller Institutes may not be able to send to the extremities of New Zealand all the representatives to whom they may be entitled, but were their membership and financial arrangements what that they might be, there should be no difficulty in meeting the expense of at least one representative. Every teacher of every public and secondary school in New Zealand should be a member of the Institute by whose labours he is profiting more and more every year, and the District Institutes might well send him his card of membership and request his subscription, throwing on him the onus of refusing us his assistance. We must have money, and, were all members who should be, but a trifle from each would suffice.

Since our last meeting sickness and death has been at work in our ranks. Dr Macdonald, who so well did his part in our first meeting in Christchurch, and who promised to be to us the tower of strength he had long been to the Educational Institute of Scotland, is still incapacitated from active work. Mr Stables, well known for his zealous labours, especially to the members of the old association, has passed away. Mr Montgomery, long my own colleague, and one of the ablest and active members of the Otago Institute, was lost to us soon after the Auckland meeting. Mr Cumming, long the distinguished head of West Christchurch school, an able inspector under the North Canterbury Board, and an active member of the Institute, has also gone to his rest. Mr P. K. Holmes has also gone. He was for 30 years well known among Wellington educationists, and for many years treasurer of the Wellington branch of the Institute. We miss them from our counsels, and we sympathise most deeply with those who mourn their departure from their hearths ana homes. Gentlemen, we have much to do in the little time at our disposal. I shall no longer detain you from your labours.

Mr FOSTER moved, and Mr WORTHINGTON seconded, a vote of thanks to the President for his address, which was unanimously accorded.

## Committees.

Committees were appointed to consider the following matters:—Teachers' pension fund; appointment of teachers; school age; the pupil-teacher system; scholarships; and system of drawing and drawing-books. A special committee, consisting of Messrs Worthington, Scott, and White, was appointed to draw up a balance sheet and consider the financial position of the Institute. The committees arranged to meet in the afternoon and evening, to prepare the business for to-day's meeting.

## General.

Mr WHITE said he thought the Institute should express its thanks to the Hon. Sir Robert Stout for his exertions in their interests.

The Rev. Mr FLAVELL gave notice of a motion to that effect.

Mr BALDWIN drew attention to another subject which he thought should come under the consideration of the Institute, viz., the case of a pupil teacher in the Canterbury district who had been charged with assaulting a pupil, and who was handcuffed in the schoolroom and marched through the streets in broad daylight. He understood that it was very doubtful if any assault had been committed, and in any case the teacher need not have been subjected to such an indignity.

It was resolved to admit the Taranaki Institute as a Branch of the Zealand Institute.

Before separating it was agreed, on the motion of Mr White, that the Council sit to-day from 10.30 a.m. to 12.30 p.m., and from 2.30 to 4 30 p.m.

Mr WORTHINGTON was appointed Acting Treasurer.

The SECRETARY laid on the table reports and parliamentary papers relating to education in New Zealand.

Mr BALDWIN laid on the table papers relating to the imprisonment of a pupil teacher at Christchurch.

The SECRETARY read authorities constituting the Council of 1886.

On the motion of the Secretary, the time of meeting was fixed at 10.30 to 12.30, and 2.30 to 3.30 p.m. daily.

# Second Day's Meeting, Jan. 7th.

The Council resumed its sitting.

All the members of the Council were present. The President, Mr W. S. FITZGERALD, presiding.

## I.—'Teachers' Pensions.

The Committee appointed to inquire into teachers' pensions' relief fund reported that they failed to see any practical way of carrying into operation the principle involved in the resolutions with reference to pension and relief funds forwarded by the Auckland, 'Wellington, and Nelson Institutes.

Mr WORTHINGTON moved the adoption of the report, which was agreed to.

## II.—The School Age.

The Committee appointed to inquire into the question of school age reported as follows:—

In view of the fact that the question of compulsory age and the age at which children may attend school, has been occupying the attention of the Press of the Colony, and has been recently referred to in Parliament as a subject requiring consideration and amendment, the Committee consider it desirable to submit the following statements on the subject:—

- That the age which children may attend school in New Zealand is from 5 to 15 years of age. It has been proposed to raise the age to 6 or 7.
- An examination of the statistics of other countries as to school age shows that New Zealand has, generally speaking, a higher initial school age than any other country. The following figures illustrate this:—England, 3 to 18; Scotland, 3 to 18; Victoria, 3 to 16; New South Wales, 4 to 14; United States, 4 to 14; New Zealand, 5 to 15.
- There are 20,000 pupils in the schools of the Colony under 7 years. To raise the age to 6 or 7 years would have the effect of saving £10,000 or £20,0(.'0 annually, but would result in closing schools in the outlying districts, or would lead to the establishing of aided schools, in which there is no guarantee that the teachers will be competent and efficient.
- Since there is no average age at which pupils must pass the First Standard, fixed by the Regulations of the Department, there is no inducement to force the pupils beyond their powers, and no occasion to resort to undue pressure.
- To allow children to go 7 years without regular instruction would be highly detrimental to a sound course of instruction.

It will be seen from the foregoing statements that the Committee are decidedly against raising the school age.

Mr WHITE moved the adoption of the report, Mr J. G. L. Scott seconded the motion. Report adopted.

## III.—Pupil-Teacher System.

The Committee reported:—

That the syllabus of subjects of examination for pupil teachers should be uniform throughout the Colony, the examinations to be conducted by the Central Department; that it is desirable that the engagements of pupil teachers be for five years before their admission to a Normal School; that there are too many pupil teachers employed in some of the provincial districts.

A motion that the report be adopted was moved by Mr. JAS. REID, and carried.

## IV.—Scholarship System.

The Committee recommended:—

- That the existing arrangements as to district scholarships should give place to an approximately uniform system for the whole Colony.
- That by "approximately uniform" is meant uniformity as regards age, subjects of examination, relative value of subjects, and length of tenure.
- That the system should be such as to bring the scholars into secondary schools at an age at which a secondary course can be commenced under favourable conditions and to enable them to continue their attendance at these schools until they have had time to qualify themselves for University scholarships.
- That a satisfactory Bystem might be developed on the following outlines:—Scholarships to be of two kinds, junior and senior, and of each an equal number. Candidates for the former to be under 13 years of age; the subjects of examination to be confined to the work of the Fifth Standard, and the period covered to be two years. Candidates for the latter to be under 15 years of age; secondary subjects to hold a prominent place in the examinations, and the period covered to be three years. Special provision to be made for scholars obliged to reside away from home.
- That all holders of senior scholarships should be required to matriculate at the end of the tenure of the scholarships.

On the motion of the Rev. T. Flayell the report was adopted.

## V.—Appointment and Payment of Teachers.

The Committee recommended:—

- That no appointment of teachers to public schools should be made without previous consultation with the district School Committees, and that in the appointment of assistant teachers, Committees should be requested by the Boards to consult the head teacher, and to send to the Board their recommendation as well as that made by the head teacher.

Mr J. G. L. Scott moved the adoption of the report. Carried.

## VI.—Drawing.

The Committee recommend the adoption of the following resolutions:—

- That the Council approve of the introduction of drawing as a compulsory Standard subject, for they are of opinion that if this is properly taught and carefully examined, it will be of great value in training the observational faculties.
- That this Council trust that as drawing is now a pass subject, it will be judged from the authorised series of text books in the same manner as writing now is.

The report was adopted on the motion of the Rev, T. Flavell.

## VII.—Financial.

The following resolutions were adopted:—

- That in order to meet present requirements, the Treasurers of district Institutes represented be asked to advance the sum of £1 on account of each delegate, that sum being considered as part payment of the subscription for 1886.
- That the Secretaries of the district Institutes be requested to forward subscriptions to the Secretary on or before the 30th November, 1886.

## VIII.—Retiring President.

Mr H. "Worthington moved that the following resolution be submitted to district Institutes for consideration:—

That each succeeding President of the Council and Institute shall be declared a member of this Council for so long a period as he shall continue to be a member of any Branch of this Institute.

Motion lost.

## IX.—Scientific Education.

Mr Bourne moved—That with a' view to the formation and encouragement of sound instruction in scientific subjects it is desirable:—

- That Education Boards should appoint science teachers in order to carry out the requirements of the syllabus with respect to science.
- That an annual examination in such subjects should be instituted by the Education Department, and that prizes or certificates, or both, should be awarded upon the result of such examinations.
- That the Education Department should, under reasonable restrictions, supply to School Committees apparatus for use in teaching of natural science, at reduced prices.

The resolution was carried.

## X.—Secondary School Examinations.

Mr Bourne moved:—

That in the opinion of this Council an examining syndicate should be appointed to conduct the inspection and examination of secondary schools throughout the Colony.

Carried.

## XI.—Standard Regulations.

Mr Milne moved:—

That in the opinion of this Council, Rule 6 of the Standard Regulations for 1885 ought to be amended as follows:—The words "during the three quarters preceding the quarter in which the examination takes place" should be omitted, and these should be inserted in their place, "since the last examination"; and that the words "the three quarters" (repeated) should be altered to "such period."

Mr MOORE seconded the motion, which was carried.

## XII.—Calculation of Percentages.

Mr WORTHINGTON moved:—

That in the opinion of this Council Rule 9 should be amended by inserting after the word "pupils" the words "in classes S 1 to S 6, inclusive."

Mr MOORE seconded the motion, which was carried.

## XIII.—The Minister of Education.

Mr WORTHINGTON moved:—

That the thanks of this Council be tendered to the Hon. Sir Robert Stout for his efforts to further the interests of the New Zealand Educational Institute.

The motion was carried unanimously.

## XIV.—Training of Teachers.

Mr J. B. PARK moved:—

- That a Committee be appointed to consist of the mover and the officers of the Institute, to draw up a report on the practical training of teachers.
- To state what they consider the most desirable shape and size for class-rooms in large elementary school buildings.

Mr WHITE seconded the motion, which was carried.

## XV.—Pension Fund.

Mr WORTHINGTON moved:—

That as the Committee appointed to consider the subject of pension fund has reported that it is unable to recommend any practical method of carrying into operation the principles involved in the resolutions forwarded by the Auckland, Wellington, and Nelson Institutes, this Council relegates the subject to the District Institutes for further consideration, and that the Society be asked to report the results of such further consideration at the meeting to be held in January, 18S7.

Mr PARK seconded the motion, which was carried.

## XVI.—Standard Examinations.

Mr MILNE moved:—

That in the opinion of this Council the following addition should be made to Rule 7 of the Standards:—"That in any one year, classes Standard V. and Standard VI. may be taught and examined together in the history prescribed for Standard V., but in that case in the next year Standard V. and Standard VI. must be taught and examined in the period 1714 to present date. Similarly in any year Standard V. may be taught and examined with Standard VI. in the geography prescribed for Standard V., but in that case, in the next year Standard V. and Standard VI. must be taught and examined in the geography prescribed for Standard VI."

Mr REID seconded the motion, which was carried.

## XVII.—The Lower Heathcote Assault Case.

Mr. BALDWIN moved:—

That this Council, having considered all the circumstances in connection with the arrest of a pupil teacher at the Lower Heathcote school for alleged assault, heartily approves of the action of the North Canterbury Institute in bringing the case before the Minister of Education, and that this resolution also be forwarded to the Minister.

Mr FOSTER seconded the motion, which was carried unanimously.

The Council then adjourned until 10.30 a.m. next day.

# Third Day's Meeting.

All the members of the Council were present. The President, Mr W. S. FITZGERALD, in the chair.

It was resolved to hold the next meeting at Christchurch, January, 1887.

The following were elected officers for next year:—President, Mr George Hogben, M.A.; Secretary, Mr H. Worthington; Treasurer, Mr J. G. L. Scott, B.A.

Votes of thanks were passed to the retiring President, Mr W. S. Fitzgerald, and Secretary, Mr D. White.

In the evening, a dinner was given to the visitors at the Shamrock Hotel, at which the Premier (the Hon. Sir Robert Stout), Drs Stuart and Salmond and others were present. The Premier, in the course of an address, said he cordially agreed with most of the resolutions passed.

This concluded the business, and the Council adjourned.

# Notice to Secretaries district of institutes

# Rules XI. and XIII.

11. That notice of business shall be given to the Secretary of the Council through Committees of Management of District Institutes in time to enable him to communicate it to the editors of the New Zealand Educational Papers at least two months before the meeting of the Council, and that no other business shall be brought before the Council without permission of the Council formally obtained.

13. Thai each District Institute shall pay annually to the Treasurer of the Council, not later than the first day of its annual meeting, the sum of £1 for each representative such Institute is entitled to elect.

# Ex-Presidents.

- Mr Henry Worthington, Auckland, 1884.
- Mr W. S. Fitzgerald, Otago 1885.

# Officers of the Council and Institute for 1886-87.

# President:

- Mr George Hogben, M.A., Canterbury.

# Secretary:

- Mr Henry Worthington, Auckland.

# Treasurer:

- Mr J. G. L. Scott, B.A., Canterbury.

Science for the Middle and Upper Classes.

A Suggestive Memorandum for the Consideration of Persons Interested in Educational Progress.

By T. Twining,

Author of "science for the People," "science Made Easy," "technical Training," etc.

London: J. J. Griffin and Sons, 22 Garrick Street, Covent Garden, W.C. 1885.

# Explanatory Note.

The Manuscript of which the following pages are a revised edition, with considerable augmentations, was originally addressed by me in May 1870 to Dr. Leonhard Schmitz, Ph.D., LL.D., &c. &c., then Principal of the International College, Spring Grove, Isleworth, who had kindly expressed a desire to know my opinions in reference to the important subject of Scientific Education. To that Institution frequent allusions are made in my remarks, under the name of "The College," and to its organization my proposals were particularly intended to apply. Nevertheless, as the principles expressed embrace many social levels, and as my suggestions are mostly of an elastic character, I trust that both may prove a convenient platform of discussion to Educationalists, and occasionally supply useful indications to practical Educators.

Perryn House, Twickenham.

*Aug.* 1885.

# Contents.

# Science for the Middle and Upper Classes.

# *Part I.*

# Chief Purposes.

AMONG the many modes of considering the scientific instruction to be incorporated in the proposed course of college studies, I will first select that of viewing it in reference to the chief purposes which it is intended to serve. They may be described under the following heads:—*Bionomic Purposes*; *Purposes of Intellectual Culture; Technical Purposes; Professorial Purposes and higher aspirations of Theory and Research.*

1. *Bionomic Purposes*. I have long used the term *Bionomy* to designate with convenient brevity, the Science of Daily Life, or in other words, that scientific and practical knowledge which alone can afford a safe and ready guidance in all matters affecting our physical well-being, our comfort, health and longevity. It consists of two parts or divisions: lstly, a selection of the most appropriate facts and principles of Mechanical and Chemical Physics, Chemistry, Natural History, and Physiology; and 2ndly, the applications thereof to the various actualities of ordinary life, including, for example, the Dwelling and its contents, Clothing and Food, and all that may promote comfort in Health and alleviation in Sickness.

It has sometimes been considered one of the privileges of wealth to dispense with learning; and certainly the Rich, who do not depend on knowledge for their daily bread, and who can pay servants for taking trouble off their hands, workmen for remedying what goes wrong in their dwellings, and doctors for curing what goes wrong in their bodies, and who moreover flatter themselves that the region of high prices is above the region of fraud, will not at first thought be so much inclined to take up Science through simply utilitarian motives, as are the Industrial Classes who absolutely require good health to secure their earnings, and good management to make them suffice. More mature reflection will however show that the points on which Science may beneficially guide the rich man's expenditure, increase in proportion as his social position multiplies his wants. Then again the pecuniary ability to assist the Poor, entails a proportionate duty to acquire that mental ability which purifies benevolence, and makes it yield unquestionable blessings. Lastly, supposing that paid knowledge could satisfactorily replace personal knowledge for material purposes, Science would still assert extensive claims on the favoured classes under the head which I have to consider next in succession.

2. *Purposes of Intellectual Culture*. Without interfering with the invidious question as to the relative advantages of scientific and classical culture, and as to the extent to which the latter can be satisfactorily replaced by the former, I shall feel perfectly safe, or at all events much safer than I should have felt a few years ago, in affirming that the ways in which scientific studies may be made to benefit the mind, will be found as varied as they are important; whether we look to them for a healthful exercise of the memory, for a disciplinarian drilling of the faculties of thought, for a progressive development of what is commonly called the

*bump of order* manifested by an increased love of method, accuracy, and truthfulness, for an unaffected appreciation of the advantages of intellectual over merely sensual enjoyments, or for an enlightened perception of the wonders which surround us, of the blessings strewed along our path, and of the delight that lies in pious thoughts of praise, thanksgiving and supplication.

3. *Technical Purposes*. The purposes hitherto considered are more or less of a *general* character. *Bionomy* or Science applied to the guidance of Daily Life, concerns the different classes of society in somewhat different ways, but it certainly concerns them all; its precepts are throughout based on the same elementary facts and principles, and as regards the youths gathered together in one College, its teaching may from beginning to end be the same for them all. Again, *Scientific Culture* should form a part of every liberal education, and though the direction of its development will naturally be swayed in after life by individual predilections, that diversity should be foreseen, but need not be carried out in a college curriculum. Now in the study of Science for *Technical purposes* there is a period of natural unison, but also a period of necessary divergence, for which special allowance should more or less be made according to circumstances. Artisan Students can not only acquire in common the whole of their General Scientific Foundation, but may go somewhat further in *Groups*, though these must afterwards divide and subdivide in search of special Technical Knowledge. Something similar as far as group instruction is concerned, may prevail among Students of higher degree, who look forward to positions connected with our various National Industries. If destined for instance to enjoy the possession, and consequently bound to direct conscientiously the management of large estates pregnant with agricultural or mineral wealth, or to superintend manufacturing or commercial enterprises, or perhaps to devote themselves to the medical profession, they must first acquire in common a substantial scientific foundation; but this done, it would be desirable that they should emphasise those lines of study which would more directly tend to the purposed end, especially if they are not likely to have an opportunity of extending their knowledge at one of the universities.—I reckon that if due care and discretion be used in the selection of the scientific elements most required, and a judicious method of tuition be pursued, youths of good natural abilities who have enjoyed all the advantages of a first-rate education on the most advanced principles, ought by the conclusion of their 15th or 16th year, to have already in their minds a very substantial scientific foundation, and whilst they consolidate and extend it during the remainder of their stay at the College, they may begin erecting any superstructure demanded by the career towards which they are called by their family associations, or by their own free choice. Thus for example, the future Land Owner may begin uniting in his mind the various intellectual ingredients which compose the very complex Science of Agriculture, and his Geology, Botany, and Zoology, his chemical analyses and his meteorological observations will all be more or less aimed in that one direction. The intended Mine Owner will not carry his Botany and Zoology beyond the general foundation, but Geology will thrive at their expense, Chemistry, say that of the Metals, will claim as much of his time as can possibly be spared for it, and the laboratory furnace will be his delight. A more varied class of chemical researches would be apportioned to the intended Medical Man; Geology would yield the precedence to Botany, and the study of the Animal Kingdom would be concentrated on Human Anatomy and Physiology.—And so on with a variety of professional and commercial callings, which it would be tedious to follow out in detail at present, though it is very essential that this should be thoughtfully done by those appointed to manage the scientific element in a system of college instruction, and that it should be done with every due consideration for the aspirations of the students, and for the conditions of their proposed career.

It is often a matter of great perplexity among parents to determine what profession or calling is to be selected for their boys; what these are inwardly best suited for, and in what direction they are likely to find the most favourable juncture of outward circumstances. This difficulty has perhaps contributed to the maintenance of the old system of education, which used to carry a youth to manhood, or nearly so, without pledging him to any career, and which in fact seemed almost designed to leave his mind free from any knowledge which might have been useful in one direction more than another. The great purpose of education at many of the public schools was considered to be the "drilling of the mind," and I have heard a friend really gifted with a considerable amount of natural intelligence, but imbued from childhood with ultra-classical doctrines, exclaim, "Knock as much Latin and Greek as you can into a boy's head till he is seventeen, and he will be fit to learn anything."—Fortunate under the circumstances were those who even at the age of seventeen, were allowed to turn the faculty of learning thus acquired towards the knowledge which was to be their future support. Young men of the best abilities were too often obliged to sacrifice their time, and strain their health, for several years more, in the pursuit of academic honours, before earnestly directing their minds to the real business of their lives.

Now among the peculiar advantages offered by a Scientific Education as a drilling of the mind, is the rapidity with which it develops in young men that compound faculty of cleverness, discretion and sound principle, which may enable them at a comparatively early age to make their way honorably in the world. It should in fact be so conducted as to make the brain a well-ordered repertory of practical information, which, if kept in proper trim, will be ever ready to exercise with lively à propos a beneficial control over the varied incidents of Daily Life.

I have little doubt, considering the rapid improvement of our educational systems, that ere long well educated boys of ten years of age will have acquired, in the lower stage of schooling, those scientific elements which hitherto advanced Schools have been called upon to supply. This will facilitate the selection of a calling long before the seventeenth year, and give the students the advantage of directing the latter portion of their studies accordingly.

4. *Professorial Purposes and higher aspirations of Theory and Research*.—In proportion as the various benefits, practical, intellectual, and technical, which Science can confer, become better appreciated, public opinion, strengthened by the example of foreign nations, will assign to *Savants* a higher social position, and a larger share in parliamentary and administrative honours. Consequently the number of young men of the upper social levels who may aspire to Scientific Professorships is likely to be greatly on the increase. It will be part of the duty of our Science Teachers to afford this description of Students, as far as practicable, special facilities tor the development of special genius, by favoring laboratory, field and observatory practice, and also by extending their discourses to many recondite facts, deep theories and untried hypotheses, which though unnecessary for general purposes, should be thoroughly known to those who would qualify themselves to speak of Science *ex cathedra*, or to extend their researches beyond its present boundaries. I need scarcely say that Science of this kind differs in tone, as much as in extent, from that which may be made to suffice for ordinary purposes. It habitually makes far more use of hard words, abstruse definitions and complex formulae. Its character, though not more enter prizing, is more proudly ambitious than that of the Science for technical or commercial purposes described under the preceding heading.

Though short may be the time available towards the conclusion of a seven years' educational Course like that proposed for the International College, for initiating in studies of this description, those Students who with the concurrence of their parents may select a scientific career, yet great may be the benefit conferred on them by indelibly impressing them at that important period, with a few leading principles, tending not only to promote their individual success, but also to make them instrumental in raising the general scientific status of the Country. With this view are suggested the following considerations:—

Professorial attainments should be specialized, yet at the same time always based on a broad and substantial foundation of general knowledge. There was a time when the whole known range of the Natural Sciences was not more than could be compassed by a single brain. As the realms of knowledge expanded, division of labour among many Savants, and the concentration of the mind of each of them on some special field of enquiry, became in most cases a necessary condition of success. At the present time the man who wishes to reach undisputed eminence as a professor, cannot, unless his mind be stored with an extraordinary amount of materials, build both broad and high. But in aiming at special distinction, general knowledge must not be disregarded. The different departments of Science are connected by cross-links in all directions, and it would be difficult thoroughly to master any one of them, without a certain acquaintance with nearly all. High social positions, like those which, as I have said above, give to the men of science in other countries a worthy share of influence over the fate of nations, must be reserved for the broadly enlightened and commanding intellects of those who with a thorough mastery of their specialty, unite a comprehensive knowledge, not only of the general laws of Nature, but also of all that is essential to the accomplished man of the world. It is obvious that commanding positions are not to be maintained by those who concentrate their attention exclusively on one subject, and hold it, as it were, so close to their mind's eye, that it intercepts the view of all the world besides; or by those who indulge in the delight of soaring high above the cares and duties of this earthly pilgrimage, seeking in the exercise of transcendent thought, a sensual and egotistic gratification of the fibres of their brain, rather than a means of serving their country, or of benefiting mankind. It is neither creditable in a moral sense, nor politic in a selfish sense, to affect to look down upon the utilitarian applications of practical Science. If we are free to disregard what may be useful to ourselves, we are not at liberty to neglect what may be useful to others. Again, those whose minds are continually in the upper regions, neglecting the common applications of Science to the homely concerns of Daily Life, are sometimes liable to exhibit a ludicrous ignorance which any intelligent housewife can correct, or to be baulked by trivial obstacles which any clever working man knows how to overcome, or to place themselves in a still more awkward position by giving orders which cannot practically be carried out.

In order that the pupils may be qualified as future Professors, for making equal head-way with scientific research and scientific propaganda, they must on the one hand be imbued with a clear and impartial appreciation of the various benefits which Science may confer on the world, or secure to itself, and on the other hand they must be taught to pay greater attention than is generally paid, to the different kinds and characters of oral or printed instruction, respectively calculated to meet the wants and capabilities of distinct categories of recipients, diversified by age, occupation, social level, and previous training.

I may here refer to my little Pamphlet entitled "Science in Popular Education," for indications respecting Science for the Working Classes, some of the principles of which might be adapted to other social grades.

Even Science has its fashions. Sometimes facts are the order of the day, at other times practical applications; or again, as in the Chemistry of the present time, the wind blows almost irresistibly from the darkest regions of the unknown, raising clouds of abstruseness and mystification that give a dismal and repulsive complexion to the face of Nature. The amateur Student who, unassisted by a professional friend, takes up a chemical work, shakes his head on seeing in page after page a mixture of algebraic formulae and ponderous polysyllables.

The following are specimens:—

- Hexabromodiazoamidobenzene
  ($C_6 H_2 Br_3 N_2 N H C_6 H_2 Br_3$).
- Methylhydroxypropylhydroxyacetic acid
  ($CH_2Me$. CH (OH) CMe (OH) COOH).
- Phenolazoacetometamidobenzene
  (NH Ac $C_6 H_4 N_2$: $C_6 H_4$. OH).

To show that there is good cause for dissatisfaction on the part of beginners, I may refer to the complaint even of one long accustomed to tread difficulties under foot. The celebrated French Chemist, Dumas, expressed himself to the effect that the complexity and uncouthness of modern chemical nomenclature, were something gigantic, and that he himself found it impossible to keep pace with all the new theories and verbal alterations which were flooding his favorite Science.

There would be comparatively little harm done if unpronounceable words and knee-deep problems were reserved for the advanced stages of chemical study, but the whole length and breadth of the Science is ever and anon ploughed up, and planted with new terms, in rows running entirely different ways from before, according to some principle of classification which presents a beautiful picture to a mind duly trained, by a thorough acquaintance with each part, to an appreciation of the connected symmetry of the whole, but which is a wilderness of incongruities to the unpractised eye.

It is a well known fact that the scientific classification which might suit an advanced Student, is not always that best suited for a beginner. Many Botanists, including my late distinguished friend Sir William Hooker, used formerly to agree to the expediency in many cases, of allowing a Student to make a practical acquaintance with a considerable number of Plants by the *artificial* medium of the Linnean method, before proceeding to group them by their *natural* analogies.

Since this was written, the Linnean Method has fallen more and more into disuse, so that at present one does not often find an opportunity of using a Flora conformable to it.

Now something like this holds good for Chemistry. It is far the best for the beginner to make himself first acquainted with the contents of a laboratory according to rules of convenience. Thus Oxygen, Hydrogen, Nitrogen and Carbon, which so largely constitute the solid, liquid, and gaseous surroundings of the Globe, and of which he probably has heard before, will welcome him close to the threshold, and it will be time enough when advancing from one convenient stepping-stone to another, he has reached a more elevated resting-place, to enter into the principles of valency and to group the Elements, now become familiar to him, as *Monads*, *Dyads*, and so on. Such a course is the more advisable, as the instability manifested of late years by chemical systems of classification and nomenclature, inspires diffidence as to future prospects, and one must be cautious in pinning one's faith to any system based on a comparatively untried foundation; especially if it materially interferes with the desirable progression of lessons from the familiar to the unknown, and from the easy to the difficult.

Prof. F. S. Barff in his "Introduction to Scientific Chemistry," acknowledges "that the explanation of properties by such terms as 'valency,' is only a convenient method of stating what we know about them, and the use of such terms may be only of short duration. It may be discovered that some of those substances which we now regard as elements, are not elements at all, but compounds. And even advanced knowledge may substitute some theory which may have a more sure foundation than the atomic theory. It is well to remark this, as young minds are often apt to espouse warmly views of a certain school, and to regard as facts what are nothing more than assumptions."

Professor Miller in the preface to his "Organic Chemistry" said, "The general method of classification adopted by that eminent chemist (M. Gerhardt) in his 'Traité de Chimie Organique,' excellent as it is in many respects for the advanced cultivator of the Science, is not however well adapted to the plan of a didactic work like the present; and it was judged preferable, after a preliminary sketch of the methods of investigation and classification employed, to commence the detailed description of the products of organic chemistry with that of a few of the best known and most familiar compounds derived from the vegetable kingdom, although their composition is less simple than that of many other organic substances."

Besides the perplexity of terms arising from the rapid succession of changes in our own Country, the advanced Student has to encounter in many departments of research, further perplexing discordances, when he seeks, as every thorough Student should do, to borrow information from foreign sources. Twenty years spent in various parts of the Continent having afforded me ample opportunities for judging of the importance and variety of these obstacles to intellectual advancement, I prepared towards the beginning of 1855, with the approval of Dr. Lyon Playfair (now Sir Lyon Playfair) suggestive indications of the points on which might be usefully brought to bear the authoritative labours of an International Congress of Savants, of which I hoped to induce the convocation on the occasion of the Great Paris Exhibition of that year. I should be happy at any time to supply the details of this project, of which peculiar circumstances prevented the realization. Since then, some progress has been made towards international uniformity in scientific matters. Thus, for instance, the use of the metrical system of weights and measures, and of the centigrade thermometer, has become a standard improvement in chemical and physical works. Other desirable changes are looming in the distance, and generally speaking more readiness now prevails among our eminent men than formerly, to adopt improvement irrespective of its birth-place.

An auspicious example lies in the late adoption of an universal meridian.

Nevertheless, in the vast field of scientific knowledge, what has been done towards collating facts and theories, systems of classification, nomenclatures and synonyms, books and charts, appliances and practices of various nations, towards improving one thing by the other, and towards fusing the whole purified mass into one common fund of information, is little as compared with what has yet to be done. Every furtherance that can be given to the enlightened cosmopolitan spirit through which alone the scientific union of nations can be effected, should be hailed with satisfaction, and I look forward with particular interest to the future influence which may most appropriately be exercised in this direction by distinguished pupils of International Colleges.

It is not easy to say to what extent there may have been a foundation for the reproach of venality which has too often been addressed to men of science in this Country. The very fact that no provision has hitherto been made on a scale worthy of a great nation, for enabling men of recognized genius to carry on researches fraught with general advantage, but pecuniarily unprofitable, has had for its natural consequence that in many instances they have been obliged for the sake of their families, to consult their finances rather than their patriotic inclination, in the employment of a large portion of their time. This was legitimate; but sometimes eminent men have been accused of lending the support of their name to commercial speculations not altogether deserving of such a lift, whilst analysts have been suspected of apportioning their approbation to the amount of their fees.

Against foibles like these, our aspirants to genuine fame should receive a friendly warning, and not less so against another class of indiscretions which have done incalculable injury to the cause of scientific progress, by inducing an unfortunate notion that Science in general is inimical to Religion.

I must say that in my humble opinion, the two educational parties between whom a barrier has thus been raised, are both to blame for its existence.—First as regards the true interests of Religion, I believe that there is short-sighted wisdom in the councils of those Churchmen who deprecate all onward progress, till they are absolutely tugged along in the wake of that public opinion of which they ought to be the pilots. Galileo's assertion that the earth turned round, was pronounced to be in direct contradiction to the Bible, and necessarily heretical anil false. That assertion is now undisputed in nearly all enlightened countries, being pronounced by the highest authorities of the Church to be perfectly consonant with Scripture, provided you give to the Mosaic expressions their proper interpretation.

The only example of tenacious adhesion to the old idea that has come to my knowledge, was related by a friend, who had seen at Naples a School Book, in which the Copernican system was denounced as a heresy that prevailed in some northern parts of Europe.

Now many a stumbling-block to the faithful, many a cause of worse than fruitless controversy, might be removed by the same expedient of a proper *interpretation*, and the new facts revealed by Science, made as harmless as the fact that the earth turns round.—The best friends of the Church are those who deprecate a waste of means in the fortifying of untenable outposts, which become, sooner or later, so many strongholds of the enemy, and who recommend a timely concentration of forces in the citadel.

On the other hand, I must confess that our savants have not always acted wisely or considerately. In some instances they have delayed the legitimate progress of ideas, by prematurely proclaiming to the world at large, theories not yet emerged from the purgatory of controversy. They have thus indiscreetly disclosed internal broils, created distrust among their friends, and opened weak points to the sarcasm of their enemies. At other times, they have prematurely reprobated what many would be disposed inwardly to condemn, but would prefer for awhile outwardly to retain.

I believe that through discretion and conciliatory demeanour on both sides, a compromise might be effected, equally advantageous to Science and to Religion, and that even Geology might be made to speak the truth innocuously. In the meantime, we may consider as a fortunate circumstance, that those depart- ments of

Science which have the most direct and important bearings on the requirements of Daily Life, are out of the way of all unpleasant collision with Theology, and that on the contrary, an acquaintance with the manifold resources which Nature offers for our benefit, tends most decidedly to raise the mind with pious gratitude towards the Supreme Being, of whose beneficence Nature is the hand-maid.

# *Part II.*

# Modus Operandi.

## *Preliminary data and remarks*

**It must be borne in mind that reference is here made to information concerning the International College, supplied to me many years since. A knowledge of these points is necessary for judging what alterations should he made in my remarks, and the subsequent proposals, in order to adapt them to educational establishments of different calibre and organization.**

I UNDERSTAND that the boys mostly arrive at the College about the completion of their 10th year, and leave about the completion of their 17th year, and that the 7 years of the College Course, each including three terms, correspond in normal progress to as many Classes.

I further understand that there will be similarly 7 Classes in the Science Curriculum, but that these will be reckoned apart from the other Classes, and wisely so. A boy, say of 12 or 14, may arrive as ignorant of Science as any can well be who arrive at 10. Consequently though his classical attainments, concurring with his age, may assign him an advanced place in the Classical Department, he will only be lit to be booked for the lowest Class in the Scientific Department. If regardless of this, he were set at advanced portions of Science, without the required training in elementary facts and phraseology, the little knowledge he might acquire with much difficulty, would be hollow, and practically almost valueless.

I am sorry to find that only 4 hours per week are contemplated for Science, though I am perfectly aware that in an Institution designed to introduce the study of modern Languages, and of the Natural Sciences, without setting aside Classical and still less Mathematical attainments, some reciprocal concessions must necessarily be made. I trust that an extra allowance may be granted for scoring arrears of ignorant boys, and that care will be taken to select competent and energetic Science Masters who understand the art of inspiring interest in what they teach; but at all events 4 hours per week are barely proportionate to the accomplishment of such objects as the following:—lstly, A comprehensive and sound acquaintance with the leading facts and principles of the Bionomic Sciences, and with their applications in Daily Life.—2ndly, The contemporaneous acquisition of certain branches of Scientific Knowledge, which if not indispensable in a utilitarian point of view, are essential in that of Intellectual Culture.—3rdly, A secure foundation for advanced studies, whether theoretical or applied.—4thly, A certain amount of special preparation for distinct scientific pursuits, whether technical or professorial.

I hope that in future years, when the value of a scientific education is better appreciated, a more liberal allowance of teaching time will become customary throughout the country.

A scheme of scientific studies framed to suit the purposes of one Institution, cannot be expected to meet those of another of an entirely different character. Hence it is to me by no means a matter of surprize, that your Professors should have found it impracticable to adhere to the draft with the sight of which you have favored me, and of which a portion is taken almost verbatim from the Syllabus of the Science Examinations at South Kensington. The scheme of scientific instruction of the International College, must of course, before acquiring anything like a permanent and stereo- typed character, be worked into shape by actual use; but in order to simplify and curtail that process, we must start with as near an approximation to what we are likely to want, as painstaking forethought can produce. We may incorporate in our projected curriculum materials borrowed from others, but only after cautiously scrutinizing and adapting them in detail, never losing sight of a certain chain of purposes which must run as a back bone from end to end.

### Distribution of Time and Subjects.

It will be convenient to divide the 7 years' Course of scientific studies into 3 Periods or Grades, respectively comprising 2, 3, and again 2 years. The scholastic year may be assumed to consist of 3 terms of 13 weeks each, making at 4 hours per week, a total of 156 hours of science-teaching in the year.

As a prominent feature of my proposals, I would suggest that in the first two Periods, two Scries or Courses of Class Lessons should progress contemporaneously:—A *Bionomic Course*, having for its main purpose to supply rules of daily guidance through life, derived from Mechanical and Chemical Physics, Chemistry and Human Physiology; and a *Cosmographic Course* comprising, chiefly for purposes of intellectual culture, the general aspects and the special physiognomies of the Creation, as embraced by Astronomy, Geology, Physiography and Natural History.—A Course of Bionomy given alone, would include notions of the three Kingdoms of Nature, and especially an acquaintance with Botany and Zoology sufficient for methodizing our knowledge of the resources supplied by the Vegetable and Animal Kingdoms; but in the proposed distribution of school studies, it is decidedly best to allot Natural History to the less overloaded Cosmographic Course, where with a view to intellectual culture, it can be developed beyond what would be required for Bionomic purposes. The two Courses will be continually exhibiting points of connection, and affording mutual support, and in fact neither could satisfactorily accomplish its purpose without the other.—The one starts from the Atom, the other from the grandest outlines of the Universe; they converge, and will be found to meet at that natural focus of our Studies,—The Human Frame.

In most courses of scientific instruction, it is desirable to go over the ground systematically more than once. In this reduplication, the first period, or Grade, may be likened to a pleasant reconnoitring expedition through an unknown region, with a light foot, but an observing eye, an attentive mind and a retentive memory. In the second Grade, the cursory survey becomes an earnest study, the mental grasp is more comprehensive, and its researches more deeply scrutinising. A third or superior Grade depends on prospective pursuits for the aim and character of its aspirations.—All this peculiarly applies to a seven years' course of College studies, as we shall have occasion to see, by and by, in analysing seriatim the successive scientific Grades corresponding to the above mentioned three Periods. For the present a few cursory remarks will suffice.

## *Grade* 1 *of the Bionomic Course*.

It has been seen that bionomic studies naturally separate themselves into two parts: an Elementary Division dealing with a selection of scientific facts and principles, and an Applied Division dealing with their applications to the actualities of Daily Life. Now the two Divisions of the 1st Grade will nicely fit into the two years of the 1st Period, each having about 78 hours of study.

Experiments of the most conclusive character have proved that even the children of the Working Classes are capable of imbibing Science, provided it be well selected, and suitably expressed, and there can be no doubt that it is much easier to teach it to the cultured pupils who come to a College. Nevertheless care must still be taken to impress facts by visual demonstration, and to give principles their simplest and clearest expression.

The elementary knowledge gained in the first year would be perfected and strengthened in the second by the useful and entertaining process of applying it in succession to all the most important requirements of Daily Life. Through Physiology, itself based on physical and chemical principles, the pupils would have acquired an insight into the constitution and functions of the human frame, and they would perceive its consequent requirements for development and maintenance, health, and comfort. They would therefore now be able to understand, and follow out consecutively, simple precepts of Hygiene respecting the selection of a site, and the general design of a House, its construction, fittings, and furniture, and the important subjects of Food and Clothing. As they proceed, they would here and there bring into use their physical knowledge, but especially they would find themselves engaged in a succession of interesting yet easy enquiries, which without too much straining their incipient acquaintance with Chemistry, would do much to develop it. The rationale of most of the processes connected with Domestic Economy admits of being briefly expressed in simple terms, but fuller explanations must be deferred for the second Period, together with those Symbols and Equations which so much assist the advanced Student in understanding them, but frighten and disgust the insufficiently qualified beginner.

## *Grade* 1 *of the Cosmographic Course*.

A brief and simple but impressive account of the Solar System would begin this Course, deeply engraving on the minds of the junior pupils, outlines probably not so entirely new to them as those of Physical Science. Everything should be postponed for a future period that might render these Elements of Astronomy a matter of hard study, or dry calculation. The memory should not be burthened with rows of figures, nor with more Constellations than might serve to give interest to winter evenings; and whilst the celestial mechanism should be made clear, easy, and attractive, by the use of the most effective apparatus and diagrams, care should be taken to preserve in those great revelations of modern Science, that majesty through which they awaken the highest aspirations of religious feeling.

Without going into conflicting cosmogonic theories, one might mark out hypothetically, and for the more convenient classification of existing geological appearances, the several stages of the Earth's History, of which those appearances are the mysterious records. This should be done cursorily, promising to respond in the next Period with a review of fossil remains, to the curiosity which a glance at the wonders of successive epochs is now intended to excite.

Taking next the Earth as at present constituted, one may give the pupils an opportunity of admiring all they can reasonably be expected to understand of the great features and phenomena of Physical Geography, and this may bring them to the conclusion of the 78 Lessons, or thereabouts, allotted to the Cosmographic Course in the first year.

At the opening of the second year of this Course, the pupils, who would have acquired elementary notions of Chemistry in the collateral course of the previous year, might be told of the three great divisions or Kingdoms of Nature, and of the manner in which the Science long known as Natural History, describes and classifies the objects comprised in these three natural divisions, according to distinctive characters, the detailed study and comparison of which is called Diagnosis.

It is worthy of remark, though scarcely a matter of surprise, that *Mineralogy* seems to have lost favor as a branch of Natural History, and whilst a very limited number of observers still pursue it *per se* on crystallo-graphic principles, the most useful Minerals are chiefly studied either chemically or geologically. As an off-set of Mineralogy in this latter direction, *Lithology*, or the study of ordinary Rocks and Stones, is both easy and interesting, and a review of the most useful ones would suitably occupy a few weeks at the resumption of the Cosmographic Course in the second scholastic year. The rudimentary chemical knowledge which it would involve would as stated above, have been supplied by the Bionomic Course of the preceding year, and in return, the lithological knowledge now acquired would be an accommodation to the Bionomic Teacher, who would find his pupils prepared in time for what be would have to say concerning the various kinds of Building Stone. I mention this as one among the many instances which might be adduced to show how necessary it is, that unity of purpose, and concerted arrangement should prevail throughout the instruction given by different Masters. Sometimes also it might be found necessary to move certain subjects, or portions of subjects, from their natural places, in order to make them coincide with seasons of the year specially favorable to their prosecution.

I will assume Mineralogy, or rather Lithology, Botany, and Zoology to divide between them, according to their respective importance and mutual convenience, the 78 hours of study available for the second year of the Cosmographic Course. This would be little indeed for a definitive range of instruction, but sufficient under good management, for initiating pursuits to be followed out in the next Period.

The main features of the Botanical Series would be as follows: *a.* Outlines of Structural Botany, *b.* Technical language of Diagnosis.

English and Latin if the boys are tolerably familiar with the latter language, otherwise English only. Just sufficient expressions should he learnt methodically, to make a starting fund. Others will he learnt as practical Diagnosis calls for them, and illustrates their meaning.

*c.* Practice at Diagnosis, either by finding out the names of easy indigenous Plants, under the supervision, and with the occasional assistance of the Teacher, or by carefully collating the various characteristics of fresh or dried specimens, or of reliable leones, with detailed descriptions.—The botanical studies of this first Period would be easy, practical, and entertaining; the more useful aims of this delightful Science would be reserved for the second Period.

Of Zoology not more would be required than might be rendered both easy and entertaining. The great divisions, and the most important of the subdivisions, are founded on characters easily understood and remembered, whilst the abstruse titles used in some departments, as for instance those of the Orders of Fishes, may be altogether avoided with little detriment. The main purpose in view, would be to convey a kind of knowledge which of its nature finds very ready access to the youthful mind, namely the manifold utility, remarkable instincts and habits, and marvellous peculiarities exhibited by the living tribes. Classification would be used to assist, not to tax the memory, and scientific nomenclature would in this department be rendered less prominent than elsewhere, in order to leave freer scope to sentiments of grateful admiration. Whether the Animal Kingdom be reviewed in descending or ascending progression, Man will be equally the chief structural type and centre of comparison. In both the Courses of which I have been sketching the First Grade, the pupils would be prompted to feel something like a *personal* interest, seeing as they would, so many rays of scientific light made to converge towards themselves, laden with intellectual and practical benefits. At the same time they would be taught constantly to raise their thoughts towards the Author of all good things, and to prove their grateful appreciation of these manifold gifts, by devoting their improved physical vigour and intellectual abilities, to the pious task of doing good.

## Grade 2, *or Advanced Bionomic Course*.

I am glad to see that the principle of going over the ground repeatedly in an expansive progression, is adopted in your draft, where the words "revision" and "extension" frequently occur. It is particularly in the second Period that this principle would receive its application. The 468 hours of Science teaching which its three years would command, and which I will assume to be again pretty evenly divided between two contemporaneous Courses, would add but few new branches of knowledge to those previously taken up, but these would be so altered as to give them for the second time the attraction of novelty. Many interpolations would be made, a less juvenile tone would prevail, and thanks to the foundation already acquired, a more scientific management of the subjects would be adopted.

Of the three years assigned to the Advanced Bionomic Course, the first will be occupied with *Mechanical* and *Chemical Physics*. Whilst time should be saved whenever possible by passing rapidly over easy things which the Pupils may be found to have sufficiently retained, some portions of Mechanical Physics should receive con- siderable accession; as for instance a fuller account of various methods of the applying and transmitting Power, and of the most useful forms of compound Machinery. Electricity and Magnetism, omitted or very briefly mentioned in the previous Period, would now be duly treated of; the necessity for a certain knowledge of chemical substances and affinities being no longer an impediment The Polarization of Light and Spectrum Analysis, might similarly be introduced, though the fuller development of such high class subjects might be reserved for the third Period.

The Chemistry of the second Period, occupying its 2nd year, though still elementary, and decidedly rather utilitarian than theoretical, would distinguish itself from that of the first Period by two prominent diiferences:—lstly. The Pupils having acquired a certain knowledge of the appearance and properties of the chief Elementary Bodies, and some idea of the regularity of the laws of Synthesis, or in other words, having certain distinct chemical images and positive facts in their minds, will now find it comparatively easy to understand the doctrine of Equivalents, and the use of Symbolic Notations. To explain these according to the newest approved system will be the first duty of the Teacher in beginning this second Chemical Course. He must however not over-rate the ability of his young hearers to take in what is perfectly familiar to himself, nor expect them to feel as much interest in formulas inscribed on a black board, as in experiments.

2ndly. There will not be as before the awkward necessity for either postponing the account of the processes by which the early chemicals are obtained, or naming articles not yet come to.

3rdly. The Teacher will similarly be able to go much more freely into the uses of chemical substances when describing them, and accordingly it is proposed that the applications of Chemistry to Domestic and Industrial Technology should be largely included. But in order to accomplish this, the fact that Science teaching at School is necessarily confined within narrow limits of time, must never be forgotten, and among the vast multitude of products which claim mention in a complete treatise of Chemistry, only those should occupy the memory of the pupils, which have a practical importance, or serve to illustrate some useful point of theory.

The third year of the second Period will be occupied with Physiology, and with the valuable guidance which that Science, supported by Chemistry and Natural History affords us in the form of Hygiene and Domestic Economy.—Thanks to the now considerably expanded Chemical Knowledge, it would become possible to include the results of the most recent researches as to the functions of the Blood in the production of warmth, in the manifestation of strength, in supplying plastic materials, or in eliminating effete ones from the system.

In most sciences the differences of tuition at different ages, depend almost entirely on the development of the ability to understand. In treating of Physiology, knowledge that might be unquestionably useful, must frequently be postponed from motives of propriety, which require strict attention and judicious management.

[P.S. 1885. I may refer to the "Synopsis" of the proposed development of the Parkes Museum for a care-fully classified enumeration of the subjects comprised in Hygienic Science. Its preparation was courteously entrusted to me, in consequence of the experience I had acquired in forming an educational collection of a similar purpose under the title of the Economic Museum of Twickenham.]

## Grade 2, *or Advanced Cosmographic Course*.

I would propose the division of this Course into 2 sub-series:—A, to include Astronomy, Geology and Physical Geography; B, to include Mineralogy, Botany and Zoology.

## *Sub-series A.*

*Astronomy*.—The revised study of the Solar System would bring in many problems no longer above the

Boys' comprehension, but of which the arithmetical solution might, for the saving of time, be handed over to the Mathematical Department.

*Geology*, or more properly speaking *Geonomy* (Account of the Earth or *Erdkunde*).—The general scientific knowledge acquired by the Pupils being now sufficient for the purpose, the Zoology and Botany of the succesive Geological Epochs, as illustrated by fossil remains, could be brought in, either separately, or intermingled with the account of the respective formations, and of the ascertained or supposed successive mutations in the distribution of Sea and Laud, as well as of the consequent climatological changes of the Earth's surface. Care would be taken, here as elsewhere, not to burthen the memory with names and forms beyond those required for illustrating the most essential types in the great scheme of progressive existences. Special care would also be required in this particular branch of scientific research, not to excite unnecessarily the spirit of scepticism and controversy, which it has often been accused of engendering, and to make Geology, on the contrary, productive of devout astonishment and awe; unfolding as it does the immensities of *time*, as Astronomy unfolds the immensities of *space*.

In using the term *Geonomy*, or *Account of the Earth*, my object has been to give the Teacher free scope for showing the close connection between *Geology*, which describes the changes wrought in the crust of our Globe, and *Physical Geography*, which whilst it deals with the present condition of things resulting from those changes, also serves in conjunction with its inseparable ally *Meteorology*, to supply us with a knowledge of the perennial agencies by which they have been effected. Hence the expediency of interweaving these Sciences for mutual explanation and evidential support.

## *Sub-series B.*

*Natural History*, to include as before, Mineralogy, Botany and Zoology. The mineralogical, or rather lithological knowledge acquired in the first Course, will probably only require cursory revision, but the review should be extended to Mineralogy proper, by including a selection of well-defined Mineral Types, such as the Onyx and the Opal, the Labrador Felspar, the Iceland Spar (double refracting Calcspar), the Tourmaline and Asbestos. *Zoology* may be rather abridged than extended in the process of revision, excepting the introduction of a few select notions of Comparative Anatomy.—By thus keeping down as much as possible the first and third of the three Kingdoms of Nature, more time will become available for Botany. This Science, besides the indispensable guidance it affords in studying the economic and medical resources of Daily Life, is so valuable a mental recreation for those who are in a position to command time and opportunities for its pursuit, it adds so much to the interest of Travel, and tends so much to promote the love of classification and methodical order at Home, that I would suggest its being considerably developed; the more so as it is, when suitably taught, a comparatively light subject, and one which like laboratory practice, if brought in as the last of the obligatory studies of the day, will often spin itself out into spontaneous pursuit.

## PERIOD III.

The appropriation of the two last years of scientific studies, will considerably depend on the progress secured in the foregoing ones. It may possibly be found necessary to recapitulate the previous instruction, mixing with it facta and explanations which may have been before omitted as not sufficiently easy; and this together with an extension of laboratory research in Chemistry and Physics, may demand considerable time; more so perhaps as regards the subjects of the Bionomic; than those of the Cosmographic Series. If, however, the pupils should be found to be sufficiently well grounded in both these series of subjects, it may be expedient to devote a considerable part of the third Period to the more advanced pursuits which I have described in a former part of this Memorandum, in speaking of *Technical* and *Professorial Purposes*. In this matter one should be guided by the aptitudes and predilections of the students, by their prospects, and in some measure by the capabilities of the scientific staff, and the resources at their command.

I have not yet mentioned Social Science, though it is indicated in your draft. The fact is that both as regards the natural classification of subjects, and also with a view to the more convenient distribution of professorships, Social Science, or rather the Social Sciences, should not be wedged into the closely packed ranks of the Physical Sciences. To explain how a more appropriate place should be provided, must be reserved for some future opportunity, and indeed is scarcely necessary, for I feel confident from the judicious and conciliatory spirit with which you have overcome the chief obstacles, that you will have no difficulty in so adjusting the various claims of the moral, philological, physical and other departments, as to make them all harmonize for mutual benefit and support.

P.S. Comprehensive indications of the various lines of advanced scientific knowledge required for responsible positions or leading professorships in the industrial world, and towards which collegiate or academic studies might be made to tend, will be found in my volume on "Technical Training" (8vo. 457 pages, Macmillan, 1874). It contains also in Chapter II. a few remarks on Science in Female Education, a subject not touched upon in the present Memorandum owing to its origin in connexion with the Spring Grove College for Boys.

# *Part III.*

# Working Details.

# *Suggestive Synopsis of Subjects and of the respective amounts of Teaching Time*.

# *Prefatory Remarks*.

THE following assumptions are not by any means obligatory, but may afford a standard of guidance in adapting the proposed curriculum to Schools variously organized.

—The Boys enter the School, after a preliminary examination in the subjects commonly known as "English," about the completion of their 10th year, and leave about the completion of their 17th year.

—To the seven years of the course of studies correspond, under normal progress, seven Classes or Stages of ordinary and of scientific studies; but the two series are reckoned quite independently of each other.

—There are three terms of about thirteen weeks each in the scholastic year, beginning respectively in September, January and April.

—The minimum of Teaching-time allowed for Science may be reckoned at 4 hours per week, making about 52 hours per Term, and 156 per year. The time of the day must be arranged to suit the convenience of the Professors. Assuming the foregoing rate, each of the two Courses indicated in this Synopsis as proceeding contemporaneously, will have two hours per week, and as one of them is divided into two Sub-series, each of these latter will have only one hour per week.

—The scientific Curriculum is divided into three Periods; the 1st embracing two years, the 2nd three years, and the 3rd again two years. In some schools it may be found preferable to allot four years to the second Period.

## Period I.

### COMPRISING 2 YEARS, AND CORRESPONDING TO CLASSES 1 AND 2.

First Grade Bionomic Course. 1st Year (Elementary Division). TERM. 1st. Rudimentary Mechanical Physics. 2nd. Rudimentary Chemical Physics. Chemistry. 3rd. Chemistry concluded. Natural History. (See the Cosmographie Course.) Human Anatomy and Physiology. Sub-series A. TERM. 1st. Astronomy. 2nd. do. 3rd. Geology (The Earth's changes). Sub-series B. Zoology. Organography and Botany Physiology. Principles of do. Classification. Practical Diagnosis. 2nd Year (Applied Division). 1st. Simple applications of Physics, Chemistry, Natural 2nd. History and Physiology to Domestic and Sanitary Economy 3rd. 1st. Lithology. 2nd. Physical Geography. 3rd. do. do. Zoology (continued). do. (concluded). Botany. (Herbaria. Practical Diagnosis.)

## Period II.

### COMPRISING 3 YEARS, AND CORRESPONDING TO CLASSES 3, 4, AND 5.

Second Grade or Advanced Bionomic Course. 1st Year. Mechanical and Chemical Physics with their common applications in Daily Life. Second Grade or Advanced Cosmo graphic Course. 1st Year. Sub-series A. Sub-series B. Astronomy. Mineralogy and Botany. 2nd Year. Chemistry, with Domestic and Technological Applications. 2nd Year. Geology and Zoology Physical Geography and Botany. 3rd Year. Physiology and its Applications to Hygiene. 3rd Year. Physical Geography, in Zoology its relations to Domestic and Botany. Economy and Hygiene.

## Period III.

## Comprising 2 Years, and Corresponding to Classes 6 and 7.

Recapitulation of previous studies, and especially of the Bionomic Course. Preparations for special pursuits.

# Origin of the Bionomic Curriculum.

# *N.B. This and the following Section are recent additions to the original Manuscript*.

As the selection of the range of knowledge comprised under the title of Bionomy, was guided by the experience gained through the Twickenham Economic Museum, it may be well to say a few words concerning that Institution, which has become a thing of the past, through its destruction by Fire in 1871.

The Labourers' Friend Society, the Committee of which I joined in 1847, rightly selected for its chief object, the improvement of the Dwellings of the Working Classes, but I soon discovered that it was not in this direction only, that reform was urgently needed, and noticing how great was the influence exercised on manufacturing industry by the Great Exhibition of 1851, I felt how desirable it was that the knowledge and ingenuity brought to bear on the fastidious exigencies of wealth and luxury, should stoop to the improvement of the domestic comfort of the Million. This idea, sanctioned by the Council of the Society of Arts in 1852, was embodied in a review of all that appertains to Household and Health Economy, classified on lines almost identical with those which I have followed up to the present time. This was addressed to the Chairman of the Society of Arts in the beginning of 1855, and having been translated into French, induced my Paris friends to add a Gallery of Domestic Economy to the Universal Exhibition of that year. Thus was started what I have been accustomed to call the "Economic Movement"; it was strengthened the following year by a special Exhibition of Domestic Economy, organized at Brussels by the eminent Philanthropist, M. Ducpetiaux. Of the echos which since that time have followed each other in various countries, I will only mention two:—The Amsterdam Exposition of 1869, which thanks to the exertions of Baron McKay, now Lord Reay, appears to have been a great success; and the Health Exhibition of 1884, which under an altered name, has still had for its main purpose the Domestic and Sanitary Welfare of the People at large, though extraneous attractions were wisely used for augmenting its popularity.

It has of course, been to me exceedingly gratifying to see the Economic Movement thus take root and flourish, unmistakably affording useful guidance to the producer, and enlightenment to the consumer, but I have felt all along that in the latter respect, it would be desirable to add expedients of a more strictly educational character; that taking advantage of the interest excited by sensational temporary Exhibitions, and turning to account the copious materials brought together by an advertising spirit, one ought to establish in the chief centres of population, and to keep constantly up to the level of scientific and industrial progress, Permanent Collections, typically representing all the departments of Household and Health Economy. Specimens, models, drawings, and in short every means of illustration, would be pressed into the service, good and bad should be contrasted, production and stages of manufacture displayed, and the rationale of everything explained, either by instructional labels, or by an appropriate Handbook. Thus visitors might learn in a manner at once impressive and entertaining "how their dwellings should be constructed, drained and ventilated, what household improvements they might derive from the discoveries of science, or borrow from the customs and appliances of other nations; what fabrics they should wear; what food they should eat, and how it ought to be cooked; how they might distinguish things which are genuine, wholesome, substantial, durable and really cheap, from those which are cheap only in appearance; and in short how they might live with judgement, and get the best money's worth for their money."

Such were the principles on which I began in 1856, and continued for 15 years, as unremittingly as my health would permit, the formation of my Economic Museum, so called from being devoted to Domestic, Sanitary, Educational and Charitable Economy. In a building erected near my dwelling at Twickenham, and provided with a workshop and laboratory, it occupied a hall about 80 feet by 30, on stands arranged in rows. Though the total length of display was over 600 feet, with a height of about 8 feet, the things contributed were already so closely packed, that a variety of devices had to be resorted to for gaining space. This I did not regret, for one of my chief objects was to show how any notable locality could have in a moderate space, a Museum of popular instruction, specially adapted to the occupations, means and resources of its inhabitants; and how by careful selection and condensation, and by employing ingenuity to save outlay, every School might with the co-operation of the boys, get together a very serviceable *Economium*. To this point I attach much importance, but must defer its consideration, my present object being to relate the educational conclusions impressed on me by my Economic Museum.

Nothing could be more satisfactory than the demeanour of the artisans, who through the instrumentality of the Working Men's Union, used to come down in groups from London to inspect it, or more earnest than the attention they bestowed, or more encouraging than their readiness to take advice; but what I wished was not merely to point out authoritatively what was right and what was wrong, but to make clear the "reason why," and so to train the mind of the visitor, that be might in all ordinary circumstanecs trust to his own good judgement. Now Science is so universally mixed up in the rationale of all that surrounds us, that neither the instructional labels, nor the oral explanations of the Curator, could possibly be entirely free from scientific phraseology, and unfortunately not even the most elementary scientific principles, not even the fundamental Laws ordained by God for governing the phenomena of Nature, had been included in the schooling, or the subsequent intellectual development, of any but a favored few among the visitors, to whatever social class they belonged, to whom the instruction of my Museum was addressed.

I naturally resolved to spare no pains to ascertain what branches of scientific knowledge were most essentially involved, a labour of analysis which it was obvious that my Museum itself offered unique facilities for conducting to reliable results. Physics and Chemistry were as might be expected found prominent everywhere; Human Physiology was indispensable for understanding the Laws of Health, and Natural History, that is to say, an insight into the resources supplied to us by the three kingdoms of Nature, and more especially by Plants and Animals, was not to be disregarded.—Such accordingly is the range of knowledge which constitutes the Elementary Division of Bionomy, whilst the Applied Division consists of the applications of this knowledge to the ordinary requirements of Daily Life. The circumscription of those requirements is of course very elastic, but every one will agree to such subjects as the following:—The Dwelling, including its site, design, materials, construction, fittings and furniture; materials and appliances for Heating and Lighting; Clothing; Food; public, domestic and personal Hygiene, including means of Comfort for the infirm, and of Safety, rescue and relief.

# Notes on the Bionomic Course.

# Elementary Division.

# Comprising Physics, Chemistry, Natural History, and Physiology.

N.B. THE portions printed in smaller type are suggestive enumerations of subjects which might be embraced by the Elementary Studies of the first Period. They are mostly borrowed from "Science made Easy," a connected and progressive Course, embracing in ten familiar Lectures the elementary Scientific Knowledge which underlies the "Things of Daily Life." For an account of this Course, and of its Pictorial and other Illustrations, see the descriptive Prospectus issued by Messrs. J. J. Griffin & Suns of Garrick Street, Covent Garden.

### MECHANICAL PHYSICS.

*Forms of Bodies* (These will be taught in the Mathematical Department).

*First Principles of Phiysies*:—Varieties of Attraction, e.g. Gravity, Cohesion, Adhesion, and Capillarity. Contending Forces resulting in the three conditions of matter, solid, liquid and gaseous.

With young beginners it is desirable to train the mind by an acquaintance with some of the most visible and tangible forms of Bodies, before attempting to make it realize the abstract conception of Matter, and understand the abstruse theories which prevail concerning it. These should be reserved for the second Period.

*Distinctive Properties of Bodies*:—Compactness, porousness; hardness; brittleness, toughness, malleability, ductility, tena- city; flexibility; elasticity; sonorousness; opacity, translucidity, transparency.—Crystallization.

*Comparative Weight*:—Specific Gravity of Solids. Comparative Density of Liquids; Hydrometers. Comparative Density of Gases; Balloons.

It is expedient to associate the Specific Gravity of Solids with their distinctive properties, leaving the mode of determining it for the subject of Hydrostatics.

*Rest and Motion*:—Inertia; Momentum; Centrifugal Force.

Many phenomena pertaining to this subject, such as Constrained Motion, may be deferred for the second Period.

*Gravitation*:—Increasing velocity of falling bodies. Centre of Gravity;—suspension, support, line of direction. The Pendulum.

*The Mechanical Powers*:—The Three Levers and the Wheel and Axle; the Pulley; the Inclined Plane; the Wedge; the Screw.

The foregoing to be shown in action, or *dynamically*, leaving for the second Period to demonstrate them *statically*. The students will then be more advanced in Mathematics. Moreover in now seeing the action of these Powers experimentally illustrated, they will have it impressed on the memory far better than can be done by any accurate calculations of equilibrium, whilst a clear notion will be established in their minds of the *Inverse Ratio of Power and Speed*.

*Locomotive Appliances*:—The Roller; Wheel Carriages.

*Hydrostatics and Aerostatics*:—Pressure transmitted in all directions.

"Water seeks the lowest level." Water as a motive power; Undershot and Overshot Wheels, Turbines, Rams, &c.

"Water seeks its own level." Water Supply; Fountains.

"Pressure according to depth."

Floating and submerged bodies. Determination of Specific Gravities.

Atmospheric Pressure:—The Air Pump. The Diving Bell. The Siphon; Intermittent Fountains. Suction and Force Pumps.—The Hydraulic Press.

Barometers. Measurement of Altitudes.

Notions of Meteorology:—Action of the Sun's heat in producing Wind, and of the latter in determining local temperatures; the Anemometer. Moisture; its measurement; its different forms, e.g. Dew, Clouds, Bain, Hail and Snow.

*Acoustics*:—Production, transmission, and reflection of Sound. Musical Vibrations and their relation to Pitch; their consonance, dissonance and interference.

## CHEMICAL PHYSICS.

**Though the term "Chemical Physics" has been objected to by some scientists, it is retained here on the authority of eminent authors as designating an intermediary position between Mechanical Physics and Chemistry.**

*Light*:—its production and transmission; Newton's Bays and the Wave Theory. Comparison with Sound. Velocity.—Reflexion. Diffusion. Refraction. Common Optical Instruments. Decomposition of the Solar Bay. The Spectrum. Theory of Colour.

*Heat*:—its production and transmission.—Expansion of Solids. Expansion of Liquids; Thermometers; the Centigrade as a standard graduation. Expansion of Gases; Ventilation. Convection; Conduction. Radiation; Reflexion and Refraction of Heat Rays; Diathermancy.—Changes in the condition of matter produced by the addition and subtraction of Heat. Latent Heat. Specific Heat. Phenomena connected with Ice, its production by Evaporation. Leading facts connected with Steam, and its uses as a motive power, and for heating, cleansing, &c.

*Magnetism*:—The Lodestone; artificial Magnets; polarity; attraction and repulsion. The Mariner's Compass. Declination and Inclination.

*Frictional Electricity*:—Positive and Negative; mutual action. Production; Electrical Machines. Storage; the Leyden Jar. Action of Points; Lightning Conductors. Electrometers.

*Voltaic Electricity*:—The dry Voltaic Pile. The Galvanic Cell; its multiplication forming a Battery. Differences between Frictional or Static, and Voltaic or Dynamic Electricity. Properties and effects of the latter:—production of Heat (Thermo-Electricity); Chemical action (Electro-Metallurgy).—Electro-Magnetism and Magneto-Electricity:—Galvanometers. The Needle, the Morse, and other Telegraphs. The Telephone.—The Electric Light.

Though the syllabic materials given are, as stated, mainly intended for the first Period, it has been found convenient to place here the whole of the subjects connected with Electricity, albeit many of them will be best taught in the second Period, and some need only be gone into in detail by those youths who in the third Period, are specializing their studies, with a view to becoming Electrical Engineers.

## CHEMISTRY.

**See also in reference to this subject, p. 11.**

## *Introductory*.

Explanatory examples of common chemical terms and processes, e.g. Chemical Affinity; Difference between Mechanical Mixture and Chemical Combination; Simple and Compound Substances; Synthesis and Analysis.—Solution; Precipitation; Filtration; Decantation; Distillation; Sublimation.—Crystallization.

It is a great comfort to the Teacher, as well as to the uninitiated student, that a free use of the most essential items of chemical phraseology be gained at the outset by appropriate explanations, supported by examples borrowed as far as possible from every-day life.

## *Inorganic Chemistry*.

Familiar indications of the properties and uses of select non-metallic and metallic Elements, and of their most notable Compounds.

As it is undesirable to have occasion to use unex- plained chemical phraseology, so likewise is there an awkwardness in naming chemicals not yet come to, as is too often the case when the Teacher, in introducing the early bodies, wishes to give an account of their preparation. A striking example is given by Oxygen, generally the first of all, of which the preparation involves the use of Potassium Chlorate or Manganese Dioxide. It is not a bad plan to group together a certain number of easy examples of preparation at the end of the elementary Inorganic Chemistry, but the explanation of the more complex processes should be reserved for the second Period, in order to have the benefit of the acquaintance with symbolic equations.

It is rather natural that in arranging an abstract of elementary Chemical Science for the first division of a Course of Bionomy, the classification should be devised in accordance with the utilitarian purpose in view, instead of being based on abstract theory. Thus for instance, the non-metallic bodies may be conveniently impressed on the memory of beginners by taking first the gaseous ones, Oxygen, Hydrogen, Nitrogen and Chlorine, and then the most important of the solid ones, Carbon, Phosphorus, Sulphur, and Iodine; Fluorine, Boron and Silicon being represented by their compounds, and Bromine and Selenium being left for the second Period. As for the Metals a popular selection of examples seems to admit of being classed very conveniently according to lines of usefulness. Such at least is the conclusion at which I arrived in organizing an Industrial Course of Chemistry, not published, but of which the Inorganic portion in 8 Lectures, was delivered at two London Institutions. That classification, rather popular than scientific, is given as follows, for the sake of any suggestive use of which it may be susceptible.

## THE METALS.

*The Common Metals*:—Iron, Zinc, Tin, Load, Copper.
*The Noble Metals*:—Silver, Gold, Platinum.
*The Liquid Metal*:—Mercury.
*The Alloy Metals*:—Nickel, Bismuth, Antimony.
*Metals of the Alkalies*:—Potassium, Sodium.
*Metals of the Alkaline Earths*:—Calcium, Barium, Magnesium.
*Metals of the Earths*:—Aluminium.
It would be optional to reserve Arsenic, Manganese, Cobalt and Chromium for the second Period.

## *Organic Chemistry*.

Chemical meaning of the term "Organic Bodies." Proximate and Ultimate analysis illustrated by means of some common article, such as Flour.—Leading characters of the main groups into which Vegetable and Animal Products naturally divide themselves; such as Saccharoids, Fats, Alkaloids, Coloring Matters.—The Alcohol Group. The Fermentations.—Chief Constituents of Animal Food: Albumin, Fibrin, Casein, Gelatin.

To what has been said at page 11 of this Pamphlet respecting the growing use made in Chemistry of *hard words*, I may here add that it is equally desirable to avoid *hard things*. It is a hard thing when nearly everybody is agreed as to the meaning of the word *Aeil*, to be told that Acids are Salts, and that their leader, Sulphuric Acid, is a Hydric Sulphate, being a combination of Sulphuric Anhydride with Hydric Oxide, alias Water. So on with Carbonic Acid and the rest. Pedantry like this is but too apt to disgust would-be students, and it is obviously more profitable to grant to each anhydride the modicum of Water which renders its properties available, and gives life to its acidity. There are many Organic Acids, which in their ordinary condition contain a determinate proportion of Water of Crystallization without being called "Hydrates," any more than we would call "Hydrates," crystallized specimens of Salts.

One of my chief reasons for writing, about 1871, the Industrial Course above mentioned, was that I wished to show that a much fuller account of Chemistry than that squeezed into two Lectures in my "Science made Easy" Course, an account in fact that might suffice for most Working Men, might equally be given without troubling their minds with those equivalents and symbolic notations, which however convenient they may be to a Student acquainted with the chemicals referred to, are stumbling-blocks to a beginner ignorant of them. Their use was accordingly dispensed with, not only in the 8 Lectures on Inorganic Chemistry, but in 12 devoted to Organic Chemistry. Now the same care should be taken in the Chemistry of the first Period of a Bionomic Course for Schools, Equivalents and Symbols being-reserved for the second Period, of which indeed they will constitute one of the chief distinctions. Roscoe, than whom one could not cite a better authority, distinctly says the study of Combining Weights, Symbols and Notations should *follow*, instead of *preceding* a visual acquaintance with the bodies to which they apply (Sec Roscoe's Chemical Primer. Macmillan. 1872). Prof. Barff in the Preface to his "Introduction to Scientific Chemistry" says, "I have always found that beginners have great difficulty in conceiving abstract numbers, and that symbols and equations are regarded by many as almost insuperable impediments."

It is a pity that a principle supported on first-rate authority should hitherto have been very little carried into practice, the above Primer for children, by Roscoe, and Rigg's "Easy Introduction to Chemistry," being the only examples to the purpose, that have come under my notice. It would be a great convenience to teachers of Chemistry at high-class Schools, where that science, if taught in earnest, must almost necessarily be gone through twice, between the ages of 10 and 17, to use a manual purposely written in two parts, or stages, approximately corresponding to our two Periods, and carefully avoiding the various drawbacks to which attention has been directed. The first would give main outlines and fundamental principles without symbolic notations, the second would introduce these, and in going over the ground again, filling in and extending, would make good use of them for explaining what cannot well be made clear without them.—Almost the only plan now available seems to be to select some comprehensive Manual, and to indicate by conventional markings on a standard copy, the subject matter to be taken in the first Period, and repeated in the second, that to be taken in the second only, and perhaps certain portions that may be omitted altogether, or reserved for a third Period. The copies in the hands of the pupils must of course be marked conformably. Trouble might be saved by a work giving in bold type the matter to be studied in the first Period, and in different print that to be taken additionally in the second Period.—When educational series present first and second stages, i.e. Elementary and Advanced Books for each branch of knowledge, it is obviously desirable that the corresponding works be written by the same author, as was the case with the Botanical ones by Balfour in Collins' series.

Whilst I highly appreciate the educational value of Laboratory Practice, I feel bound to warn Teachers of Chemistry against allowing beginners too free a use of Chemicals. I speak from experience, having had Chemicals at my free disposal when I was about 12 years old, and a good Laboratory at 13. I had however learnt caution from what I had seen happen to a pharmaceutical friend, from whom I took private lessons at the time that I was following the course of Chemistry of the celebrated Professor Orfila at the Royal Athenaeum. Paris, in 1818. My friend was showing me the "Philosopher's Lamp," which unfortunately is one of the first experiments that a chemical student arrives at, and without proper apparatus, one of the most dangerous. The flame having become extinct, he took out the cork and tube, replacing them after he had added a little acid. After waiting what he imagined to be sufficient time, he held the point of the tube to a candle, when the bottle exploded in his hand, scattering fragments of glass and acid spurts all over the shop. We were quit for a fright, and this specimen of imprudence had a salutary effect on my mind, and I never had any mishap worth mentioning, though certain narrow escapes warrant me in earnestly recommending that tyros should be specially trained in forethought and caution, and enjoined not to attempt any dubious experiments without the presence of a practised operator.—I used at one time to find entertaining and instructive, the carrying out in the small way of industrial processes, such as the manufacture of scented Soap, Dyeing in various colors, Distillation of Essences, preparation of Cough Lozenges with Liquorice, Guimauve and Tolu; &c. But a better occupation for advanced students would be Food Analysis, of which Bionomy in dealing with Adulteration, Fraud and Impurities in general, suggests so many useful applications.

## NATURAL HISTORY.

## *Comprising Mineralogy, Botany and Zoology*.

On referring to the Synopsis, Period I., it will be seen that taking advantage of the proposed Cosmographic Course, I have transferred to it that preparatory study of the Three Kingdoms which is necessary for understanding the resources of Domestic Economy and Hygiene, thereby lightening a little the studies of the Bionomic Course. Lithology, the branch of Mineralogy which embraces the study of the Rocks, comes in appropriately at the beginning of the second year, *after* Geology has related their supposed mode of formation,—*after* Chemistry, in the Bionomic Course, has introduced their constant elements, and *before* the applied Division of that Course has occasion for studying these rocky masses as Building Stone. It will further be seen that Botany occupies the last term of every school-year, so as to have the benefit of the season when vegetation flourishes, and Practical Diagnosis can be made an entertainment; the preparatory studies of Organography and Physiology having been gone through in the second term of the first school-year.

## *Mineralogy*.

Bionomy, representing as it does the necessities rather than the refinements of Life, may be said to have less connexion with this than with most other sciences. Lithology has already been selected as the most useful branch, on account of the important materials it supplies for building purposes, among which may be included, besides the common kinds of Stone, most of the ordinary varieties of Marble.

In some cases one may be led into smaller matters by the examination of the ingredients of which compound rocks are composed, as for instance, in distinguishing Granite from Syenite, but their inspection need only be superficial, leaving Crystallography and other technical elements of mineral diagnosis, for the opportunity afforded in the second Period. Even there however, it would be scarcely worth while going seriatim through the dry pages of a Mineralogical Manual, but a teacher versed in the subject, might unite usefulness with interest, in proceeding upwards through a few groups of his own selection, say for instance:—Stones too expensive for ordinary masonry, but used for decoration; then others choicer still, till he arrived at those costly gems which one has so convenient an opportunity of admiring in the shop windows of the London jewellers. Certain minerals at once peculiar and useful, such as Rock Crystal, Mica, Talc, Steatite, Asbestos and Graphite, might either form a group by themselves, or be relegated to the departments of Domestic Economy where they are used.

## *Botany*.

The Cell and its growth. Cell Contents. Multiplication of Cells. Cellular Tissue.—Germination. Cotyledons and their functions.—Functions of the Leaves.—Functions of the Flowers.—Morphological review. Exogens, Endogens, and Acrogens. Diagnosis. Principles of Classification.

These syllabic indications, mainly taken from the Botanical Lecture of the "Science made Easy" Course, apply to the first or initiatory Period. It is more particularly in the second Period when a growing acquaintance with the phraseology of Diagnosis, facilitates a review of Economic Botany, that it will be seen how vastly more important, and more diversified than those of Mineralogy, are the educational claims of Botanical Science. Looking at it from an economic point of view, we notice among its teachings, the growth of Endogens and Exogens, Woods of every description for Building purposes and Furniture, Textile Fibres, and Dyeing Materials for coloring them, and above all an endless variety of "Food-stuifs." As for the histological and physiological directions, or the diagnostic, herborizing and cultural lines in which the students may be taught to pursue Botany on its own account, they will much depend on the resources available for the purpose.

It will at all events be well to take advantage of any facilities afforded by the season purposely selected for Botanical studies, and by the locality of the School, for inspiring the boys with a lively interest in spying with an admiring eye into the secrets of vegetable life, but as for any prospect of future devotion to this Science, it will be prudent to explain to them how much the enjoyment of Botanical pursuits will depend on the opportunities of their respective careers.

Diagnosis is of course best studied with the aid of fresh plants; the dried specimens of an Herbarium soon get injured by being repeatedly handled for close inspection; and good leones with critical details clearly given, and if necessary enlarged, are preferable for class instruction. Such are Henslow's Illustrations of the Natural Orders, and the costlier ones executed with artistic skill by Miss Elizabeth Twining.

A Pamphlet entitled "The Botanic Stand" (T. T. 1883) describes a miniature Botanic Garden for the study of the Natural Orders of Plants.

If there is any branch of knowledge that can console a boy for an early infliction of Latin, it is Botany. It is true that its glossology has been vernacularized with excellent results as far as indigenous diagnosis is concerned; but the substitution of English for Latin names, particularly as regards the generic ones is fraught with incongruities. It is an acknowledged rule that generic names ought not to be descriptive, and the popular English ones mostly present a misleading generalization of the properties of certain species. A standard international Latin nomenclature is the best means of reducing the confusion of synonymy to a minimum, and it would be a pity not to keep up the practice of Latin diagnosis in important works.

## *Zoology*.

Man. Monkeys. Bats. Insect-Eaters. Flesh-Eaters. Gnawers. The Toothless Tribe. Cud-Chewers. Thick-Skins. Pouch-Bearers. Water-Moles. Seals and the like. Whales and the like. Birds, Reptiles. Frogs and the like. Fishes. Insects. Spiders and the like. Crabs and the like. Worms and the like. Soft-bodied Animals. Rayed Animals. Primary Animals.

It may be seen by the foregoing, taken from the Syllabus of Lecture VIII. of the "Science made Easy" series, that in so rudimentary a course, I found it expedient to begin Zoology with the Human Species, and to progress downwards, as is usually done in Botany, instead of adopting the modern plan of an upward progression, and I am convinced that as regards the teaching of our proposed first Period, addressed to boys from 10 to 12 years of age, the same downward plan will be found the best. In fact the Human Type, leaving details of the structure and functions for Physiology, but introducing the chief physiognomic distinctions of Race with the aid of striking Diagrams, like those of the Working Men's Educational Union, can scarcely fail to excite in juvenile minds, an interest as lively as that evinced by the Mechanics, who used to flock to ray Lectures at the London Institutions. That interest is moreover well kept up by the remainder of the Mammalia, not to say of the Vertebrata generally. Very different would be the effect of beginning with an uninviting disquisition on Protoplasm and the Amoeba. In the second Period the ascending progression may have its turn. Additional interest and instruction will be gained by travelling in an opposite direction through the same scenery, or in other words, working one's way back again from the mysterious depths of the ocean to the daylight of familiar forms.

Pictorial Illustrations of Animals suited for class-use abound, including besides the English, some good German and French sets; but in order to have a uniform series, I have found it best to adopt a selection of those published by the S.P.C.K., grouping them in due sequence on sheets of stout cardboard. This plan has answered so well, and the epitome of information contained in Lecture VIII., which they serve to illustrate, approaches so nearly to what school-boys are likely to want in the first Period, that I may venture to suggest its use, the more so as boys classically educated would find the Latin names added in brackets to the English ones. For the second Period, it would be desirable to select from the copious stock of zoological literature, some standard work popularly written, and well supplied with woodcuts, which after serving for eclectic study, might be permanently useful as a repertory of Economic Zoology.

## PHYSIOLOGY.

The Human Skeleton. The Composition and Structure of Bone. Histological details.

The Nervous System.—The Blood; Circulation. Respiration.—Nutrition; Food in the Mouth, in the Stomach, and in the Intestinal Canal. Digestive Secretions. Action of the Liver. Absorption and Assimilation. The Lymphatic System.—The function of the Kidneys.

The Senses:—The Organs of Sight, of Hearing, of Smell, of Taste and of Touch.—The Skin as an Organ of Secretion.—The Nails and the Hair.—Concluding remarks.

Considering the favorable success of the two Lectures on Physiology which conclude my "Science made Easy" series, and the convenience of having a corresponding set of 16 Diagrams, I think I may venture to propose their use in the first Period. For the second, a more authoritative, as well as more comprehensive work will be desirable.

# Bionomic Course.

# Applied Division.

# Comprising Domestic Economy and Hygiene.

In the arrangement of a Course like this, it is necessary to consider the convenience of the Teachers no less than the requirements of the Boys. The notions of Domestic and Sanitary Economy, or in other words, the account of the applications of Science to Daily Life indicated in the synoptical table for the second year of the first Period, must necessarily be as simple as the scientific elements thus far imparted. An enumeration of the chief subjects to be included has been given at page 40.

A valuable and comprehensive series of original contributions to Hygienic literature has been published in connection with the International Health Exhibition of 1884, and may be consulted at the Parkes Museum of Hygiene, Margaret St., Regent St.

In the second Period, the scientific knowledge and the applications thereof, will both be of a much more advanced description, and to some extent it may be expedient to distribute the latter to the teachers of the former, that is to say, to let the teacher of Mechanical Physics introduce Water Supply and the like among the illustrations of his Course; whilst the Chemical teacher may similarly amalgamate with his lessons, the applications of Chemistry to Household and Health Economy, and to the manufacturing processes connected therewith; and the Teacher of Natural History may supply information concerning the resources we borrow from the Three Kingdoms. It is on this principle that have been devised the indications for the Bionomic Course of the second Period in the synoptical table.

The third Period will afford an opportunity of recapitulating in a methodical form, the previous bionomic data, reviewing seriatim the whole range of Domestic and Sanitary Economy, and so bringing into instructive relief the scientific principles on which they are founded, as to supersede the necessity for a separate recapitulation of the several sciences. I may mention as likely to afford convenient guidance in this review:—firsts, the Summary of the Contents of the Twickenham Economic Museum, contained in its single sheet Programme, and more in extenso in "The Christian Teacher's visit to the Twickenham Economic Museum" (Goodman 1864); and secondly, the comprehensive Synopsis of Hygiene, printed in connection with the Parkes Museum, and obtainable at that Institution (74A. Margaret St., Regent St., W.).—The two classifications are very much the same. In the Synopsis the location of the materials and appliances for Heating and Lighting is perhaps better, and more latitude is given to climatological Hygiene; but on the other hand I may mention, quoting the introduction to my "Familiar Lessons on Food and Nutrition," that an Economic Museum is "a Hygienic Museum *plus* an assortment of those things, which, without having a direct bearing on Health, have become almost indispensable requisites of civilized life. Such are for instance the pens, ink and paper that minister to our intellectual wants, the appliances by which we measure time and space, bulk and weight; to say nothing of various matters connected with the construction, decoration, and furnishing of Dwellings, in respect of which, after Hygiene has had her say, it is well to listen to the suggestions of Comfort and Convenience, Artistic Taste and Comparative Price."

Attended to as well as taught, must be the hygienic precautions calculated to secure a sound development of youthful constitutions. It behoves the Masters of Schools to enforce, if necessary, that moderation in athletic sports which may preserve their invigorative influence from all drawbacks, but it is essential that the Boys themselves should be trained to be in this, and many other things, their own guides and guardians.

One of the most satisfactory ways in which the bodily abilities of the boys can be intelligently exercised, is their practising under guidance, the arts of Carpentry and Metal-working in the preparation of Apparatus and Models for the furtherance of their scientific studies.

A desideratum too important to be overlooked, but which must necessarily be dealt with according to circumstances, is the extension of scientific studies in any special direction demanded by the intended career of the Students. One moiety of the time allotted to Science in the third Period might be secured for this purpose by omitting the recapitulation of the Cosmographic Course, which is much less necessary than that of the Bionomic Course, and even the latter might be confined to one year.

As before stated the whole of the proposed scheme is elastic, and intended to rouse a spirit of thoughtful organization, rather than to supersede it.

# Aids to Science Teaching in Schools.

# *The Binary System of Instruction*.

Not least among the difficulties encountered in giving to Science its proper place in high-class education, is a deficiency of appropriate Teaching-power, which results from the small demand for it, and which is aggravated by the tendency of the S.K. Examinations to induce among Teachers the study of one or two isolated branches of Science, irrespective of each other, and of their bearings on the requirements of Daily Life. Accordingly the Teachers capable of taking charge of the whole, or a fair part, of even a 1st Grade Bionomic Course, elementary and applied, are comparatively few, and in many localities it may be found convenient to have recourse to a plan by which nearly the whole elementary range can be taught in the form of Lectures or Class Lessons, with a minimum of professorial assistance. To draw attention to this new pedagogic device was one of the chief objects I had in view in bringing out my Ten Lectures on Elementary Bionomic Knowledge, entitled "Science made Easy," and I cannot do better than borrow from the "Introduction," the following account of the plan in question. It is called the "Binary System of Delivery," because it involves the joint action of a Reader, who has the printed matter before him on his desk at the Lecture Table, and a Demonstrator, who has charge of the Illustrations.—"Wherever a specimen is to be shown, a diagram to be pointed to, or an experiment to be performed, a mark in the Text warns the Reader to make any pause that may be required. The Demonstrator, who has before him a list of Instructions, with every device for enabling him to be ready at the right moment, does the needful, and the reading is resumed without the least embarrassment or loss of time." A little cleverness and practice suffice to make the whole progress as rapidly, and with as much smoothness and homogeneity, as the discourse of an extempore professor. The Lectures being purposely contrived for adaptation to School-work, any intelligent Teacher can use selections from them for giving instruction to junior classes single-handed, whilst advanced pupils may with singular advantage, be trained to perform the parts of Reader and Demonstrator, and nearly all the Boys can co-operate in preparing the apparatus, thus acquiring a personal interest in a course of instruction essentially entertaining and obviously useful.

## *Open-handed Examinations*.

Well conducted Examinations should afford a fair and friendly insight into the capabilities and acquirements of the students, without unnecessarily taxing their brains, or trying their nerves, and without affording scope for the ingenuity of "Coaches," who thrive on a system of surrounding knowledge with sham fortifications, having weak points and back entrances, and defended by puzzles and "catch questions."

Now trials carefully conducted during many years at various London Institutions with my "Science made Easy" Course, have conclusively proved that earnest examinations can be carried on without these drawbacks, to the entire satisfaction of both Examiner and Examinees, by a plan so simple and easy, that I cannot help wondering that it has not, as far as I am aware, ever been tried before.

For the purpose of the Examinations, each Lecture has been divided into a convenient number of parts, large or small according to the nature of the subjects; and a Question has been prepared for each part, embracing as far as possible, the main substance or gist thereof, and so framed that a person answering it, may be fairly prompted to show to what extent he has understood and retained the matter referred to.

A QUESTIONARY, or set of such Questions, about a dozen in number, is printed at the conclusion of each Lecture for the convenience of frequent use in the progress of instruction. All the Sets are united on an Examination Sheet, forming a General Questionary for the whole Course. It is on this that the Examiner is to mark at the examination time, two or more questions thoughtfully selected for each Lecture. Which these questions may be the student cannot possibly foresee. He has the satisfaction of feeling that he cannot be asked any question which he has not had a fair opportunity of preparing himself to answer, but such preparation must, as far as his abilities allow, embrace the gist of the whole Course, and this is all that can be desired.

The Questions have appended to them numbers ranging from 3 to 25, which indicate their more or less comprehensive and difficult nature, and show the *maximum* number of Marks which a Candidate can obtain by answering them in a *thoroughly efficient* manner.

At the Examination Table each Candidate receives a copy of the General Questionary with the Questions marked for each Lecture he is to be examined in. Some are easy, others more difficult or comprehensive, in order to give him an opportunity of adapting his attempts to his abilities. The Examiner in determining what number of Marks each answer of a Candidate deserves, bears in mind the number appended to the printed question as the maximum obtainable.

I may refer for further particulars to Part I. of "Science made Easy" (p. 26). It must however be remembered that the Examinations there described, and which used to be conducted on my behalf at the

London Institutions with such satisfactory success by Wm. Hudson, B.Sc., were in matters of detail specially adapted to the capabilities and requirements of Working Class Candidates. At Schools for the Middle and Upper Classes, altered arrangements would bring into combined relief the genuine reliableness of the principle, and its easy adaptability. I trust indeed that the more this "Open-handed System" is looked into, the more evident will become its peculiar suitableness for giving shy and untutored merit a fair chance of success. Feeling perfectly secure against abstruse or out of the way Questions, since none can be asked but the carefully and clearly worded ones of a published Questionary, Candidates will set to work with a satisfaction, and present themselves at the Examinations with a self-possession, that could scarcely be secured by any other means. At the same time it is obvious that the comparatively permanent character given to the Questionaries, will repay a great amount of care bestowed on their first preparation, whilst periodical revisions will secure their being kept up to the level of the time. Lastly, I may mention the great saving of trouble it is to the conscientious Examiner, to have a well-digested series of questions spread out before him for his selection.

It is obvious that a Questionary in order to be at once brief, clear, and satisfactory, must be the reflex of its own particular book, of which, however, the student is not to learn portions by rote, but so to grasp the sense of the whole, that he can when called upon, express it in his own words. But the desirableness of fixing the attention of Candidates on special text-books is not confined to the Questionary System, and I could point to many a public Examination in which their perplexities have been increased, and their real progress hindered by the disinclination of certain educational authorities to incur the responsibility of recommending one source of information in preference to another. The first duty of the organizers of Science Examinations, is of course to make themselves thoroughly acquainted with the prospective requirements and average capabilities of the candidates with whom they have to deal, then to point out suitable sources of information if they exist, and if not to induce and superintend their production. If this cannot be done, and the candidates are to have no other guidance than that of a Programme, Syllabus, or Curriculum, that guidance should at all events be so rational, so obviously well-intentioned, so detailed and so clear, that they may constantly feel they are in the right track, acquiring valuable knowledge in exact accordance with the views of a conscientious and kind Examiner, who will test it in a manner at once thorough and equitable, friendly and fair.

If such principles generally prevailed, one would not hear of a spirit of antagonism between Examiners and Examinees, and of the latter being trained to overcome obstacles thrown in their way, by means of coaching and cramming, sham memory and ephemeral knowledge. The needed reform might at first be a hardship for certain Teachers who have acquired a special reputation in preparing youths for admission to the Civil and Military Service, and the like; but they would soon turn their ingenuity towards a more satisfactory success, wafted on the rising tide of sound utilitarian science, which bids fair to extend its benefits to every department of our national organization.

London:

Printed by William Clowes and Sons, Limited.

Stamford Street and Charing Cross.

Front Cover

CANADIAN COURTS A Art. B Furniture and Leather. C C Marine. D Machinery. E Education. F Garden. G Central Gallery. H Minerals. K British Columbia Wood. L Quebec Wood. U Windmills. N N Photographs. R Bee House. S Market. T Carriages.

# Notes of Lectures

*Colonial and Indian Exhibition, 1886.*

Special Edition.

Given in the Conference Room of the Colonial and Indian Exhibition, and Specially Adapted for *Lectures to Working Men's Clubs*.

By the Head Master of Brighton Grammar School.

*Blank pages for the records of observations made during a visit to the Exhibition are placed at the end of the Notes*.

London: William Clowes & Sons, Limited, Printers and Publishers to the Royal Commission, 13 Charing Cross, S.W., and at The Exhibition. 1886. London: Printed by William Clowes and Sons, Limited Stamford Street and Charing Cross.

The Brighton Grammar School,

*President*—THE RIGHT HON. THE EARL OF CHICHESTER.

THESE "Notes," in a briefer form, were printed for lectures given on The Indian and Colonial Exhibition to the boys of our school. It was probable many would visit the Exhibition but once, and I exceedingly desired that even one visit should bring with it the realisation, not only of the vast resources of the British realm, but its great "World Mission," and their own responsibilities as British subjects.

Since it was suggested that the "Notes" would be useful outside our own school, a number of additional copies were printed, *to be sold at cost price*, while Mr. Henry Willett, with his well-known liberality, rendered it possible to make a considerable reduction to working men's clubs.

The first edition was not published.

The present edition is adapted to lectures given on the Exhibition to the London Working Men's Club and Institute Union, and is by special request published and sold with the official publications at the Exhibition book-stalls.

The "Notes" to fulfil their purpose should be "developed" in lectures, and, to an audience supplied with copies of the "Notes and a good "wall map," a lecture can easily be given.

I myself will gladly lecture, without fee, so far as my engagements permit.

But as even without lectures the "Notes" will be useful, may I urge that they form neither "Guide nor Catalogue."

If read before visiting the Exhibition, they will place the mind in a "receptive condition" to profit by the visit, but,

During the visit they should only be consulted on entering a Court, then the eyes and mind should do their own work, and the Court should be enjoyed.

Granting that the desire to be amused may fairly form *one* reason for visiting the Exhibition, it will surely be a national loss if, for lack of guidance, this Grand National Collection were regarded as a mere show for a day's sight-seeing.

E. J. Marshall.

August, 1886.

Will those who use the "Notes" as a basis for lectures pardon me for suggesting that their lectures should utilise the "Facts" given in the "Notes" as pegs on which to hang "Principles." The facts can be mastered by their audience at home, after the lecture.

The caution should also be given, that the importance of the exhibits should not be judged by their attractiveness. African diamonds draw crowds; the Indian fibres are not even noticed. Yet compare not only their money value, but their importance to the working man and to the world. *(See Notes.)*

A Billiard Table stands out prominently in the Court of New South Wales, yet it represents but the work of one clever man in the Colony. The "Stripper" is half hidden in a side court of South Australia.

# Introduction.

# The British Realm.

Her Majesty Queen Victoria is Queen of the United Kingdom of Great Britain and Ireland, and Empress of India.

The Colonies form a portion of the United Kingdom, though the expression "United Kingdom" is generally only used in reference to the "Mother Country."

The Colonies may be arranged in two classes:—

- Those strictly Colonies, which find homes for the children of the Mother Country, such as Canada, Australia, New Zealand, Cape Colony, the West Indies.
- The Dependencies, *i.e.*, those which may be regarded more as possessions held to protect the Realm and its commerce, such as Gibraltar, Malta, Cyprus, Mauritius, the Straits Settlements, Hong Kong.

## THE GOVERNMENT OF THE REALM OUTSIDE THE "MOTHER COUNTRY."

India is a distinct Empire, governed by the Queen, through the "Secretary of State for India," and his Council of fifteen members.

The Colonies Proper have Governments on the model of the Mother Country, with a Governor representing the Queen, a Ministry, and two Houses of Legislature, answering to the House of Lords and the House of Commons.

The Dependencies or Possessions are variously governed, but have generally a Governor and a Council, but not Houses of Legislature.

While a "Crown" colony has not the power of independent legislation possessed by a Colony, it is not so controlled by the Mother Country as is a Dependency.

## Thoughts on entering the Exhibition.

- This Exhibition represents countries whose total area is sixty-six times the area of Great Britain and Ireland.
- The countries which are represented are something more than corn fields or sugar plantations, or sheep runs, or timber forests. "The men who send us the products here exhibited have churches and governments, parliaments, universities, and schools.
- "The Colonies are great communities in an early stage, and there is no reason why the names of New Zealand or Victoria should not one day sound as impressively in the ears of men as the names of England or France, Italy or Greece."

*See Thoughts after visiting the Exhibition, page 60*.

## Questions on entering each Gallery.

What is the Situation of the Country represented? What is its size, and its population?

Does this Gallery represent a Colony? If so, I shall look for evidence of the energy and enterprise of the British race. If it be an old colony like Canada, I shall expect to find it has made progress in manufactures. If it be a young colony like Queensland, the natural productions of the country will form its chief exhibits.

Does this Gallery represent Dependencies such as the Straits Settlements? Then evidence of native industry, unaided by machinery, and productions natural to the country, will be shown.

What are the Mineral Resources? Are there any Coal and Iron, the minerals which have been some of the sources of Great Britain's wealth?

What is the Climate of the country represented—tropical, semi-tropical, or temperate? How will its exhibits represent the climate?

What will the Models and Groups teach me respecting the people and their homes, the birds, the beasts, and the fishes?

What impression will the Photographs and Paintings give me of the character of the country and its scenery?

*What people are, and what they do, is greatly influenced by the character of the country in which they dwell*.

map of India and surrounds

Excellent Maps abound in the Exhibition, and should be examined on entering the Courts. Care is needed in determining Size or Distance by Map Measurements.

# India.

The Map shows that the natural divisions of Hindustan or India are:—

- The Mountain System of the Himalaya in the north, which contains in its western portion the State of Kashmir.
- A large plain south of the Himalaya, through which the Ganges, with its tributary the Jumna, flows, and which includes Lower Bengal (Assam) and the North-West Provinces.
- Another plain, through a portior of which the Indus, with its five tributaries, flows, and which includes the Punjab and the Western Rajputana States.
- A northern table-land, between the Aravali Hills and the river Nerbudda, which includes Central India and the Eastern Rajputana States.
- A table-land called the Deccan, supported, as it were, on the Eastern and Western Ghats, and which includes the Central Provinces, Hyderabad, Mysore, and Coorg, and a portion of the Bombay Presidency.
- The Carnatic, or low country, extending from Cape Comorin to the river Kistna, and which includes a portion of the Madras Presidency.

Some idea of the size of Hindoostan.—From the line of the Himalaya southwards to its extreme cape on the Indian Ocean, India occupies a space more than fifteen times as large as our Island of Britain, and a journey across it, from north to south, or from east to west, would require half a year, if one travelled ten miles a day. The Himalaya are as distant from Cape Comorin as Iceland is from Spain.

Some idea of the Population of India.—If Her Majesty's Indian subjects had filed before her at the rate of fifteen persons each minute, for twelve hours each day, from the first day of her reign, the whole of them would only have passed in this year of her Jubilee.

Thus, it will be easily understood that in Hindoostan there must be great variety of Race, of Climate, of Productions, and of occupation for the people.

### A FEW WORDS ABOUT THE PEOPLE OF INDIA.

It is generally believed that in very early times India was inhabited by a race of the same stock as that to which the Chinese belong, viz., the Mongols, and that about 1,600 years B.C. a colony of the Aryan race, the same race from which we are descended, came down from the high plateau of the north into the plains of Northern India. This colony, having conquered the Mongols, settled on the great plains of the Indus and Ganges, driving the Mongols to the table-land of the Deccan and to the Carnatic, over which some centuries later they spread.

Broadly speaking, there are two distinct races in India.

- —The Aryan of the North, whose language is related to the Sanscrit.—To these belong the Bengali and Assamese in the north-east, the Hindus proper of the plains of the Ganges, the vigorous Rajput tribes of the North-West Provinces, the dark forbidding Jats, the Sikhs of the Punjab (the best cavalry in Asia), the Mahrattas northwest of the Deccan.
- The Dravidian of the South, the principal groups of which are the Tamil and the Telugu speaking groups.

Between these two are such native tribes as the Bheels and the Gonds, the Todas, the Badagas.

Specially compare the different races in the Ethnological groups, as to size, character, dress, *and notice how superior the representatives of the Aryan stock are to the purely native tribes*.

# Divisions of the Indian Exhibition.

- The Art Ware Courts, with their specimens of Art Ware and ornamental fabrics from each Indian Province.
- The Economic Court, with its exhibits of economical products, of agriculture, and of the various races inhabiting India.
- The Administrative Department, which helps to give some practical notion of the vast machinery required for the government and control of the Empire.

# The Art Ware Courts.

# General Remarks.

Notice that the exhibits in these Courts are:—

1. The results of long-inherited skill and patient handicraft, and not of machinery.

In the Indian Museum is an enamelled plate which represents the work of four years, and a large engraved jade bowl, on which a family of lapidarians was engaged for three generations.

2. That the labour and time devoted to them could only have been given in a country in which labour was abundant, and the payment for labour and the cost of living very small.

3. With few exceptions, the Indian Art Ware in these Courts is similar to the Indian Art Ware of two thousand years ago. Contrast this almost stationary condition with the progress indicated by the exhibits in the Australian and Canadian Courts, and ask "Why?"

"Why?" The history of the Aryan races in India is involved in much obscurity. The following notes in the briefest form show how that history is connected with Indian Art Manufacture:—

Possibly some five hundred years after the Aryans had settled in the north of India, the Brahmans, i.e. *prayer bearers,* had acquired great influence. These Brahmans arranged society into four fixed Classes or Castes, and compiled the "Code of Manu."

The Code of Manu is the great Hindu law-book, by which every act of Hindu life has been regulated for nearly 3000 years. It has petrified

Hindu society, and this may be specially seen in the

Hindu Village System.—In the Hindu village, the ancestors of the village accountant, watchman, money-changer, smith, potter, carpenter, barber, shoemaker, have for hundreds of years, through the influence of caste supported by the Code of Manu, held the same office.

# Indian Art Ware Courts.

These Courts almost bewilder by the number and variety of their exhibits, therefore, it will be well to notice—

- That the exhibits may be arranged in certain definite classes.
- That certain facts and art principles are of general application for every Court, greatly as the exhibits of each Court may differ from each other. Therefore,

To enjoy the Indian Art Ware Courts:

- Before you enter the Court, read over the notes on pages 11—15, until you have a very definite recollection of what you have read.
- On entering each Court, glance over the special notes on that Court.
- Then enjoy the Court, consulting your book as little as possible.

## The Religious Element in Indian Art.

Both in the villages and in the towns, the religious life of the Hindus, as organised by the code of Manu, finds expression. Every thought, word, deed, of the Hindus belongs to the world of the unseen as well as of the seen, and nothing shows this more strikingly than the traditionary arts of India. The materials of which different articles are fashioned, their weight, and the colours in which they are painted, are fixed by religious rule. *See The Industrial Arts of India, South Kensington Handbook, which should be read by those who desire to understand Indian Art*.

## General Arrangement of the Exhibits.

Each of the Arts mentioned in the following list is represented by the workers in the Palace Yard.

## The Art Ware Exhibits are:—

Metal Work, of Gold and Silver, but specially of Brass and Copper.

Textile, or Woven Fabrics, which take the form of calicoes muslins, silks, brocades, gold and silver lace, carpets. Note, except in the carpets, the lack of woollen goods.

Jewellery.—Filigrain and enamelled.

Lacquered and Inlaid Work.

Carving of wood, ivory, and stone, and Clay Modelling.

## Metal Work.

Damascening.—This process takes its name from Damascus, where the early goldsmiths carried it to high perfection. The design is cut out in grooves on the surface to be damascened, and these grooves, when filled up with gold or silver, produce Koft work; when filled up with other metals, Bidri work—from Bidar, the home of the process.

Swami Work is metal work in relief, either beaten out from the surfacc, or affixed to it, by soldering or wedging, or screwing on.

The Hindus use brass and bell-metal for domestic purposes, and copper for religious purposes.

## Textile or Woven Fabrics.

India was probably the first of all countries which perfected weaving. Not until last century did the cotton manufacture obtain a footing in England. In 1641 "Manchester Cottons" were made of wool in imitation of Indian cottons. Contrast an English "power loom" with an Indian loom. The Greeks, who entered India with Alexander the Great, B.C. 327, found the natives wearing garments made of "tree wool," *i.e. cotton*, and robes worked in gold, and flowered garments of the finest muslin.

The charm of Indian Textile fabrics lies in (1) The beauty of the dyes used. (2) The harmonious arrangement of the colours; all violent contrasts are avoided. (3) The simplicity and treatment of the decoration or pattern.

*Notice, that the most common pattern* is the knop, or bud, and the flower. This pattern is never seen twice in the same form.

The guiding principle is alternation, and this is seen in the native garden and heard in the native music.

A Native copying a flower will peg it down flat on the ground, laying out its leaves, and buds, and flowers symmetrically on either side of the central stem; if these arc not opposite to each other in the pattern plant, he will make them appear so in his drawing by adding others.

The weaver puts the proper colours into his fabric either from his own knowledge or a pattern, but no native can do his best from a pattern. If he is told simply, "Now I want you to make something in this style, in your own way, but the best thing you ever did, and you may take your own time about it, and I will pay you whatever you ask," he will succeed. Art in Europe is spoiled by haggling and hurry.

The loveliest little mosque in Bombay was built without a plan, the workmen day by day tracing roughly on the ground the designs by which they worked.

Some Calicoes are woven with coloured threads, others as the chintzes and bandanas are printed.

English chemical dyes are fast spoiling the Indian dyers' work. The Maharajah of Kashmir does his best to keep English dyes out of his country. *Notice the cloths of unbleached cotton, with their exquisite borders in red, blue, and green silk.*

Muslins.—The once celebrated Dacca muslins are now almost a thing of the past. *Formerly* they were manufactured in pieces 15 yards long and one broad, with a weight of not quite two ounces, and a value of £40 the piece. *Now*, the finest would weigh nearly four ounces, with a value of £10 the piece.

Silks.—It is not lawful for Mahommedans to wear pure silk, hence, fabrics which have a woof of cotton and a warp of silk, or a back of cotton and an outside surface of silk. Fabrics, in which cotton is mixed with silk, are termed mashru, *i.e.* lawful.

Brocades.—Gold and silver are worked into the decoration of all the more costly loom-made goods. The native word kincob is applied to the highly ornamental brocades of the Bengal province. "The King's daughter is all glorious within, her clothing is of wrought gold."—Psalm xlv.

Very poetical names are given to the brocades, such as "Moon and Stars," "Ripples of Silver," "Pigeon's Eye," "Peacock's Neck."

Gold and Silver Lace.—An immense manufacture all over India, particularly in the Royal cities. The gold and silver wire used is produced by wire-drawers, who can obtain nearly half a mile of silver-gilt wire from a rupee's worth of silver.

Embroidery is done on silk, muslin, wool, and leather.

Carpets.—Few people realise, when buying Oriental carpets, that they are buying works of art, and not manufacturers' piece goods, produced at competition prices. The attempt to set a trade value of "so much per square yard" upon such artworks as Indian tapestries and carpets, is as absurd as it would be to purchase pictures by the same standard. European demand for Indian carpets has led to their deterioration.

The carpets of cotton, with stripes and with squares, and diamonds introduced, are from the oldest Indian designs. The woollen pile carpets came in with the Mussulman invaders.

## Jewellery.

The European Jeweller bestows the least amount of work on the greatest amount of metal. Weight is his standard of excellence.—The Indian Jeweller gives to the least possible weight of metal the highest artistic value. The great variety of articles in the Punjab Courts furnish the best illustration of the universal use of silver ornaments by all ages, and all classes, in India.

The Bengal and Madras Courts give an excellent illustration of Filigrain work.

The quantity and quality of jewellery worn by women is a sure and safe criterion of the prosperity of the people. It is their Savings Bank.

## Pottery.

Notice the form, how simple and true to Nature, how suited for its special use.

Household Pottery (except the hookahs and surahis) is unglazed, and the demand is immense, since the Hindus have a religious prejudice against using an earthen vessel twice. Clay Idols are also thrown away every day after being worshipped.

"The Potter is an hereditary officer in every Indian village. India has undergone more religious and political revolutions than any other country in the world, yet there at his daily work has sat the potter, steadfast and unchangeable for 3,000 years, Macedonian, Mongol, Maratha, Portuguese, Dutch, English, French, and Dane, of no more account to him than the broken pot heads lying round his wheel."

The Beautiful Enamelled Pottery seen in the Punjab Court is a sumptuary, not a religious art.

## Lacquered and Inlaid Wood.

Lacquered Work.—Hardly a Court without specimens. The higher class is applied to furniture and house decorations, but the lacquering of inferior objects, as walking-sticks, mats, bags, is carried on everywhere, even by the wandering jungle tribes.

Inlaid Work.—*See the "Bombay Boxes."* Inlaying is performed with brass and tin ware, sandal wood, ivory, staghorn, mother-of-pearl. The Taj has inlaid work of precious stones.

## Carving and Modelling.

Carving.—In every Court evidence of Indian skill in carving, cither in wood, as the screens testify, or stone, as the idols and soapstone ornamental dishes show, or in ivory, as seen in the Courts of Bombay and Madras.

The Clay Figures *in the Jeypore Court, and the Madras Court, show native skill in* modelling.

But with all this skill in carving and modelling, *will not find a single exhibit which shows native power for artistic figure sculpture*.

## Furniture and Household Decoration.

In India, the great art in Furniture is to do without it. "Up country you may pass through a whole palace, and the only furniture in it will be rugs and pillows, and, of course, the cooking pots and pans, and the vessels for eating and drinking, and the wardrobes and caskets, and images of the gods. But you are entranced by the perfect proportions of the rooms, the polish of the ivory-white walls, the gay frescoes round the dado, the beautiful shapes of the niches in the walls and the windows, the richness and vigour of the carved work of the doors, and projecting beams and pillars of the verandah."

*Notice how frequently use is made of the wood of the Shisliam or blackwood Tree*.

## A few special particulars respecting some of the Principal Courts.

To present a catalogue of the Exhibits of each Court would be tempting those who can visit the Courts but *once*, to waste their time and spoil their pleasure.

The particulars now given either refer to specialities or to exhibits illustrative of principles stated on pages 11 to 14.

If in walking through the Courts the eye rests on the exhibits mentioned, well and good; if not, do not worry to find them.

Rajputana Courts, on each side as the Art Ware Courts are entered—Notice the Kotah Screen inlaid with ivory—The Bhartpur Screen of Jalli work, resembling frozen lace—The Bikanir "gesso" Screen, the patterns of which have been produced by applying layer after layer of liquid clay with a brush. Jeypore furnishes the chief supply of idols in Brahminical India.

Kotah Dyed Cloths.—These cloths are first dyed, then small portions of the cloth, about the size of a threepenny-piece, are tied up with cotton thread, the cloth is again dipped, but the colour does not touch the portions tied up; the process is repeated, and intricate patterns are then produced, in three colours. This knot-dyeing process is called "bandhna," and gave its name to the old bandanna handkerchief.

Central India—Collections not extensive nor of special interest.

Bombay.—Bahavangar portion of Screen, the richest and most beautiful in the Courts. Good specimens of "Kincob," a gold and silver brocade made at Surat, used for covering state carriages, saddlecloths, marriage dresses of bridegrooms. A beautiful panel of hammered copper, and window of perforated brass—Baroda pigeonhouse—Baroda doorway with iron bosses—Collection of turbans requiring 40 to 75 yards for a single turban.

The people of Baroda and Gujarat consider it a sin to kill animals, but to feed them an act of charity.

Bosses on doorways were originally placed on doors to prevent damage from the knock given by the head of a visitor's elephant. That which was designed for protection is retained as an ornament.

Bengal Court.—Jewellery—Silver filigrain work—Bidri work—Ivory carving of Murshidabad in Case 43—Gold Embroidery—Chikan, or embroidered muslin.

The silver filigrain work of Cuttach is generally done by boys, whose sensitive fingers and keener sight enable them to put the fine silver threads together with rapidity.

Nepal.—Nepal is an independent State, extending 700 miles along the southern face of the Himalayas. The small court gives specimens of native arts and industries—Carving—Brass Work—Musical Instruments.

North-West Provinces.—Inlaid work on pillars of screen similar to that on the Taj—Moradabad ware in case 62—Agra soapstone carvings in case 61—Bidri ware—Brass work illustrated by models of temples and mosques—Muslins—Embroidery.

Moradabad Ware.—In this ware, the tin is soldered on the brass and then cut through to the brass, which makes the yellow outline to the pattern.

The Taj is a tomb built by Shah Jehan for himself and his favourite wife, whose pet name was Taj. In a beautiful garden, on a double platform, the first of red sandstone, 20 feet high and 1000 feet broad; the second, of marble, 15 feet high, and 300 feet square, stands the Taj, a colossal casket, whose base is 186 feet, whose height is 200 feet, and whose cost was above 2,000,000 sterling. Bishop Heber remarked of the Taj, "The Saracens built like Titans and finished like jewellers."

The Punjab Court.—No figure carving, since the inhabitants are principally Mahommedans—Jewellery—Koft work—Lac turnery—Pottery—Woollen fabrics, for there are severe winters of the Hill Country—Delhi embroidery—Dress of a Delhi dancing girl—Carpets of state—Amritsar door in beaten copper.

Lac Turnery.—The lac surface is obtained by pressing a stick of lac (sealing wax) on an object revolving in a lathe; the heat developed by the friction melts the wax. Sometimes a layer of red lac, then green, then black, is laid on. The black is scratched through for the green leaves; the green and black for a red flower, and for a white line, all are cut through to the wood.

The Golden Temple of Amritsar.—In the courts of the Exhibition leading into the Court of Ceylon there is a large model of this temple. The temple rises out of a large tank, and is reached by a broad roadway of white marble, with golden balustrades and lamps. The lower half of the temple walls are of carved white marble; the upper half of the walls and the roof, of copper plates, arc richly gilded, and seem a mass of gold. The doors are solid silver; the windows are golden.

Kashmir Court.— Papier-mâché—Silver gilt wire—Shawls—Chintzes.

The Screen is made of Deodar, the time of making was four months, by eight workmen, whose average wages were sixpence a day, and whose tools were the native chisel and adze.

Shawls.—The value of Kashmir shawls has greatly decreased. The Shawl, No 31, now marked 300 rupees, would once have cost 800 to 1000 rupees.

Central Provinces.—Screen made by native carpenters of Nagpur—Brocades and gold wrought cotton tissues—Tussar silk goods (see page 22)—Carving in which these provinces hold their own.

Houses with carved teak fronts of great beauty are found even in the villages. The necklets are largely worn by Brahmin youths.

Assam.—Screen of bamboo and cane—Barpeta bracelets and necklaces—Jorhat earrings enamelled in gold—Model of homestead—Silk fabrics made of eria and muga silk (see page 23).

The Barpeta bracelets and necklaces consist of alternate beads of coral and gold, about the size of marbles. The lockets and earrings are enamelled in gold.

Burmah Court.—The screen of this court shows the visitor that he has passed from India proper into a country where the religion, the manners, the customs, and consequently the arts of the people differ from any already examined.

Jewellery with peculiar ruddy colour—Lacquered ware—Basket work—Cotton cloths—Tamein or female dress.

Jewellery.—Much of the gold is dyed with tamarind juice, which may be regarded as the "Hall mark" of Burmese jewellery, since the Burmese say that no other metal but gold would assume the peculiar ruddy colour.

The Burmese Lacquered Ware is of two kinds: I. Basket work, a very important trade; 2. Wood work.

Cloths.—Some Burmese cloths, owing to their intricate patterns, require many shuttles, and are known as "fifty-shuttle," "eighty-shuttle," "hundredshuttle" putsoes.

Madras Court.—Old native jewellery, jewellery of the aboriginal tribes, every metal from iron to gold—The peasant jewellery—Travancore filigrain work and ivory carving—Musical instruments.

Native Jewellery.—Two hundred articles, including gold ornaments for the ear, the nose, and the back of the hair. The gold marriage emblem, a representation of the foot of Krishna. Gold beads, gold rings for thumb and index finger, gold necklet, silver armlets, wristlets, necklets, finger-rings and toe-rings.

Hyderabad.—Lacquer ware—Muslins—Gold and silver cloth for beautiful state umbrellas and elephants' cloths—Two beautiful carpets.

Bidar, the home of Bidri ware. No dowry is considered complete among the better class of Mahommedans unless a complete set of Bidri ware, from bed legs to a spittoon, is included.

Mysore and Coorg.—Swami work—Deities carved in soapstone—Inlaid ebony furniture.

Swami Work. *See page 12*. The maker of the Prince of Wales' exquisite gold dishes exhibits fine specimens of Swami work.

Hindu Deities.—This collection indicates the "motif" of almost all the well-known Mysore work.

Mysore Goldsmiths are renowned for delicacy and ingenuity of work.

# The Imperial or Economic Courts.

The Economic Court is divided into four main divisions.

Division 1.—Timbers. Division 2.—Food stuffs—Beverages—Narcotics—Medicines. Division 3.—Oil—Fibres—Skins and Leather—Canes and Basket Work. Division 4.—Gums—Dyes—Tans—Minerals and Oils.

On the walls opposite each Division there are, or will be, index collections of the exhibits.

Timber.—The archway to the Court forms a forest trophy with 3,000 specimens of useful timber.

The Bamboo Trophy is formed of thirty species of bamboo. Around the trophy are a very large collection of articles made of bamboo which may be said to be the "staff of life" among Indo-Chinese nations.

*Notice near the Trophy the two women at the mill*. "Two women shall be grinding together, the one shall be taken, the other left."

Pood Stuffs.—A pleasant quarter of an hour may be spent in visiting the shops of the fruit seller, vegetable seller, and grain seller.

Fruit.—The most characteristic fruits of India are the mango, guava, letchi, pine-apple, plaintain, and nuts.

The true almond is a sacred offering.

The Singhara nut, grown on a water-weed, is an important article o food. In Kashmir, it is said, 30,000 persons are dependent on this wild plant during certain months.

Cocoanut. *See page* 24.

Vegetables.—India is the country of the Melon and the Cucumber.

Nearly the whole of the pot herbs are wild plants needing no cultivation. In no country of the world are so many food stuffs to be obtained for the mere cost of collecting.

Pulses.—Known as "dal" and "gram."

Forty-eight millions of acres devoted to the culture of the lentil. "Rcvalenta "is made from lentils.

Grain.—Rice; sixty millions of acres devoted to its cultivation; five crops each year. Paddy is rice from which the husk has not been removed.

Millet is the staple food of India, taken as a whole.

Wheat.—In 1885 over twenty millions of acres devoted to its cultivation.

Indian wheat has entered into competition with American wheat. Though the carriage to England is cheaper from America than from India, labour is cheaper in India than in America.

*Note the Crain Trophy, the idea of which is taken from the famous tomb, Itmad-ud-Dowlah, at Agra*.

Sugar is obtained from the sugar cane and the palm.

Narcotics.—*Mode of preparation illustrated*.

The sale of opium is a Government monopoly worth £*9,800,000*, of which £9,000,000 is for opium sent to China.

Hemp is smoked as *ganja*, drunk as *hasheesh* liquor, or eaten as a sweetmeat called *majun*.

Drugs.—Over 1,300 plants are reputed by the natives to possess medicinal properties. Over 100 drugs with an established European reputation are exhibited. Cinchona or Peruvian bark, introduced by the Government, flourishes.

Oils, obtained from Linseed, Rape Seed, Sesame, Poppy, EarthNuts, and Castor Seed.

The trade in oil seeds has greatly increased. In 1S79 the trade value was £4,600,000; in 1885, £ 10,745,000.

Ground Nuts are the fruit of the *Arachis hypogcea*, which, instead of hanging down among the leaves, conceals itself in the earth. The oils of the ground nut and of sesame seed are sold in Europe as olive-oil.

With the oils we class the perfumes: otto of roses, oil of carraway seed, aniseed, patchouli, and sunflower oil, said to be an ingredient in "macassar oil."

Fibres.—The India Flora contains over 300 fibre yielding plants. The chief are Cotton, Jute, and Rhea.

*Notice the Rope Trophy, and the Mats made of coir, or cocoanut fibre; also the collection of Fibres by the Glenrock Company*.

Jute.—The value of the exports in 1828 was £62; in 1880, over £*6*,200,000. Dundee owes its prosperity to the jute manufacture. In 1873 its working classes engaged in jute manufacture increased their deposits in the savings bank £36,000.

Extracts and Inspissated (thickened)

Saps.—Camphor—Catechu—Caoutchouc—Gutta-percha—Assafoetida and Indigo. *See the collection of*

*Gums—Resins—Byes; also the model of Indigo factory*.

Assafœtida, obtained by wounding the root of the *Ferula*, from which the gum resin flows.

Catechu.—Prepared by boiling down the chips of the khair tree, is useful as a medicine and a condiment, also in dyeing and in Indian tanning.

Lac.—The *cocus ficus* punctures the twigs of certain trees, and resinous incrustation is formed. *Stick-lac* is the substance in its natural state on the twigs; when broken off and boiled in water, it becomes *seed-lac;* when melted and reduced to thin plates, it is termed *shell-lac*. Remember the use of lac in Indian art ware. In England it is used chiefly for sealing wax and varnishes. *Japanese Lacquer* is the natural resinous gum of trees.

*Notice the model of an Indian Bazaar*. Nothing is more characteristic of an Indian village than its bazaar or market-place.

Minerals of India.—The geological survey has furnished an invaluable collection of ores. *Coal*.—At present there are 80 coal mines worked in India.

# Tea, Coffee, and Tobacco Courts.

The exhibits are placed in glass cases according to the districts.

N.B.—Till 1823 China was believed to be the exclusive home of the Tea Plant. The first 12 chests of Tea received from Assam in 1838; in 1884, 60,000,000 pounds were exported.

The Cultivation of Cocoa has been recently introduced, and there are thriving plantations on the Madras Presidency.

Tobacco.—The Government have experimental farms. *See Exhibits*.

Agricultural Implements, &c— In the Annexe there are models of agricultural implements. *If you can find the plough*, examine it, and compare it with an English steam plough. A steam plough was introduced with great *éclat* into Bombay Presidency. It was led in procession into the field wreathed in roses; but it was impossible to make use of it so it was put away into the village temple, and there, after a time its great steel share was bedaubed red and worshipped as a god.

# Administrative Court.

Representing the Department of Revenue and Agriculture, The Department of Finance and Commerce, The Home Department, The Public Works Department, The Legislative Department, The Foreign Department, and The Military and Marine Department.

Post Office.—The most interesting exhibits are those of the Post Office, with its models of mail runners and riders, carts, boats, rafts, &c.

The Public Works, with its models of railway carriages and works for irrigation.

Military and Marine, with its elephant kedahs for catching wild elephants.

The Portrait Models, illustrative of our Indian native troops, which are in the vestibule of the Exhibition, are worth looking at.

# The Indian Palace.

A typical Royal Palace and Courtyard, with its "Karkhaneh," or workshop, and Durbar or Audience Hall. The Palace is entered by the Gwalior gateway. The vestibule is draped with Indian printed cottons.

The Silk Court lines half of the curved passage round the Durbar Hall. The products not only of the mulberry silk-worm, but of the "tussar," "muga," and "eria" worms.

Varieties of Silk-Worm. 1. The Mulberry Silk-Worm. 2. The Tussar Worm, the fibre of which is three times as thick as ordinary silk; Tussar silk is the only wild silk imported into England, where the "seal cloth" is a tussar-silk plush woven into a cotton back. 3. The Eria Worm, which feeds on the castor oil plant, and in Assam spins a white silk. The cloth made from it is of incredible durability, lasting through the lifetime of more than one person. Eria fibre is half the thickness of tussa fibre. 4. The Muga Worm produces silk which receives dye better than either tussar or eria silk. These silks are better spun than reeled.

# Ceylon.

An island to the South of Hindustan, "The pendant jewel of India."

Size.—One-sixth less than Ireland. Population, three-fourths of that of London; by far the greater portion of the inhabitants are Sinhalese.

Government.—A Crown Colony, not a portion of the Indian Empire.

The Entrance Porch and the wall which flanks it are faithful representations of portions of the Buddhist Temple of the Sacred Tooth at Kandy.

The Decorations on the Walls and roof of the Transept are in yellow, the sacred colour. The dado round the Court has on it representations of mythological animals, the elephant, the lion, the bull, and the goose.

# General Character of the Exhibits.

The Products of Cultivation stand first, since the Sinhalese have from the earliest ages attached the greatest importance to agriculture.

Great tanks for collecting the rain water for irrigation were commenced as early as 500 B.C., one of which, that of Kaluwewa, had an area of over forty miles in circumference.

The Art Ware is inferior to that of India. The carriages exhibited are made for exportation, from Ceylon woods, under the direction of Englishmen.

Products of Cultivation—Good results of educated enterprise.—At one time the Sinhalese appeared to conceive that the production of spices was their special duty to humanity.

Coffee was introduced by British influence, and before thirty years had passed good coffee properties were sold at from £90 to £130 an acre.

Cinchona Bark, from which Quinine is obtained, was next introduced; the exports in 1875 were 18,731 lbs.; in 1885, 11,678,360 lbs.

Tea Cultivation was next attempted; the exports in 1876 were 282 lbs.; in 1885, 3,799,684 lbs.

Cacao cultivation followed; the exports in 1876 were 282 lbs.; in 1885, 3,799,684 lbs.

A fungus has during the last few years injured the trees, and the production has greatly declined.

Spices.—Cinnamon, the culture of which is one of the earliest native industries.
Cardamoms—Nutmegs—Mace—Cloves—Pepper.

Medicinal and Medicines. *See the collection of the Director of the Royal Botanic Gardens*. More than five or six hundred different causes of disease are recognised in Sinhalese Medicines.

Oil Seeds and Oils. *See Notes on India*. Citronella oil from citronella grass, lemon grass oil, oil of cinnamon, are valuable as perfumes, and are largely exported.

Dyes.—Orchella weed, a lichen which grows on the stems of cocoanut palms. Sapanwood—Arnatto.

Fibres.—Coir from the cocoanut, exported as yarn for filling mattresses, and also in the form of fibre.

Mats, Baskets and Rattan Work.—Specimens may be purchased.

Gems. *See large Collection*.

Ceylon was called by the Chinese "The island of jewels;" by the Greeks "The land of the hyacinth and ruby." Some suppose that hither the ships of Solomon came for gold and silver, ivory and apes, and the almug trees and precious stones.

The Plumbago Exhibits, near the entrance, are worth a passing glance. *Notice the uses of Plumbago*.

Products of Cocoanut Palm, *in two collections, well worth an inspection*.

Uses of Cocoanut Palm: Wood—Material for house, furniture, canoe. Nut shell—Spoons, forks, basins, mugs, salt cellars, children's money-box. Leaves—Thatch, dinner plates, torches. Fibre (coir)—Rope, string for nets in which babies swing, fishing nets. Juice—as simple milk; when fermented, it is arrack and toddy, vinegar. Sap—Jaggery sugar. Oil— Anointing in sickness, lamps. "Over a native's couch when born, and over his grave when buried, a bunch of cocoanut blossoms is hung to charm away evil spirits."

Other products not important for exportation.—Arrowroot, India-rubber, a number of Resins and Gums, Cotton and Silk. Six crops of silk can be produced annually.

Pearl Fisheries.—Ceylon has been famous for its pearls from the earliest time. *See three strings of pearls*, 316 *in number, valued at* £1,500. *Also the model of Pearl Fishing Boat*.

The fisheries occur at irregular intervals, by reason of the excessive mortality amongst young oysters. In 1888 and 1889 it is confidently expected three hundred million oysters will be fished.

Pearl Pishing Boat.—The diver descends with two ropes, one having a heavy stone, the other the net. At the bottom, he throws himself flat, the stone is drawn up, the diver gathers as many oysters as he can in half a minute. A signal is given by the rope which holds the net, the boatman above gives a jerk, and the diver regains the surface.

The value of a pearl depends on its roundness, its brilliancy, and its silky whiteness. Fine pearls sometimes realise from £20 to *£200*.

*Notice also the Chank shells*, which are used by the natives of India for ornamental purposes, and, when perforated at one end, sound a loud note of call to temple worship.

Pictures and Photographs.—Miss Gordon Cumming's pictures. Photographs of Veddas on south side.

The Veddas were the early inhabitants of Ceylon.

The Sinhalese of the present day are of the Aryan stock.

# Special Exhibits.

Models of Natives.—Buddhist Mendicant Priest. Notice his bowl, his yellow robes which have been torn to pieces and then re-sewn, the fan to cover his eyes that he may not see a fathom in front of him, the muslin to strain the water lest in drinking he should destroy even insect life.

Masks on the walls, worn by "Devil Dancers," who dance through the night in the sick man's room to cure him.

Native Books, written on the leaves of the talipot palm, will be found in the lower portion of Case K.

*The boards which bind the leaves are often ornamented with precious jewels. Models of arrack still, native oil mill, salt works, elephant kraal for capturing elephants, near case G*.

Agricultural Implements.

The plough resembling that used two thousand years ago is designed to operate on land rendered soft by repeated flooding.

Dagoba.—A gilt representation of a Dagoba stands near the entrance to the Court.

The word Dagoba is derived from "dhatu," a relic, literally a tooth; and "garbha," a casket. Buddhist tradition says that when Gautama Buddha died, his body was burned, and his charred bones distributed over the country. His left canine tooth, after 500 years, was moved to Ceylon for safety. A silver Dagoba in the Ceylon Court contains a model of the "Sacred Tooth."

The term Dagoba is applied to all Buddhist relic shrines.

# The British Dominions in North America

## Comprise the Dominion of Canada and the Island of Newfoundland.

Size.—Thirty times as large as Great Britain and Ireland. Population—the population of London on a "working day."

To thoroughly enjoy the Canadian Courts, read "Canada and its Scenery," by the Marquess of Lome, published by the Religious Tract Society for 3d.

# The Dominion of Canada

Comprises the following provinces:—

- Prince Edward Island, same size as Norfolk.
- Quebec, Ontario, which form Canada proper, five times larger than England.
- Nova Scotia, hardly half the size of England.
- New Brunswick, half the size of England.
- Manitoba, twice the size of England.
- British Columbia and Vancouver Island, about six times the size of England.

map of Canada

The North-West Territory, about forty times the size of England.

Newfoundland has not joined the confederation.

A Railway Trip of nearly 4,000 miles through the Dominion of Canada, from Louisburg on the coast of the Atlantic Ocean to Vancouver on the coast of the Pacific Ocean.

Stage I. about 2,000 miles, through the older provinces of Nova Scotia, New Brunswick, Quebec and

Ontario, with their Forest lands, in which large areas have been cleared for Farms and Orchards.

Stage II. about 1,200 miles over the broad Level Prairie of Manitoba, Assiniboia, and Alberta. Here no railway cutting or embankment is needed. Both climate and soil combine to make this the best Wheat growing district in the world. Winnipeg, not quite the "Half-way House "between ocean and ocean, is on this stage. Its population in 1871 was 241, now it has probably reached 30,000. Here, more than 2,000 miles from the sea, we have Lake Winnipeg, about two and a half times the size of Sussex, Surrey and Kent, and a river, the Saskatchewan, flowing into it, up which a steamer can travel 1,5oo miles.

Stage III., the last 600 miles of railway, more than 300 of which are cut through the solid rock of the Rocky Mountains. The railway mounts more than 3,000 feet above the sea-level before Columbia, the most western province, is reached.

Advantages of the Canadian Pacific Railway.—England to Sydney in Australia, *via* Suez and Colombo, takes about 42 days, and all the coal required by the steam ships has to be carried to the "coaling stations."

England to Sydney, Australia *via* Louisburg (the most eastern port of Canada), and the Canadian Pacific to Vancouver, will take about 29 days. Louisburg and Vancouver are respectively on two of the largest coalfields in the world. *Thus not only a great saving of time but of cost is effected by this route*.

The journey from England to Yokohama in Japan, *via* Suez, takes about 55 days, the journey from England to Yokohama, *via* the Canadian Pacific Railway, takes 20 days; a saving of 35 days.

# Canadian Courts.

Canada has required so much space, and her courts are so scattered, that their position must be sought in the Index plan.

## Industrial Enterprise.

A walk through the Canadian Courts will convey the impression that Canada is not saying, "See, English brothers, what the Dominion will produce," but, "See what we Canadians can do."

"Look at our machinery, our furniture, our sewing machines, musical instruments; see all our contrivances for ventilation, sanitation, heating, cooking; notice our carriages, carts, waggons, harness; admire our silversmiths' work, our jewellery, baskets, brushes, and fancy articles.

"We can build good ships and boats, we can send you canned vegetables and fruits, salmon and lobster, evaporated squash, turnips, carrots, cabbages, and onions; and please you with sugar, confectionery, and condiments.

"In photography, book-binding, and even sculpture and engraving we can compete with you; and do you not think that our men, women and children should be satisfied with our efforts to dress them?

"As for Education, our Normal Schools, our High Schools, our Art Schools, Colleges of Agriculture, and Veterinary Science, show you what we can do in that direction."

The Exhibits illustrating Education and Instruction require thirty pages of the Official Catalogue. Possibly among the most interesting exhibits are those representing the work done in the Canadian Schools.

Contrast the agricultural implements of the Indian Economical Court with those in the Canadian Machinery Court. Also the Art Ware Courts with the Canadian Central Court.

Notice the excellence, the variety, and the price of the respective Canadian industrial exhibits, and do not forget that the manufactures of Canada are still in their infancy.

Will Canada become a smaller purchaser of British Manufactures than she now is?

Will Canadian manufactures ever enter into competition with British manufactures in the markets of the world? What lesson does the following extract from the letter of a Pekin correspondent to the *Times* teach?

"A Canadian told me of his vain attempts to get things made in England as his customers required them. One of his articles, I remember, was axes, of which he sent drawings and wooden models till he was tired, but could never get the pig-headed makers to vary their traditional form. All the explanation he could get in reply to his complaints was, that, 'that was the way to make an axe.'"

There is yet time for the English workman to retain his supremacy, as the following will show.

Taking the exports of the Canadian mines at 10, fisheries will stand at *22* forest products at 58, animals and their products at 69, other agricultural products at 39, and the manufactures at the bottom of the lists 9.

For many years hence, therefore, Canada should find her greatest profit by developing her natural resources and exchanging them for British manufactures.

# Natural Products of Canada.

Farming Products. Canada is pre-eminently a country of yeomen farmers.

The Exports of Farm Products rank in the following order, as to value:—Grain—Cheese—Homed Cattle—Eggs—Butter—Hay—Sheep—Meats—Flour and Meal—Fruits—Poultry—Malt—Potatoes—Seeds.

To form some idea of these products study the various Trophies at the east end of the Central Court, such as The Great Fruit and Agricultural Trophy. All the Fruit shown in this Trophy was grown in the open air. Thirty years ago Nova Scotia imported apples, now she exports 1½ million bushels. In Ontario are vineyards and peach orchards fifty acres in extent; strawberries are raised as a field crop, no less than 105 Ontario fruit growers are exhibitors.

The smaller Agricultural Trophy; the Cheese Trophy; two of the cheeses weigh 1,288 lbs. *See the Model of a Dairy Farm in Manitoba*.

Forest Products.—At present the produce of the forest exceeds in value any other yield of the growth, produce, or manufacture of the Dominion.

The Timber trade is termed the lumber trade, and it, with the industries dependent on it, employ about 100,000 hands.

The Lumber men are the pioneers who have opened up Canada.

At the saw mills, a giant pine, which has taken a century to grow, is taken out of the water by machinery, placed in position under the saws, and in a few seconds cut up into boards. The beauty of the tints and brilliancy of colour of the Canadian forests in autumn require to be seen to be understood.

Minerals.—On the railway trip the traveller, in passing through Nova Scotia, through the country to the north of Lake Superior, and through Columbia, is crossing the most important mineral districts.

The Mineral exhibits (see index plan) show the wealth of these districts, in iron, gold, silver, copper, lead, tin, zinc, asbestos.

*Nova Scotia and Columbia exhibit coal, and also represent by obelisks the amount of gold obtained from each of these provinces. When examining the asbestos exhibits, do not forget that asbestos is a mineral*.

Fisheries.—The largest]in the world; 5,600 miles of sea-coast in addition to 102,000 square miles of Lake areas.

No fewer than 60,000 men engaged in them. Sea Fisheries.—Cod, Herring, Mackerel, Lobsters, Oysters, Seal, Whale. Fresh Water Fisheries.—Salmon, Trout, White Fish.

*In the Canadian Fishery exhibits, are stuffed specimens of fish, fish oils, models of boats, fishing tackle, and a fine collection of canoes*.

The Sea Fisheries inexhaustible.

The Arctic currents bring down the food for the fish in the shape of living slime, formed of myriads of minute creatures which swarm in the Arctic Sea. Twelve large fish-breeding establishments in the Dominion.

Natural History is well represented. *See the Hubbard collection. The collective exhibit from the Island of Anticosti; the Insects of Canada, near the Education exhibits; the collection of Birds, and the stuffed specimens of fur animals*.

Among the Birds are the Sperm-billed Shoveller, the Golden Eye Wrestler, the Cormorant, and the Snow Goose.

The Hubbard Collection.—Notice the head of the Moose Deer. This deer, which stands as high as a horse, is becoming scarcer every year. There are four specimens of the Elk or Wapiti, whose branching horns, though beautiful in a trophy, are formidable when the animal is brought to bay. The Buffalo, which roamed in countless thousands, is now almost extinct; like the Indian, it hears in the shrill whistle of the locomotive its death knell. Buffalo horns are found by thousands on the prairies. The Mountain Sheep dwells secure amongst the high cliffs; notice how large the horns in the specimens are at the base. The horns and head of a mountain sheep often weigh 50 lbs. The Woodland Cariboo is one of the fleetest, wildest, and shiest of all the deer tribe. Notice the head of the Musk Ox. Though he has very short legs he is very fleet of foot, and his covering may be almost called double, being a long surface hair outside, and close, fine wool underneath.

# Australia.

# Thoughts on entering the Australian Courts.

In these Courts, five "Daughter Nations" show us some of the results of a century's "nation making."
None of the children of the mother country have followed her so closely in the parliaments, churches, universities, schools, and national games.
None have developed to the same extent or in the same varied degree the natural resources of their new homes.

## The importance of these colonies to the Mother Country

Is shown by the fact that while her trade with Canada was valued in 1884 at about 18 millions, her trade with the Australian colonies was valued at over 55½ millions. This is still more remarkable when we? remember that the population of Australia is only about half the population of Canada.
Five daughter nations. "Every one speaks of England as home, though neither they, nor their parents nor grandparents, ever saw the old country."

# General Remarks.

Australia is a large island twenty-six times the size of Great Britain and Ireland, with a population half that of London.
This large continent-island contains the five distinct colonies here named, with the date of their birth:—
Comparison of the Australian Courts with Canadian Courts.—While the Canadian Courts give the impression that the Canadians are more anxious to show what they can do, rather than what their Australia, Fiji an New zealand map Dominion produces, the Australian Courts show more what these colonies produce than what they do. Why?
1. The Australian colonies are more youthful, and young colonies must rely principally on what their country naturally produces.
2. The natural products of Australia are so varied and abundant that the daughter colonies find it now far more profitable to exchange them for the manufactures of the mother country.
N.B. If the mother country act wisely, see page 29, this profitable exchange will continue in the future.
3. The climate of Australia is more favourable for the development of natural products than the climate of Canada. In Australia there is no winter in the English sense of the word. Very few Australians have seen snow. The Canadian winter stops all agricultural work.
The Vegetable Products exhibited range from those of the tropical climate of Queensland to those of the warm temperate climate of South Australia, which resembles the climate of Spain, South France, and Italy.
Notice the position of the great mountain range on the map. Compare it with the mountains of Natal in map of South Africa. Read the notes on Natal, page 53.
The natural Australian vegetation is entirely evergreen, of nearly 6,000 plants, over 5,000 are not found elsewhere. European trees on their first introduction seem puzzled whether or no to shed their leaves, and also when to do so. Some turn evergreen, others apparently discover the Australian winter is the European summer, and alter their habits to suit the change.
The Eucalyptus—the everlasting gum-tree—is represented in every Court. Its gum contains a large proportion of "Kino-tannin." Its bark is useful for tanning and dyeing; the leaves yield a valuable oil; the wood is invaluable; the timber of some species effectively resists the white ant and *teredo navalis*, and hence is most useful for railway sleepers and harbour works. Its leaves are vertical and do not shelter sheep.
The highest tree in the world (480 feet), nearly two and a half times as high as the Monument in London, was discovered in Australia.
There is a large case of Eucalyptus oils and other products in the Victorian Court.
Note well that the only native fruit is a kind of chestnut, and that the trees, which bear the beautiful fruit you admire, were all introduced by colonists.
The Timber exhibits in each Australian Court show the variety and abundance of timber.
"But the genius of destruction is in the air," and Australians of the next generation may, in the intensified droughts (which are even now the bane of the climate), lament the lack of forethought in their fathers.
Let us hope that in Australia the old adage will prove true, "The rain follows the plough."
The Animal Products relate principally to sheep, for which the vast natural pastures and the climate (droughts excepted) are very favourable.
The exhibits of Natural Grasses and Fodder Plants should not be lightly passed by. How much depends on these grasses! *See the case in the South Australian Court, near the Camels.*
Australia on its discovery had neither sheep, cow, pig, nor horse. In 1792 there were in Australia only 23

head of cattle, 11 horses, 105 sheep, 43 pigs. In 1885 there were 9,000,000 cattle, 80,000,000 sheep, 1,500,000 horses, 1,000,000 pigs.

The Spanish proverb says, "Sheep have golden feet, and wherever the print of their footsteps is seen, the land is turned into gold."

The Merino sheep, the horse stock, the fattening cattle, and the dairy cows, all thrive throughout the year, without shelter, upon the open natural pasture lands. The Merino sheep were introduced into Australia from the flock of a Mr. Henty, of West Tarring, Sussex. The climate of Australia closely resembles that of their old home in Spain.

The Industrial Exhibits have reference to the special needs of the colonists, such as clothing, leather, saddlery, furniture, glass ware, earthenware, soap, candles, carriages; also agricultural implements and machinery, such as the "Stripper" and the "Stump jumping plough."

Caution.—Many of these industrial exhibits are evidences not of "staple industries," but of what the colonists *can do*, if they wish. Will they wish?

The Leather Exhibits, in the shed with the electrical machinery, have a very special importance. Formerly, Australia sent raw hides to England for English labour to tan. *She now sends leather*.

Education and Fine Arts.—Each Court gives most creditable evidence that the colonists recognize, "Man does not live by bread alone." Paintings—Photographs—Maps—Books—Musical and Scientific Instruments.

The Photographs and Paintings, specially the large wall paintings of localities, are most worthy of attention. Do not be tempted to even glance at the portraits, you have not the time.

What the Courts teach respecting Australia apart from the "work" of the Colonists.—The ethnological groups, the conservatories, and the cases of birds are both interesting and instructive. Much may be learnt by a few minutes' inspection of each.

The Natives represented belong to the Oceanic negroes, ranking with the Bosjemen of South Africa as the lowest and most degraded of races.

Their numbers are now estimated at 50,000. That they are not beyond education, the educational exhibits of South Australia show.

In every Court there are cases with specimens of aboriginal dress, weapons, tools, &c. The stone implements in these cases, and the method of obtaining fire, shown in the Sea Coast Group, prove that the natives are in the lowest grade of humanity.

Australian Animals.—Of 150 species of mammals, more than 120 are not found elsewhere, and of these 105 are marsupialia, or pouched animals.

The chief marsupials of Australia are the kangaroo, bandicoot, the phalanger or opossum. There are also pouched hyaenas, pouched rats, and pouched bears. The true opossum is a native of America, and is the only marsupial found out of Australia.

"The first mammals created were those *now* characteristically Australian kinds. The kangaroo represents to-day the marsupial animals that jumped about Europe thousands of years ago."

*The birds are remarkable for their plumage. The living and stuffed specimens are numerous. Specially notice the case in the Queensland Court*.

In the groups will be seen the platypus, which has the bill and feet of a duck, the body and fur of a mole, and the internal structure of a reptile. This animal lays eggs like a bird, and suckles its young like a mammal.

# New South Wales.

The Mother Colony; three times the size of Great Britain and Ireland—Sydney the Capital—Founding of the Colony.

William Pitt in 1787 sent Captain Arthur Philip to form a settlement in Botany Bay, where Cook had unfurled the British flag in 1770. Finding Botany Bay unsuitable, he sailed to Port Jackson and founded Sydney, the first English settlement in Australia.

Sydney (*see the large picture at the north end of the Court)* extends on the shores of Port Jackson, a land-locked harbour of romantic beauty, in which all the mercantile and armed fleets of the world might safely ride at anchor at the same time.

The Great Pastoral Colony.—In 1792, number of sheep, 105; in 1883, number of sheep, 34,000,000. In 1884, the value of the wool was 9½ millions sterling. *See Wool Trophy, and the cases of Preserved. Meat and Fish*.

One of the Gold Colonies—Bathurst—the centre of the Gold District.

The gold-bearing area, 70,000 square miles.

Mr. Hargreaves, a colonist of South Australia, went to California in 1848, and noticing that the geological formation of California resembled that of Bathurst in his own colony, he returned, and in 1851 discovered gold.

Great Mineral Wealth.—Copper—Silver—Tin—Antimony, Bismuth, and Cinnibar.

One of the two Coal Colonies.

*See the Copper Ingot Trophy, the Gold Trophy, the large Collection of Silver Ores. See also the Collection of Gems and Precious Stones*.

Nature seems to have pointed out New South Wales as the great manufacturing colony of Australia. Coal (equal to the best English) is found near abundance of iron ores, limestone, and fire-clay. A variety of coal called "kerosene shale" is sent to England to mix with ordinary coal for gas-making.

*Specimens of this coal arc among the coal exhibits. In this Court are also kerosene candles*.

Natural History.—*See the group of cabbage-tree palms, and tree-ferns, with the wild cats, bears, kangaroos, opossums, laughing jackass, and the settlers hut*.

Wine is increasingly made.—The valleys of the rivers Hunter and Paterson are said to be equal to the best French wine-producing districts. *See Wine Trophy*.

The exhibits of Silk, Sugar, and Arrowroot are important as indicative of future industrial developments.

Photographs—*More than* 2,000 *photographs*.

Curiosities—*Relics of Captain Cook*.

# South Australia.

Fifteen times the size of England and Wales. Founded, 1836. Capital, Adelaide.

Some of the Colonies have obtained wealth by the discovery of goldfields; but the progress of South Australia has been achieved by patient industry and enterprise.

The Granary of Australia; The great wheat-growing colony. Wheat, 68 lbs. to the bushel is grown. *See exhibits of Flour and Grain*.

In South Australia two million acres of corn have to be harvested in three or four weeks, and labour is expensive and scarce. The "Stripping Machine" enters the field, in ten hours strips off the heads of the ripe com from ten acres and, brushing out the wheat, leaves the straw standing on the ground, to be burned or gathered at leisure.

Stump Jumping Plough.—After the scrub has been rolled down and burnt, stumps of trees still remain; whenever the "stump jumping plough" comes against a stump, it causes the plough to lift until it slides over and takes the ground on the other side. *See the Plough*.

The Horticultural Colony.—See photographs representing natural size of fruits of the Colony, among which is a bunch of grapes, seven of which would have weighed a hundredweight. *In a case near this was exhibited a pear weighing* 2 *lbs.* 12 *ozs.*

The Olive Oil is equal to any in the world. The Mulberry Tree thrives, and if labour were cheaper the rearing of Silk-worms would be an important industry.

*Notice the Wine Trophy, and the exhibits of Preserved Fruits*.

Until the establishment of jam factories and fruit-preserving works, it was a common thing to see peaches, apricots, and apples carried in cartloads to the pigsties. There are about 600 market gardeners within a few miles of Adelaide. Pumpkins over one and a quarter hundredweight have been grown, and cauliflowers forty pounds in weight.

The nature of the soil around Adelaide, and the warm and dry climate bring the fruit of the vine and olive to great perfection.

First comes the corn harvest, then the vintage follows, and then the olive harvest. This succession of harvests adds greatly to the profit of the colonists.

Honey.—Notice the exhibits from the Fairfield Apiary, which has yielded in one year nearly six and a half tons of excellent honey.

The great Copper producing Colony.—*See Copper Trophy from the famous Wallaroo Mine*. The copper in this trophy is worth £1,6oo. *See also specimens of Malachite or Carbonate of Copper*.

Not rich in precious metals, nor in iron, nor coal.

Two once valuable mines, the Kapunda and Burra-Burra, are no longer worked. The value of the copper obtained from these mines was nearly £6,000,000. A teamster first noticed the red oxide of the Burra-Burra copper.

Merino Sheep.—*See the Merino rams in the pens, some of which, if alive, would fetch two hundred, guineas each*.

Camels.—The map will show you that South Australia stretches from the south to the north of the island. The interior of the Colony is very arid and the heat semi-tropical. Without the camel, the inland district could not have been explored, nor could the Adelaide and London telegraph have been constructed except at a ruinous cost. South Australian camels have been known to travel twenty-five miles a day for nine successive days without a drink of water.

The Emu is an Australian bird resembling the ostrich. *See specimens*.

Ostriches.—Colonists wish to establish farms for ostriches as at the Cape.

Two most instructive group scenes.

*A sea-side scene, and The scene on the Murray River*.

Notice the suitable decorations of the Court, viz., *paintings of native flowers and fruits*.

# Victoria.

In size about equal to the area of Great Britain. Pounded in 1835-—Melbourne the Capital.—Forty years ago a bush town. *See the native encampment, and compare this encampment with the photographs of Melbourne of* 1886.

The most populous, the richest, the most prosperous Colony.—This the visitor to the Exhibition need hardly be told; he has but to walk through the Victorian Courts and then compare them with the courts of the other Australian Colonies. Undoubtedly Victoria is "The Go-ahead Colony," its people "work while they work, and play while they play."

The Victorian youths are fine shots, bold, fearless riders, and great in yachting, rowing, cricket, and athletics of all kinds.

The Great Gold Colony.—It is said that two-thirds of the area of Victoria is covered by gold-bearing rocks. The chief gold district is round Ballarat.

*See Ore Crushing Machinery, South Promenade*.

The first finds were alluvial gold, i.e., gold once contained in veins and reefs of quartz and carried away by geological action. During the first years of gold digging little attention was paid to quartz mining; by degrees batteries of stampers were introduced, and there are now hundreds of crushers with from five to a hundred heads of stampers.

The Golden Arch represents the exact bulk of Gold raised in the Colony up to the end of 1885, the value of which is 216 millions, or about a fourth of the national debt of Great Britain.

*Close to the Golden Arch are models of the famous gold nuggets, among them the* "Welcome" Nugget *found in* 1858, *and sold for* £10,500. *The present value is given as* £8,780.

The Colony had scarcely drawn its breath before gold came pouring into Melbourne, and population was drawn to the Colony by hundreds of thousands. Its trade with the outer world was thus promoted, its flocks and herds were multiplied, the cultivation of land extended, and manufactures of all kinds sprang up spontaneously.

Many other valuable Mineral Productions—Copper—Silver—Tin—Antimony.

Rearing of Cattle largely carried on.

Victorian Wool, largely produced from Merino sheep, fetches a high price. Upwards of 10,000,000 sheep in the Colony.

*Notice the giant exhibits, with wool and fleeces on one side, and on the other the woods of the Colony. Notice also the exhibits of Tinned Meats*.

Horses, sent to India.

Wine largely made. *A fine view of Victorian vineyards*.

As in South Australia the Mulberry flourishes and the Silk-worm thrives.

Fruit largely grown. *See Models, beautiful paintings of Victorian flowers, and also the preserved fruits*.

# Queensland.

Five and a half times the size of Great Britain and Ireland.—Founded 1859—Capital, Brisbane.

Population, not one-tenth of London, but the herds of cattle and sheep could easily feed two Londons, and the wool clip is one-half that of Great Britain and Ireland At the present time "The great Emigrant Colony."

Walk through the courts of this the youngest of our Australian Colonies, merely to obtain impressions, and you will be convinced (1) That the Colony has unlimited resources for becoming a great sheep colony, a farming colony, a mineral producing colony, and a colony for tropical productions. (2) That the people of Queensland are developing these resources with skill and energy, and that a great future lies before them.

The Tropical Colony.—A highland region, lies to the west of the coast district, and table-lands, called "downs," extend for a considerable distance. Upon the elevated "downs," wheat, oats, barley, and every kind of temperate product can be grown. In the lower districts, all tropical productions flourish.

*Notice the Arrowroot—Tapioca—Sago—Rice—the Preserved Pineapple—Guava—Apricot, &c.*

Valuable Timber.—*See the large Cedar Logs*, one 20 ft. 5 in in girth, the other 18 ft. 8 in. *Notice the various oils from the Eucalyptus*.

Great Mineral Wealth.—Queensland may probably prove the richest mineral colony. The mineral exhibits are 1,407 in number, and include Gold—Silver—Copper—Tin—Mercury—Cobalt—Bismuth—Coal.

Gold has been found in nearly every part of the Colony. *See ore from Mount Morgan*.

Eminently a land of Copper and Tin. *See Tin ore from Heberton, and the block of pure copper weighing* 1½ *tons*.

One of the two Coal Colonies.—Precious Stones—Diamonds—Sapphires—Garnets. *See exhibits, and the necklace of diamonds and opals worth £1,000*.

The Mount Morgan Gold is found not in quartz, but in ironstone and in siliceous deposit. This deposit was discovered by Morgan, whose horse knocked up what appeared to be a piece of stone. Morgan saw that it contained gold, and purchased the farm on which the "stone" was found at *£1* per acre. It is calculated that £9,000,000 worth of gold will be obtained.

Stream Tin is in fine grains, the size of a pin's head and under, and has been brought out of the granite rocks by the action of running waters Value of Tin obtained, over £4,000,000.

Gems and precious stones are found in the tin streams.

Hungary, the land of opals, has a rival in Queensland.

Pearl Shells. *See Trophy; also the* 400 *large Clam Shells in Conservatory*.

Natural History. *Notice the Queensland landscape group with bears, flying squirrels, soot owls, cranes, iguanas, puff lizards, the wingless birds, the duck-billed platypus. Notice also the beautiful case of Australian birds and the two dugongs*.

The Dugongs are animals somewhat resembling whales, which feed on the seaweed of the Indian seas. Their flesh is excellent, their concealed tusks are good ivory, and their skin good leather.

# Western Australia.

Eight times the size of the United Kingdom—Founded 1829—Capital, Perth.

The Cinderella of the Australian Colonies.—This colony has been like a ship undermanned, but is now rapidly improving.

The Climate is the finest and most salubrious in the world. The severe droughts and floods of the other colonies unknown here.

Timber important. *See jarrah Trophy, and also Karri Trophy*.

Wood of Jarrah impervious to the borings of the Teredo and Termites, thus much sought after for jetties, piles, railway sleepers. Karri trees have been found over 400 feet high, with the first limbs 300 feet from the ground, thus the towers of the Crystal Palace would stand under them.

Mother-of-Pearl abundant *off* the coasts. *Notice the Trophy; also the Southern Cross Pearl; also the Pearl Diver in his dress, and contrast him with the poor pearl diver of Ceylon*.

The Southern Cross Pearl is formed of nine pearls together in one solid mass. It is valued at £10,000.

Notice also the Honey. *See also Miss Bunbury's collection of wild flowers*.

Owing to the plentifulness of flowering trees and shrubs, all rich in honey, the bees are never at any time of the year in want of food.

Natural History. *Notice the specimens in the large wood and glass pavilion*.

# New Zealand.

Two large islands, called respectively the North and South, and a smaller island named Stewart's Island. These are in the southern hemisphere on the other side of the globe, almost directly opposite to the British Isles. They were discovered by Captain Cook in 1769. A settlement of missionaries was made in 1814, and the first English Consul was sent in 1840.

Size and Population.—The total area of the three islands is almost equal to that of Great Britain and Ireland. The population is about one-seventh the population of London.

# General Remarks.

Another "daughter nation," whose aim, judging by her Courts, is Resolute, Intelligent Progress. In no Court in the Exhibition are the exhibits so well balanced, in none do they so readily give a full and accurate impression of the character and resources of the Colony exhibiting.

The Climate in the North approaches that of Italy; in the South it is very similar to London, and it is particularly suitable for colonists bom and bred in the United Kingdom.

On entering the Court *find the Relief Model of New Zealand*.

Ten minutes would be well spent over the model, noticing the geological colourings, the beautiful harbours on the coast, the nearness of every portion of the islands to the sea. The foliated schists contain the gold mines, and the cretaceo-tertiary is the formation for the coal deposits.

Specially notice the volcanic region in the North Island, which has lately so terribly suffered from the eruption of Mount Tarawera.

Wool the most important production.—The long-woolled sheep of Britain benefit by the change owing to the genial climate. The wool exhibits are most carefully and thoughtfully arranged. Experts cannot fail to profit largely. The value of the wool exported is treble the value of the gold. A truly "golden fleece."

Wheat, &c., &c.—Owing to the range of climate every variety of cereal and root crop may be raised. *See exhibits of Wheat—Barley—Flour—Semolina—Potatoes*.

Garden Produce, &c., so also many fruits grown in hot houses at home, ripen in the open air in New Zealand.

New Zealand Flax is the fibre of the *Phormium Tenax*, and has an old-established reputation. Value in 1884, £24,500.

Farm Produce.—Dairy factories have been established, and the manufacture of cheese is important. *See Food Exhibits near the Fernery*.

Frozen Meat.—*The Refrigerating process is exhibited in the South Promenade*. The Colonies until recently exported only wool and skins, and boiled down the flesh for the sake of the tallow.

Timber, Kauri Gum.—*See Timber Trophy; specially note section of Kauri Pine*.

The Fernery, the finest in the Exhibition. *Notice the beautiful Todea superba*.

The Kauri grows in the north half of the North Island. The tallest trees are nearly as high as the Monument in London. Its turpentine forms the Kauri gum, which is also dug out from the sites of old forests. Logs which have been buried for many years have been found sound enough to be used as railway sleepers.

Minerals.—Hardly a district in the Colony without Brown Coal. Gold mining is still in its infancy. Silver, Copper, Iron, and other metals will be found to be abundant. *See the excellent collection of Minerals; also the Metallic Sand shown in one of the cases of the Mints Department. Specimens of Bituminous Coal in the Fernery*.

No iron mines are at present worked; the black sands which occur plentifully on the coasts furnish the iron.

Brown Coal is coal of more recent formation than the coal we bum. In Otago the seams are from five to twenty feet thick. Nearly the whole of this coal can be obtained without sinking. Bituminous coal, also abundant, in seams from 18 to 40 feet thick.

Animals.—The exhibits of New Zealand birds and fishes are especially interesting. *Notiec the Skeletons of the Moa (Diornis Maximus) (D. Elephantopus); also the only Moa egg ever found, valued at* £1,000. The collection of New Zealand fishes is scarcely less interesting. *See the Tuatara group, and the living Tuataros in the Conservatory*.

The seas about New Zealand abound in fish. Those exhibited and marked with a red star are food fishes.

The Tuatara is the largest New Zealand reptile, it lives mainly on insects; its jaws and teeth arc immensely powerful, and it can inflict a severe bite; it lives in burrows, in company with native petrels. On the mound in the group is a young mutton bird. *Notice the case with the "vegetable sheep" a composite plant which grows only on the shingles of the High Alps of New Zealand*.

Manufactures.—Notice how the colony is rendering itself independent of the outside world. With abundance of good timber, the colonists have become ship-builders, and have built 83 steam ships. There are 23 manufacturers of agricultural implements. At the Exhibitions in Sydney and Melbourne, New Zealand took the chief prizes for brass and copper goods.

*Boys will be interested in the machine for teaching swimming*.

Maps, Pictures, Photographs.—The beautiful Physical Map of New Zealand deserves special attention. The maps, in combination with the pictures and photographs, enable the visitor to form a most accurate idea of New Zealand and its scenery. *See Miss Gordon Cummings views of the hot spring district, destroyed by the late volcanic eruptions*.

Do not pass over Lindauer's paintings of Maori Natives, at the South entrance to the Courts, near the Maori Storehouse.

The Natives are termed Maories; they say, "as the white man's rat has extirpated our rat, so the European fly is driving our fly away; as foreign clover is killing our ferns, so the Maori will disappear before the white man."

# The West Indies.

The West India Islands are a group of nearly a thousand islands, which form a curve from the south of Florida to the mouth of the Orinoco. These islands vary in size from Spanish Cuba, the size of Ireland, to the smallest rock. Only 54 of them are inhabited. The greater portion are British colonies, but Spain, France, Holland Den mark, and Sweden are owners of a few islands.

The British West India Islands have a total area of not quite half the size of Ireland, and with a population of about a quarter that of London

You are now about to inspect the exhibits of Tropical Colonies; contrast them with those of Canada, which has a temperate climate.

Enter the Gallery from the east end, and you will notice—

- The Brilliancy of the Court, which is typical of the West Indian climate, vegetation, and scenery, as those who have seen the islands, or read Kingsley's "At Last," will admit. *Specially notice the partitions painted so as to represent the numerous palms, ferns, fruits, and flowers of the islands*.
- That distinct Islands have distinct Courts.

You will understand their arrangement the better if you remember that,

The West India Islands are divided into The Greater Antilles, of which Jamaica is the only British possession; the Lesser Antilles, and The Bahamas.

The Lesser Antilles are divided into the Windward Islands, so called because they stand out, as it were, to catch the Trade winds, and the Leeward Islands.

The Courts of the Leeward Islands are on the left hand as you enter the Gallery, and represent Dominica, Montserrat, St. Kitts.

The Windward Islands are represented by Grenada, St. Lucia, St. Vincent, and Tobago.

Barbados and Trinidad are geographically Windward Islands, but on account of their size and importance they are not, for governmental purposes, classed with them. The Courts which represent these islands and Jamaica are on your right hand.

Though each Court has distinct features, yet the products common to the West Indies will be found more or less in all the Courts.

To obtain a good general idea of the products of the West Indian Islands, look in the left-hand corner of the Grenada Court, when you will see—*Cocoa, sugar, coffee, nutmegs, cloves, cotton, castor oil seeds, capsicum, limes, pine apples, shaddock, tamarinds, fob's tears, plaintain, bread fruit, honey, arnatto, and ground-nuts*.

map of Central America

## Special Notes.

The Leeward Islands.—Of these St. Kitts, about the size of Jersey, is the most prosperous, and after Barbados is the most cultivated island in the West Indies.

The Windward Islands.—Grenada, St. Lucia, St. Vincent, and Tobago, are not together larger than Glamorganshire. The only flourishing island is Grenada. *Specially note the exhibits in the left-hand corner referred to above*.

Jamaica is the largest of our West India Islands, and is about the size of Somersetshire, Devonshire, and Cornwall together. Jamaica seems resolved to convince the visitor that its rums hold the supremacy! No coffee can beat that grown on the Blue Mountain. Fruit for the American market is now an important export.

Pine apple culture has yielded a profit of £80 an acre. Jamaica is not the great sugar-growing colony it once was. Why? *Notice that the Jamaica exhibits are representative exhibits; notice also the ferns, pasted on the Jibe of the lace palm*.

Barbados, or Barbadoes, named from the bearded fig-tree, a branch of which is in the Court *(L. Barba, a beard)*.

The island is a little smaller than the Isle of Wight. Sugar is its staple, and in its Court Barbados appears to invite comparison between its own sugar and its enemy, the beet sugar. Fisheries important. *Notice the exhibits of cocoa, cassava, yams, and coral. Notice the two curious maps on the wall*.

Trinidad has an exceedingly picturesque Court. The island is about half the size of Jamaica, and owes its name to its discovery by Columbus on Trinity Sunday, 1496. Sugar is the staple production, but its Court is characterised by the variety of its exhibits, which show that, not depending on one branch of industry alone, it has not suffered as other West Indian islands have suffered. The planting of cocoa has greatly increased during the last few years.

*The large blocks which look like coal* are asphalte, from the famous Pitch Lake. This lake, with its ninety acres of pitch, is one of the wonders of the world.

Two hundred and thirty-five specimens of Wood are exhibited.—*Notice the fibrous substances; two collections of Butterfies one exhibited by a boy, W. F. Kirton; the other by a girl, Miss Morton*.

The Bahamas consist of 29 islands, 661 bays, 2,387 rocks, which stretch from the northern coast of St. Domingo to the eastern coast of Florida. Nassau is the chief town.

The inhabitants of the islands draw their chief spoil from the sea, and neglect the fruit, cotton, and fibrous plants, which they might cultivate with great profit *Notice the Sponge, the Star fish, the Coral, the Pearls found in Conch Shells, the Fibres, and the Gorgonias or Sea fans, which are pressed into various shapes*.

The sponge exported in 1885 was valued at £58,000.

# British Honduras.

One of our oldest "Possessions" (1670), but one of our youngest Colonies (1862). Size, about one quarter of Scotland. Population, one-fifth of Brighton.

Europe looks to Honduras for a great part of its supplies of Mahogany and Logwood. A flourishing settlement in its early days, when logwood was £100 per ton; at the present time it is worth but £6 per ton.

The Exhibits show that sugar, bananas, and cocoanuts are important products. *Notice the fibres, also the case of Indian dresses*.

# British Guiana.

A Tropical Colony on the north coast of South America, with its sea coast looking towards the West Indian Islands. Sir Walter Raleigh's El Dorado.

Area.—One and a half times the size of England and Wales.

Population.—A little more than that of Brighton.

Our knowledge of the country is limited to the coast region. The ocean for some miles from the shore is a dirty yellow colour from the alluvial deposit carried into it by the Essequibo and other rivers. It is this deposit on the coast region which gives it its extraordinary fertility.

As the Products so closely resemble those of the West Indies and Honduras they need not be examined, and thus opportunity will be given for the closer inspection of the exhibits illustrative of the homes and habits of the native Indians and the natural history of the colony

Sugar its chief product; Demarara sugar, long famous. Other products, Rum—Timber—Gums—Cocoa—Coffee.

The natives are Caribs and non-Caribs; alike in very many respects, they differ in their hammocks; the cotton hammocks you see are Carib hammocks; the palm-fibre hammocks, non-Carib.

Natural History.—The exhibits show how abundant is animal life. *Notice the beauty of the birds and insects. Note, The insect homes*.

The Botanical wealth of Guiana is great. The superb *Victoria regina* was discovered in the river Berbice; Orchids and ferns are very abundant. The forests contain hundreds of species of timber trees, among which is the *Mora*. On the top of the lofty mora the wild fig-tree is sometimes seen growing as a parasite.

*A Pair of Sandals made of the leaf of the Eta Palm*, a tree which has for the Carib as many uses as the cocoanut palm has for the native of Ceylon.

Model of Native Woman straining Cassava Pulp.—Cassava Pulp is starchy matter obtained from the root of the *Janipha Manihot*, a shrub about six feet high. The pulp in its natural condition has in it a poisonous narcotic. The woman has placed the pulp in the long bark strainer, and by the motion of her body is squeezing out the poison. The pure pulp will be made into bread. By chewing burnt cassava bread, and then allowing it to ferment, the natives obtain their piawarrie. *See large piawarrie jar*.

# South African Colonies.

# Cape Colony.

General Remarks.—Cape Colony was taken from the Dutch in 1806, and governed as a "Dependency" till 1853, when a "Colonial Constitution" was granted it. Owing to its two distinct races of English and Dutch, troubles have arisen, the children of the mother country have not heartily recognised it as a home, and the progress made has been slow in comparison with that of the other Colonies.

Size and Population.—It has an area nearly four times that of England, and a population not quite a third of London, of whom map of South Africa Kaffirs, Hottentots, Bushmen or Bosjesmans, and Malays form more than one-half.

Productions.—At the commencement of the century, the industrial products were only Grain, Cattle, and Wine, and the total exports reached but £15,000.

The exports now include Wool, Mohair, Ostrich Feathers, Diamonds, Wine, Copper, Gold, Tobacco, Horn, Ivory, Hides, Aloes, and their value in 1884 nearly reached £7,000,000. *Notice the exhibits of each of these, especially the Diamonds, Ostrich Feathers, Wool, and Mohair*.

In 1885 the exports of wool were valued at £1,426,000; of mohair, or angora hair, at £200,000. Hides, £128,000.

*Do not allow the Cape leather to pass unnoticed*.

Ostrich Feathers.—The ostriches are reared on farms, many of which are over 1,000 acres. A good bird will yield feathers to the value of £r 5 a year. *See Ostrich Hatching Machines*.

Wine.—In 1885 there were 70 millions of vines in the Colony.

In no other country in the world can there be obtained from the same area ah amount of wine equal to that obtained at the Cape.

Diamonds.—The principal diamond mines are at Kimberley and Bloemfontein. *See models of the Bloemfontein and the Kimberley Mines, and watch the process of diamond cutting and polishing*.

Diamonds are found on the banks of the Vaal River, but back from the river the dry diggings are pits sunk until the trefaccous limestone and clay are reached, and in this are the diamonds found.

The First Diamond, found in 1867 by a bushman boy, was valued at £500.

The value of diamonds exported in 1884 was nearly £3,000,000.

Botanical Wealth.—Since the time of its first settlement the Cape has been a constant source of pleasure and delight to botanists and gardeners. Amongst the most famous plants are heaths, orchids, bulbous plants, and plants of the cactus tribe. *Look in the Conservatory, also at the water-colour drawings of Cape wild flowers, and the stall for the sale of everlasting flowers. See also specimens of vegetable wax, made from berries of a myrtle-like plant*.

Cape Scenery.—*See paintings of Colonial Scenery by Baines*.

Models, &c.—*Harbour Works in Tabic Bay*. The Colony has no natural harbours. *Kaffir Kraal and Bushman's Hut* in the grounds near the Malay houses.

The Lovedale Stand, with its exhibits of native work, shows how missionary work promotes civilization.

*Notice the Hunting Trophies*. South Africa is "The Sportsman's Paradise." *See the Traders' Waggons, the Collection of Curiosities, and just beyond the Queen's Gate entrance, a fine show of Wool and Angora Hair. Look behind it*.

The Traders' Waggons.—"The departure of a great trader with his train of half-a-dozen waggons, is a great event in some Cape towns. As the drivers "clap" their long whips, and the teams (eight pair of oxen at each wain) move away, all eyes are upon them, with the look which is given to ships when they leave port. But the return, when every waggon is full of precious wares, excites more attention. Not unfrequently the wares are sold by auction on a morning market, and the tusks, teeth, skins, horns, and feathers are spread out on the ground as if they were no better than field stuff or garden produce. It is no uncommon thing to see waggon cargoes worth £10,000 exhibited for sale in this unceremonious way, amidst a crowd of onlookers, some of whom are as wild as the animals which produced the barbaric spoil, and as black as coal."

Natives typical of the different South African races have been brought over by the Commissioners, viz., Zulus, a Malay family, a Kaffir family, a Hottentot Bushman with his wife and baby.

# Natal.

800 miles beyond the Cape of Good Hope. One-third the size of England. Population, of whom one-twelfth only are whites, about equal to that of Liverpool.

Climate.—"Climates" would be a more expressive term. From the Drakensberg Mountains, which are the inland boundary of Natal, the ground descends in terraces to the sea coast. Thus we have the "Coast District" at about the sea level, with its Tropical Climate and productions, such as coffee, arrowroot, maize, pine apples, oranges, lemons, mangoes, peaches, mulberries, cotton, indigo, and tea. The Midlands, which, on account of their greater elevation, have frosts and are not suitable for tropical productions. The Uplands, still higher, suitable for sheep and cattle rearing, and for the growth of wheat and other cereals.

Generally speaking, an increase in altitude above the sea level diminishes the temperature 30 Fahr. for every 1,000 feet. Though on Plateaux or such terraces as we find in Natal, this decrease in temperature is modified, yet this note will explain why these terraces of varied elevations have varied climates, and thus varied productions.

Sugar *(See Concrete Sugar*).—Which makes good ballast for the wool ships; hence the freight is low, and the cost less to English refiners. Colonists much disturbed by the very perplexing "Bounty question." Capital is driven to the development of other Colonial resources. Is this an evil?

Wool.—Sheep farming has been the most steadily profitable industry. *See exhibits of Wool*.

Fruits, Jams, Jellies.—*Notice exhibits of preserved fruits. Exports in* 1880, £599; *in* 1885, £2,583.

Minerals.—Gold, 1882, £6,500; 1885, £52,000. Coal.—*The Coal exhibits cannot possibly escape the eye*.

Natural History.—Birds and birds' nests. *Notice the Oriole nests. Also the cases of beautiful butterflies and insects. Among the insects the "Praying Mantis."* Native Curiosities.—*See Sir Donald Currie's Museum*.

# The West African Possessions.

# Sierra Leone, Gambia, The Gold Coast, Lagos.

Their exact area and population have not been determined; on a small map of Africa they appear to be strips of sea coast.

At present, owing, (1) To the unhealthiness of the climate to Europeans, (2) To the quarrels of the African tribes, (3) To the neglect of the Home Government, these possessions fall very far short of their value.

But when Christianity and Civilization have altered the character of the natives (of which there is proof abundant that they do), how much work will be found for English looms and forges.

Sierra Leone is the Liverpool of West Africa. It gives us a coast line of about 200 miles. Gambia gives us the command of the best river in that part of Africa. The Gold Coast gives us about 240 miles of coast line. Lagos, a small island, gives us the only safe harbour along 600 miles of coast.

These possessions tap the interior of north-west Africa, provide outlets for African produce, and open doors through which British goods can be sent into Africa.

# A Gallery of "Dependencies."

# The Falkland Islands, St. Helena, Mauritius, The Straits Settlements, Hong Kong, North Borneo.

This Gallery may be termed "The Curiosity Shop Gallery." St. Helena has its relics of Napoleon; Hong Kong its "Chinese Exhibition" of implements, dress, shops, pavilions, pagodas, houses, fishing boats; The Straits Settlements their collection of 288 articles of Malay domestic use, models of houses, and Chinese furniture; North Borneo closes the gallery with its native dresses, and the collection of Curios by Mr. Macbean, Dr. Walker, and Mr. Cook.

# Falkland Islands.

A cluster of Islands in the South Atlantic about 300 miles east of the Straits of Magellan, held for the protection of the whale fishery.

The Tussac Grass (see exhibits) grows to the height of 7 feet, and is very fattening for cattle. Sheep do well, and their wool fetches a high price in London. The first cargo of frozen mutton (30,000 carcases) has reached England a few weeks since.

# St. Helena.

An island in the South Atlantic, about 1,600 miles from Cape Town. Size, one-third of the Isle of Wight. Now important as a base of operations for missionary and commercial enterprise, and as a health resort for Europeans on the Congo.

Formerly important as a kind of Half-way House for Homeward-bound East Indiamen. Napoleon I. was in captivity here from 1815 to 1821.

# Mauritius.

The "Malta" of the Indian Ocean, and the Half-way House between the Cape of Good Hope and Cape Comorin, south of Hindostan. Area, five times the size of the Isle of Wight, with about the population of Birmingham.

The Dependencies of the Mauritius are—The Seychelles, Rodrigues, Diego, Garcia, and about 70 islands scattered over the Indian Ocean.

Productions.—Sugar—Rum—-Vanilla—Aloe—Fibre The colony exports nearly the whole of its productions, relying upon its imports for the supply of its needs.

# The Straits Settlements, North Borneo, Hong Kong, New Guinea.

It would be a matter for great regret did the "Curiosity Shop' character of the exhibits in these Courts lead the visitor to under estimate the importance of the Dependencies they represent.

One of the most important questions of the day is—

*"Where are new markets to be found for British Industry?" Not only are our goods shut out of European markets by hostile tariffs, but our sale is limited by the growing progress of the industries of European countries, in which longer hours of labour and lower wages prevail.*

Hong Kong gives us a magnificent vantage ground for trade, with a population of 250 millions in China, and through China with nations in the interior of Asia.

The Straits Settlements give a vantage ground for the Malay Peninsula and countries such as Siam, connected with it, on the "opening up" of which countries depends the "opening up" of a great Indo-Chinese trade.

North Borneo and New Guinea give us the trade of Malaysia with its wealth of natural resources. *See Malaysia on the map*.

We have thus access to populations eager for British Manufactures.

May the hope be expressed that the British manufacturer will supply the real needs of native populations, and by excellence of workmanship establish implicit faith in British work.

Specially may Christianity, the only abiding civilizing agent, be commended to these native populations by British justice and observance of "The Golden Rule."

## The Straits Settlements

Are trading centres on the Straits of Malacca.—They include Singapore, Penang, known as Prince of Wales' Island, with Province Wellesley. The Dindings, Malacca, Perak, and other native states near, are under British protection.

Total area about ten times the size of the Isle of Wight. Total Population about that of Liverpool, of whom more than three-fifths are Malays and Chinese.

Commerce, all "Free Trade" Ports.—The chief exports are tin, sugar, pepper, nutmegs, mace, sago, tapioca, rattans, gutta-percha, india-rubber, dye-stuffs, tobacco. Value of trade in 1859, £14,820,000; in 1884, £36,200,000.

The exhibits represent both the exports and the every-day life of the natives. *Notice the collcction of Perak Butterflies*, and the *Edible Birds' Nests*.

## Hong Kong.

The Gibraltar of the East.—As Gibraltar has the control of the Mediterranean Sea, and opens the strategical gate to our dominions in India from the West, so Hong Kong controls the entrance to the Chinese sea, and strategically closes the road to India from the far East.

## MALAYSIA compries seven group of island, whose area is six times the area of the British Isles.

But the tenure of Gibraltar is *strictly military*, that of Hong Kong *solely commercial*.

Area of Hong Kong, 30 square miles, about the size of the island of Sheppey. Population, about a fifth that of Liverpool; less than 5,000 whites.

Hong Kong is an unproductive island, destitute of resources. *Its exhibits are principally of Chinese character*.

*A Chinese Bazaar, presided over by Chinese, is held in the Albert Hall*.

## North Borneo.

The youngest of the British Colonies. Founded by the North Borneo Company under Royal Charter in 1881.

Area.—About the size of Scotland.

The Products at present are limited to the jungle produce of the Eastern Archipelago; Gutta-percha—India-rubber—Camphor—Rattans—Bees-wax.

Edible Birds' Nests, built by swallows, which have on either side of the gullet two large glands; from these glands naturalists conjecture that the isinglass matter, which so largely composes the nests, is formed.

Large nurseries have been planted with tobacco and sugar.

# Fiji.

An archipelago of 200 islands in the South Pacific within the tropics. About 80 of these islands are inhabited, the largest is Viti Levu. Ceded to the Queen, 1874. Population, about one-third of Liverpool; one-fortieth Europeans.

Fiji is distant by steamer five days from New Zealand, six and a half days from Sydney, nine days from Melbourne. The whole group is about one-fourth the size of Scotland.

The beautiful climate and fertile soil enable the natives to supply their own wants with ease, and they care little for work.

Products.—Tropical—Sugar and cotton the most important. The most interesting exhibits *are those illustrative of native life, and Miss Gordon Cumming's sketches of Fijian manufacture, pottery and scenery*.

Value of Labour.—Wages of labourers brought from India, *£18* per annum; of labourers from South Sea Islands, *£12* per annum; of Fijian labourers, about £6 per annum.

Does this proved efficiency of Indian labour suggest a means to avert the serious danger which will arise from the rapidly increasing population of India?

# Questions after visiting the Exhibition.

1. We have realized to some extent the vast resources of our Colonies; we have noticed with pride the energy and self-reliance of our younger brothers. What of the future of the Mother country? Ought not her highest ambition to be satisfied if that future leave her simply "The Mother," with a mother's influence?

2. English looms and forges are working "short hours." "Trade is depressed." Last winter brought hunger to the home of many an honest workman. Has our visit to the Exhibition suggested no remedy?

3. Our trade is said to be passing away from us. Other nations, the German notably, are regarded as

aggressive competitors. Are we not, with such vast resources, childish in complaining? Why should we begrudge the German the reward of enterprise and *education*?

*Germany has no colonies*.

4. We have seen how British rule has the power to benefit native races. We have also seen how large is our indebtedness to those races.

Shall we regard our "Dependencies" as mere agencies for increasing British riches? Have all this influence and power been given to Britain for selfish aggrandisement?

Royal Commission on Vegetable Products.

1886.

Victoria.

Second Process report And Continuation of the Minutes of Evidence; Together with Appexdices.

By Authority: Melbourne. John Ferres, Goverment Printer,

# Second Progress Report of the Royal Commission on Vegetable Products.

*To His Excellency* SIR HENRY BROUGHAM LOCH, *Knight Commander of the Most Honorable Order of the Bath, Governor and Commander-in-Chief in and over the Colony of Victoria and its Dependencies, &c., &c.*

MAY IT PLEASE YOUR EXCELLENCY:

In continuation of the Report We had the honour to lay before you on the l6th of February last, we now beg to submit to you the Second Part of the Minutes of Evidence which has been given before us since that date.

We have followed out the plan previously suggested, and have distributed many thousands of copies of the First Part among the Members of the Agricultural, Horticultural, and other similar Societies in the Colony; and have, in return, received abundant proof of the interest our inquiry has awakened amongst agriculturalists.

The information gathered in the Minutes of Evidence now submitted to your Excellency is of an eminently practical character, and we propose at once to issue it in a similar manner, with the full belief that good will result.

We have the honour to be,
Your Excellency's most obedient servants,
J. F. Levien, President (L.S.)
Walter Madden, Member, (L.S.)
Fredk. T. Derham, Member, (L.S.)
Charles Yeo, Member, (L.S.)
J NO. L. Dow, Member, (L.S.)
Jas. Buchanan, Member, (L.S.)
James Baird, Member, (L.S.)
Joseph Knight, Member, (L.S.)
Andrew Plummer, Member, (L.S.)
T. K. Dow, Member, (L.S.)
D. E. Martin, Member, (L.S.)
John J. Shillinglaw, Secretary.

Public Offices, Melbourne,

21st July, 1886.

# Continuation of the Minutes of Evidence.

# Minutes of Evidence

*Taken before the Royal Commission on Vegetable Products*.

Monday, 22nd March, 1886.

*Present*:

- The Hon. W. MADDEN, M.L.A., in the Chair;
- James Baird, Esq.,
- T. K. Dow, Esq.,
- The HON, F. T. Derham, M.L.A.,
- D. Martin, Esq.,
- Charles Yeo, Esq,
- William Edward Ivey, Esq., examined.

751. *By the Commission*.—You are what?—Director of

William E. Ivey Esq. 22nd March 1886.

the Agricultural College in Canterbury, New Zealand.

752. Have you also had considerable experience in this colony?—Yes, I was in the civil service here, in the Agricultural Department several years.

753. Are you prepared to read a paper, or de you prefer to make a statement as to the working of the college in New Zealand?—I have not prepared any paper, because I did not know exactly what the Commission wanted to know.

754. It is proposed to establish an agricultural college here?—So I understand.

755. And we are desirous of knowing from you in the first, place, as to the establishment of the college in New Zealand, as to the working of it, and any suggestions that you may think fit to make for the establishment of a college here; but by-and-by I propose to ask you some questions as to the growing of vegetable products other than wheat in this colony. Would you prefer to make a statement or that I should ask you questions?—I am hardly cognizant of the condition of things here, so that I could hardly make a statement.

930. How long has the college in New Zealand been established?—It is nearly eight years since I left Melbourne to establish it; it was opened in 1880 for the first time.

931. Under what circumstances was the college established—has it a Government grant or I have they given it an endowment?—There was an endowment of land: the old Provincial Government of Canterbury set aside 100,000 acres for an endowment for agricultural purposes. This land was sold, and the money put out at interest, a great portion of it

William E. Ivey Esq. *continued*, 22nd March 1886.

and it is from the interest of this money that we carry on in a great measure. The other sources of income are the 22nd March 1886. profits upon the farm and rents from the unsold lands; part of the endowment is still unsold.

758. And what extent of buildings have you there—is it a large building?—Yes.

759. Do you accommodate pupils there?—I am very sorry I did not bring over a photographs I came away at once upon the telegram, but you may get some idea from a lithograph—*[producing a book]*—but this is a very poor miserable affair. The farm von will find described in the body of the book.

760. Have you one agricultural college and several farms, or have you the whole tiling combined?—We have but the one college.

761. An experimental farm around that college?—No, it is not; it it carried on on economical principles as a form, and nothing more. The experiments we carry on are in the general course of agriculture.

762. But is the Agricultural College situated upon the farm?—Yes, as you will see by the plan.

763. What is the extent of the farm?—660 acres.

764. The buildings seems to be extensive?—Yes, they are very extensive.

765. And seem to be very solidly built too?—Yes, us well built as it is possible to have them.

766. Of what material?—Brick, faced with New Zealand stone.

767. Do you accommodate pupils there?—Yes.

768. How many?—There is room for 50.

769. How many have you?—We have never been quite full, we average about 36; bur I may say the buildings are unnecessarily good for the purpose.

770. That is exactly the fault that was in my mind; but, though they are unnecessarily good just now, they may not be by-and-by?—No, if you have the money, of course; but it is not necessary to go to the great expense they have done in that building; but there was a reason for it which it is not necessary to explain.

771. Has the college proved a success?—I think so, of course.

772. Is the endowment sufficient for the maintenance of the college?—It is just about sufficient without going beyond what we are doing, that is leaving out experimental work; we can just make both ends meet; but that is due chiefly to the very low price of produce just now. When the thing was arranged, we did not reckon upon agriculture going, I may say, to the bad as it has done, so we are rather pinched; but we can just go on without luxuries.

773. I understand you that the farm produces a surplus?—Yes.

774. And the surplus helps to maintain the college?—Yes.

775. It is part of your course of instruction that boys being trained shall have practical knowledge of farm work?—That is the chief part; you may say that is the backbone of the whole thing.

776. Besides that, what do you teach them?—I think the prospectus gives you all the information—*[producing copies of the same]*—I thing the shortest way would be to put in the prospectus.—[*The*

William E. Ivey Esq. 22nd March 1886.

*same wan handed in and is as follows*:—]

# School of Agriculture.

Opened

19th July, 1880.

DIRECTORS—W. E. IVEY.

LECTURERS:

- *Agriculture*—W. E. Ivey, M. R. A. C., F. C. S., F. I. C.
- *Chemistry, General and Physiological*—G. Grey, F.C.S.
- *Botany and Zoology*—T Kirk. F.L.S.
- *Veterinary science*—T.P Hill. M.R.C.V.S., London.
- *Mathematics, Physics, and Land Surreying*—T. Bingham, Science and Art Department, South Kensington.
- *Book-keeping, Physical Geography, Meteorology*—E.C. Buckley.

EXAMINERS IN PRACTICAL AGRICULTURE, 1884.

- John William Overton, Prebbleton.
- John Rennie, Leeston.

# The Course of Instruction.

PRACTICAL WORK.

Students are required to take part in the regular daily work of the farm, so as to acquire a practical knowledge of ploughing and every other kind of farm work, the use of implements and machinery, the management of stock, milking, and the making of cheese and butter.

Work is carried on daily in the chemical laboratory. In illustrating the teachings of the lecture theatre, agriculture specimens are as frequently as possible used Students during their term of residence proceed from the testing of simple substances to the quantitative analysis of—especially—manures, soils, foods, and farm and dairy products generally.

Biological laboratory work includes:—Use of the microscope, and the preparation of microscopic objects: examination of and experiments with rust, smut, and other injurious fungi; germination of seeds under various conditions; examination of the minute anatomy of plants: cells and cell contents; evolution of heat; diffusion of fluids in plants; rate of growth; fertilization; maturation of seeds, &c., &c. Water-culture; examination of milk and other animal fluids; organic impurities in water: Bacteria, in nitrification. &c.: the minute anatomy of injurious inserts.

Field investigations with regard to the life and history of injurious insects and fungi.

Adulteration of seeds.

In Land Surveying and Levelling, field-work will be undertaken at suitable times for practice in the use of iustruments, in measuring land, harvest and other piecework, and in taking levels for drainage purposes, the results of the field-work being plotted, and plans drawn.

The carpenters' and blacksmiths' shops are furnished with the necessary appliances Students take their turn at work with the carpenter and blacksmith, so that they obtain practical instruction in both rough carpentry and farriery as far as these are carried out on the farm.

# Syllabus of Lectures.

AGRICULTURE.
*Lecturer*—W. K. Ivey.

The proper aim of the farmer when cultivating the soil—Relation of animals and plants to the soil—Composition of the plant—Sources of the food of plants—Origin, formation, and physical properties of soils—Causes of diversity of soils—Relation of soils to water, heat, &c.—Improvement in the mechanical condition of soils by cultivation, drainage, &c—Construction and use of cultivating implements, harvesting machinery, &c.

William E. Ivey Esq. *continued*, 22nd March 1886.

Chemical composition of soils—Condition of the various constituents—Effects of exposure thereof to atmospheric action—Available supply of plant foods in soils—Exhaustion of soils—Nitrogen and nitrification—Means of preventing exhaustion and of restoring fertility—Rotation of crops—Manuring—Special and general manures, and their application—Market value of special manures according to their chemical composition—The cereals, their habits, peculiarities, and cultivation—Cost of cultivation and value of root and fodder crops generally—Laying down to grass-Grasses in general.

The livestock of the farm, breeding management, feeding, &c, of farm horses, cattle, sheep, pigs—Dairy management, the processes of cheese and butter making wool growing, bacon curing—The feeding value of foods.

# CHEMISTRY.

*Lecturer*—W. Gray.

Object of the science and its relation to agriculture—Matter and force—Elements and compounds—Chemical affinity—Different modes of chemical action—Nomenclature and formulæ—Atoms and molecules—Quantivalence—Acids, bases, and salts—Relation of temperature and pressure to gases—The non-metallic elements, hydrogen, oxygen, carbon, nitrogen, chlorine, bromine, iodine, and fluorine, sulphur and phosphorus—The atmosphere, and its connexion with animal and vegetable life—Source of combined nitrogen—Water, impurities affecting it for domestic purposes—Composition of rain water—Sewage—Manufacture of sulphuric acid—Manufacture of superphosphate of lime and other artificial manures—Products of combustion and fermentation—Chemical changes taking place in farm yard manures, &c.—The general composition of the proximate constituents of plants and animals—Carbohydrates, starch, sugar. &c.—Albuminoids, glutin, caseine-Fibrine, &c.—Formation of peat, lignite, coal, &c.

The metals and their compounds—economic use in agriculture—Alloys, &c—Potassium, sodium, calcium, magnesium, iron, aluminium, tin, antimony, arsenic, copper, lead, mercury, gold, silver, and platinum—Detection of mineral poisons—The mineralogical constituents of rocks and their chemical composition-Functions of the mineral food constituents of plants—Essential and non-essential soil constituents—Assimilation—Chemical preparation of plant food in the soil-Absorptive properties—Animal nutrition—Chemistry of digestion, respiration, and excretion—Constituents of food—Ratio between heat-giving and flesh-forming foods.

Organic chemistry—Principles of organic analysis—Hydro-carbons, alcohols, ethers, acids, ethereal salts—The composition and properties of the more important animal and vegetable products—sugars, starches, oils and fats, gums, aromatic compounds, albuminous substances, fibrine, caséine, glutin—Composition and functions of animal fluids, blood, milk, bile, gastric iuice, urine, &c.—Biliary and urinary calculi—The various kinds of fermentation—Manufacture of wine, vinegar, &c.—Action of ferments in the ripening of cheese, rancidity of butter—Nitrification in soils—The vegetable alkaloids, strychnine, brucine, morphia, &c.—Organic colouring matters—Preparation and use of tannin in dyeing—Products resulting from the destructive distillation of coal, wood, &c—The chemical changes taking place during germination, ripening of fruits, maturation of seeds.

# BIOLOGY.

*Lecturer*—T. Kirk.

*Morphological Botany*.—The external form of plants-The development of organs—Structure and life history of the chief orders of Cryptogams, more especially of parasitic fungi—Special morpholotry of those orders of Phœnogams comprising the plants cultivated on the farm—Special modifications to effect fertilization, &c., &c.—External characters of the seeds of agricultural plants.

*Physiological Botany*.—Nature and formation of the cell—Modes otincrease—Combinations of cells—Modifications—Functions of organs—Food of plants—Absorption—Diffusion of fluids in plants—Movements of plants—Evolution of heat in plants—Germination—Diseases of plants, and proposed remedies—variation—Origin of Species—Influence of external agents on plants-Distribution ot again cultural plants.

*Entomology*.—The chief orders of insects—Detailed structure and life history of insects—Injurious effects of certain species—Causes of their sudden increase—Proposed remedies.

# Vererinary Science.

**William E. Ivey Esq. *continued*, 22nd March 1886.**

*Lecturer*—T.P. Hill.

Anatomy of the horse, cattle, and sheep—Structure and mechanism of the skeleton—Muscles—Organs of digestion, circulation, &c.—Dentition.

Pathology—Diseases of various organs, and remedies therefor.

Treatment of wounds and accidents—Materia Medica.

# Mathematics, Physics, and Land Surveying.

*Lecturer*—T. Bingham.

Arithmetic—Algebra—Plane Trigonometry, including the solution of triangles—Logarithms—Euclid.

Mensuration of every kind of surface, of solids, artificers' work, excavations, embankments, timber, &c, &c.

Elementary Hydrostatics and Hydraulics—pressure of water—Artesian wells—The different kinds of Pumps—Waterwheels—Siphon—Hydraulic friction—Hydraulic Press and Ram, &c., &c.

Mechanics—Parallelogram of forces—Mechanical powers—Steam engine—Laws of motion, &c.—Definition of "work"—Conservation of energy.

Land Surveying and Levelling.

Heat—Latent and specific heat, radiation—Distillation, evaporation, &c.

Sound—Production, propagation, and reflection of sound, vibrations, &c.

Light—Velocity and intensity of light, mirrors, lenses, refraction, and polarization.

Electricity—Magnetism, factional and voltaic electricity, electromagnetism, voltaic piles.

# Book-Keeping, Physical Geography and Meteorology.

*Lecturer*—E.C. Buckley.

*Book-keeping*.—Explanation of commercial terms—Documents used in ordinary, business transactions—The various books used in book-keeping—Single and double entry, &c.

*Physical Geography and Meteorology*.—Wind, dew, mist, and cloud—Formation of springs, brooks, and rivers—Snowfields and glaciers. The Barometer, Thermometer, Anemometer, and Rain Gauge—Methods of observing—Atmospheric pressure—Prevailing winds—Temperature—Distribution of rain—Causes of variation in climate—Influence of ocean currents—Influence of mountains—Law of storms—Characteristics of the New Zealand climate in their relations to agriculture, &c., &c.

It is for 1884, but is the latest one we have, and is to all intents and purposes good enough for the present purpose. It gives you the objects and terms and so on. It says here the farm is carried on, as nearly as possible, upon economic principles. Then the course of instruction: students are required to take part in the daily work of the farm, ploughing and so on. Then there are lectures on chemistry and a laboratory, the sciences, land surveying, and so on; but beyond that, and it is a point I insist upon carrying out, we have practical instruction; it is not only upon the farm, but practical instruction in the sciences, such as chemistry. We have a laboratory, the finest in New Zealand. As it states here, the work is carried on daily in the chemical laboratory; they go through a regular course of practical chemistry; the same in the biological laboratory, that is the microscopic work, examining, say, plants attacked by rust and smut; vegetable anatomy, and so on. The same with land surveying; they are taught in the field. Then we have carpenters' and

William E. Ivey Esq. *continued*, 22nd March 1886.

blacksmiths' shops; they are taught practically there Before a student passes us and gets a final certificate he has to be able to shoe a horse, for instance, well. There is one point I would like to make in connexion with the teaching, and that is this : we have two practical fanners as examiners.

777. Disconnected with the institution?—Disconnected altogether, to ensure that the practical work is done properly. These men attend four times a year. They attend during the harvesting, and put the students those I intend to pass, for the final certificate at any rate, through a course with the reaper and binder, and everything connected with the harvesting and stacking; they then come when we have got in the harvest and put them through a course with the threshing machine. The threshing machine is worked by the students, except the engine-driver; we have another man to instruct them how to feed, &c., but most of his time is occupied in going from one thing to the other; the whole of the work is practically done by the students, under the direction of the engine-driver, so that they have a thorough practical knowledge; there is no mistake about it. Those farmers come and examine in that; then they come about the time when the wheat is being drilled, and then they examine them in ploughing—they have to pass in ploughing you understand. They very often pull the plough to pieces—a double-furrow plough—and tell them to put it together and start work, and if they cannot do that they will not pass them. Then, again, they attend at the sheep shearing; so there is no doubt as to the practical work; if they do pass these men, they must be really well up in practical agriculture. So there is no doubt as to the practical part

778. Do the same farmers attend each examination?—Yes, so far; but that is not necessary, they are two of the best farmers we can get anywhere near, but it is not at all necessary that the same two should always attend.

779. While you are upon that point, how is the farm worked; you are director of the farm as well as of the college?—Yes.

780. Under you have they a practical man—a working farmer?—No, I am the practical man.

781. And do you employ labour?—Yes, we have perhaps three men or four men; we have a man in charge of each department, as it were—one man with horses, our at the head of the stock and dairy, one man head of the machinery, and so on; in fact three men and an odd labourer are all we have in the place; all the rest of the work is done by the students.

782. Do they each take a turn?—Yes. There is a regular timetable. In connexion with that I would like to remark that the whole of the work is done by contract—that is practically the whole; now and then, of course, certain work we cannot do that way.

783. What work do you refer to?—All the farm work.

784. By the students?—By the students. For instance, we pay for a double-furrow ploughing, first-class, 5s. 6d. an acre; second, 5 S.F.; third, 4s. 6d.

785. For labour only?—Yes.

William E. Ivey Esq. *continued*, 22nd March 1886.

786. Per acre?—Per acre; and then we charge for each horse 2s. 8d. a day. For harrowing, we pay 7 ½d. an acre; for rolling, from 9d. to 1s.; drilling, 1s. 1d., and so on.

787. What can the students earn in a year?—It depends altogether on the students. I have paid some of the students as much as £24 or £25 in a year.

788. That comes off the £65?—No, I make a point of that—that has nothing to do with the parents. It does not go off the fees paid by parents. The average is about £12 to £15. I may say that the fee was £45 last year.

789. That is the fee for students?—Yes, but it has been increased this year to £65.

790. Do I understand you to say that you have given up all experimental fanning upon the farm?—Except what is carried ont in the ordinary course. That is experiments with manures upon the turnip crop or any other crop, and of course the different rotations. We carry out experiments as much as possible in that direction, but there is no experimental farm—no purely experimental farm; in fact the whole farm is in a measure experimental, and yet it is carried on upon economic principles.

791. Your desire has been more to show how the ordinary crops can be grown to best advantage, rather than to show what other crops the soil and climate may be suited for?—Yes, simply because I have been precluded from the latter by want of funds. I should like to carry on both, but this is essentially what we want to do—we want to teach farming, and economic farming to begin with, and also scientific farming, because I consider that scientific farming is economic farming in a great many instances.

792. It is proposed in this colony to establish a great many farm schools and one central college, to which youths from the farm schools can be drafted. Is it your opinion that that system ought to work satisfactorily?—I quite agree that there should be one central college and so many farm schools. I have no doubt that that is the

best plan to be adopted. Of course I can hardly know the position of things, but I know from the newspapers what has been done to some extent, but I do not know the opinions of the members of the Council. I should be inclined, from my own knowledge and experience, to turn it just the other way about. Let them commence at the college, and go to the experimental farm schools to finish off. I think I can give very good reasons for that, though I am not aware of the reasons of the Council or adopting the opposite plan.

793. Are you prepared to give those reasons?—Yes. The reasons are chiefly from my experience with the students. I think they are bound up with other reasons, though I would like to give you them also later. I find first of all that the fresher we get the boys from school the better. If they have been knocking about upon a farm they never turn out half as well as if they have come almost fresh from School, And Have Never Perhaps Worked A Horse In Their Lives. Some of

William E. Ivey Esq. *continued*, 22nd March 1886.

my best men I have turned out of material of that sort. Some of them have never driven a except perhaps in a buggy. They take to the indoor work much better—their power of doing school work has not been interfered with, as it is almost always when a man runs wild for two or three years, and that is one reason why I prefer them to come to me as early as possible to the central college, where we give the chief portion of their indoor teaching. When they have taken this course at the central college they are then, I think, better able to appreciate the teachings at these special schools than they would be before. Take dairying for instance: they get a thoroughly practical knowledge of dairying. We have a large dairy; we turn out six or seven tons of cheese in a year. We buy the milk; we have a regular factory on a small scale. They have then a thorough knowledge of cheese making to begin with, and not only that, but they have been inside, they have examined milk under the microscope, and know thoroughly well what it is made of. They know all the processes of cheese making, and not only have they had it under the microscope in a biological laboratory, but they have examined it in a chemical laboratory. If this plan were adopted here, when they have a knowledge of milk they could go down to Gippsland or some other dairying district in Victoria. They have a thorough grasp of the whole thing, and after one cheese-making season they would come out with a much better knowledge than if they had been there first and muddled about with milk, and poured it from one thing to another, and knew nothing about what it was made of, or why acidity was generated, for instance, in the curd, and so on. They come to us, and we teach them these things—they would learn very little about it if, on the other hand, they knew nothing about it at first; but knowing these things, they then would get a thorough practical knowledge of dairying at the special school. It strikes me so without a knowledge of the opinions upon the other side, and it would be the same in other things. My idea is to give them a thorough course of agriculture as we do in the central college. Let them turn out there with the knowledge that they have in our college in New Zealand, and then those other schools would be of infinite advantage. Take an irrigation school, or fruit growing, or anything of that sort, we cannot teach it in the central college, and if a man intends to go to fruit growing, let him go to the special school afterwards and finish his studies.

794. Get his knowledge and then apply it?—I think so, decidedly; and another advantage you would have in that case, your staff would not require to be half so numerous as if you go the other way about, because, in the central college, you have all the science teachers; in the farm schools you merely require one expert in each; in the dairy school, one cheese maker; and in the other schools, fruit growing, orchard, or anything else, you want one expert; but as you are doing now (though it seems as if I were criticising), if I understand you aright to-day; you say you would appoint teachers in the farm schools. That seems to me to be doing the work over again; you would save half the money there, and you would save two-thirds of the buildings.

795. Your idea is that each farm school should be a

William E. Ivey Esq. *continued*, 22nd March 1886.

different school, say in one place for the growth of grain, another for fruit, another for cheese making, and so on?—I think so.

796. According to the climate?—According to the climate.

797. Then you do not approve of having all these things combined at each of these farm schools?—Certainly not. I do not think it would be advisable to have a dairy somewhere in the Wimmera, but rather in Gippsland, for instance.

798. Yes, but suppose we have irrigation?—Then that is different.

799. You teach all in New Zealand?—Yes, we do; but it would be better done if we had schools also.

800. But would not it be better then to have the schools alone?—Without the college at all.

801; Yes, without any scientific knowledge at all?—No, but if you had competent scientific men in each school it would be all right.

802. Could not the men pass from one school to another?—I do not think so.

803. Not the scientific teachers?—I think certainly not, because the whole work would be intimately connected—the practical work with the theoretical work all through the year. I think you would find it

altogether impracticable. If you want a teacher, he must take the students right through the course, from year's end to year's end. Peripatetic lecturers are an utter fallacy; by the time the man gets to one place, all he has taught in the other is utterly forgotten.

804. But would not this difficulty crop up in the system you advocate—that these youths would leave the central college with perhaps a good knowledge of the science of farming, and go to these farms where they find only a man with a practical knowledge of farming, having no knowledge of science: do you think the practical man would exercise proper control over those youths; should not there be a man with scientific knowledge in charge of each school?—I do not think it is at all necessary. The schools should be special schools, and the man in charge a specialist. But you understand my idea is that, in the central college, they should be taught practical agriculture as well as science. I would never yield that point. When they went to the farm schools, they should be almost as capable of taking charge of a team of horses as the man in charge. But what I see with equal clearness is this, that if you have a college in a good climate, the system we teach in New Zealand would be useless in the warmer parts of your climate, or, as you say, under irrigation. As in New Zealand, we teach one system to grow turnips, and so on, but in Auckland it is quite a different climate, and there is a totally different system of agriculture; so it is here. You have a totally different system in the ranges here from what you have in the far north, and will have more so in the future.

805. That is exactly our object in having schools in various parts of the colony, so as to provide for different parts and climates, and we have schools, I think I may say, in all the different kinds of climate?—Yes, and those would be very valuable indeed; but I think the idea conveyed

William E. Ivey Esq. *continued*, 22nd March 1886.

by the question put to me would come to the establishment of six different colleges, and teachers in each.

806. Why we establish schools in different parts of the country is because the people living in those parts of the country want agriculture taught suited to that particular portion?—But that would be very costly, if you had separate staffs for them all.

807. We find in this country that lads, not trained to work when they are young, brought in and trained a year or two in the central college, when they are sent out do not care about working?—That is the very point I make. I say it is essential that they shall do the work at the central college. This is purely a practical programme. I do not for a moment advise that they should go to a school and learn theoretical agriculture, I do not believe that for a moment. They should go out every morning, milk the cows, feed the horses and harness them, and take their turn in the blacksmith's shop, and so on. We divide it into half their time inside and half out on the farm.

808. So that, according to your view, the Agricultural College would be surrounded by a farm?—It ought to be, to have a theoretically perfect college.

809. What extent should that farm be?—Our farm is sufficient for our requirements, but we can get more work out of the land than you could. I should say about a thousand acres.

810. Notwithstanding that there are form schools, where there is a a large area?—Yes, it is a matter of practical knowledge. I know just how many students I can work upon my 600 acres under the plough. I work twelve horses, that takes four students with three horses apiece for the horse work. If you divide the number of students by four, you can very easily see how often a man's turn will come to use the horse teams. That is one thing, and there are all sorts of little practical difficulties that have to be overcome in arranging a thing of this sort, and that is one—how many students will the place keep at legitimate farm work. It is no use making work. You will find if you attempt to put too many students upon a farm, and give them anything that merely makes work, they will not do it; they will say to you straight out, and I admire them for it, We came here to learn farm work, and we do not think this is farm work." They want the horses, and if you give them horses they will work any hours you like. My students work threshing up to half-past eight or half-past nine at night, from breakfast time in 811. Do you make them clean the horses when they are working?—Yes, they go out early in the morning and clean the horses, that is during the week they have the horse teams; there are no men to clean them. And they milk in the same way. 812, In the case of our carrying out a system more like what we contemplate here, that is commencing upon the school farms and finishing up at the central college, do you not think a small farm at the central college would be sufficient to give sufficient labour and experimental work for the last year or two of the student's course?—I think you would have to abolish the farm work almost entirely. You would have to make it almost wholly a technical school, without

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experimental work. You would not want any horses; the students would have merely to go out and superintend the experiments.

813. If you had 120 or 130 acres you would have it ploughed?—That would be very little; about six students would do the work; seven or eight, at any rate, would do it.

814. How many hours a day would you expect the students to work ploughing?—Eight hours.

815. Eight hours outdoor work?—Eight hours one day; next day they are indoors.
816. If the object of the farm was to carry on experiments without any regard to the reproductive character of the farm, would not three or four hours' labour per day be sufficient to keep a student identified with agricultural labour in the finishing up at the central college?—You would fill up his time then with theoretical work indoors?
817. Yes, and give him a shorter time outdoors work, to keep up his practical acquirements. For instance, in some agricultural colleges I visited they never work more than four hours upon the farm; and in the cases such as we propose, a number of men and where there is plenty of work, would not it be possible at the central college to do with less land and fewer hours of work?—It is possible, of course; but the question arises whether it is the best plan or not. You would not be able to give them much horse work; it would be nearly all theoretical work, indeed, connected with the superintendence of experiments; and my experience of students is not that they are very fond of superintending experiments. I am very glad to say they will work very hard if you give them horses; and, in fact, under contract work, what you have to do is to see that they do not work your horses out.
818. In the climate of Australia might not students be content with less than eight hours' labour?—I am sure they will be content with as little as they can get, most of them; but the question is whether or not it would be a better means of turning out good farmers. That is the question really. I do not say it would not, but it is a question.
819. Have you visited the old Model Farm, near the Botanic Gardens?—Yes, I was there a day or two ago.
820. What is your opinion of that as a site for a finishing Central College of Agriculture in connexion with farm schools?—If your ideas are carried out, I think it would be a very good place.
821. Did you observe the buildings there?—I did.
822. Are they suitable for the purpose?—They could be readily adapted, and would be very valuable for the purpose.
823. I suppose the land there would be suitable, if extensive enough? It is not good land, but it could be made useful for experimental purposes.
824. Do you think the buildings are too large for the purpose?—That is rather a good fault.
825. Your ouly objection to the site would be the limited extent of land?—That is the thing. If I wanted an ideal school after my own



idea, that is the objection I should raise to it; but the buildings are very valuable for the purpose, no doubt. They would not want a great deal of modification and there they are, and it is difficult to get the money for buildings.
826. What did your buildings cost in New Zealand?—They cost over £20,000 without the furnishing.
827. Was that provided out of the 100,000 acres of land?—Yes; at the same time the buildings need not cost, for a central college, so much as that. They are unnecessarily good.
828. In your opinion do not yon think the boys who have had practical teaching at the farm school would not be able to learn the scientific part better after they have had that practical teaching?—Decidedly not. I take the exactly opposite view. The worst men I have had are men that have been upon farms and stations, and are as dense and thick in the head as they can possibly be, simply from their haying been away from schooling and riding about two or three years. It spoils them entirely.
829. You think their knowledge makes them stupid?—No, they have no knowledge; they know how to ride a horse and draft a few sheep, and nothing more.
830. There is this difference in our case, that the students coming from our school farms would not be, in any respect, like young men from stations and ordinary farms; they would have been under instruction the whole time upon those school farms; they would be under practical farmers, and receiving instruction from an agricultural chemist, an English teacher, and whatever other teaching is necessary to fill in the first portion of their course to be finished at the central college, so they would not be at all unfitted for receiving the finishing teaching?—I understand that; they would be quite different cases; but you must recollect that under my system the cost would be less than half what the other would cost, and would give them the same instruction; and they should come out, I do not say better men, because that is a matter of opinion, but I think they would be as good, and I think the annual expense would not be one half. You would want several agricultural chemists and teachers—almost one to every school; and yet, on the other hand, with a central institution one man would do the whole of the work.
831. There is one reason why we thought of having different schools spread all over the colony; for instance, we have one at Dookie North; it is a different climate, different soil; different farming is required from what would be in the colder places. And then again further in the north, perhaps up Horsham way, they have a different thing still?—I quite think that.

832. And if you want the men to learn everything properly, you must send your students from one school to another until they learn the whole thing. What do you think of that?—I think it is a very good idea. A man has to pass his examinations in theoretical and practical agriculture at the head college; why could he then not go to Dookíe where there is no irrigation, or to another school where there is irrigation, and stop three or four months there, and then to Gippsland

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to see dairying for three or four months, and he would, having his theoretical knowledge of agriculture, be able in those short periods of time to grasp the different styles of farming that are carried out in those farm schools or farms.

833. As regards the land endowment, the proportion sold, what did it fetch, do you recollect?—I think we sold about 40,000 acres at £2.

834. And the portion you did not sell what rents may you get for it?—I think the rent is about £750 a year; it is mountain land in the west.

835. Have you had any money grants from the State?—No, none whatever.

936. Relied solely upon the land endowment?—Yes.

937. Who appoints the board that you have?—They were appointed in the first instance by the Government, I believe the Provincial Council and the Government, but now they are elected by the University

938. Who appoints the farm examiners?—The board; there is a subcommittee, an agricultural sub-committee—there is the Canterbury College Board of Governors—and then we have a certain number on different committees.

839. Why does not the college fill better?—It may be that we have too much room for the wants of the colony, but I think it is not very

840. Do you think the charges are high?—At present they are; no

841. We have fixed a much lower scale for our farm school?—Yes, you will have to; and another reason I think is that a great many possible students do not like the farm work. If our institution were like the English institution, where students could ride about and look on at the farming, we should fill up very quickly; but I am afraid I have rather a bad name among many of the young people down there; they have to fill dung carts and so on, and I have absolutely had letters front parents objecting that to learn agriculture it is not necessary to fill dung carts. I'say I think it is, and as long as I am there they would have to do it, and if they stop that, they lose me. I do not mind any amount of complaints upon that ground, because I know I am perfectly right about it. If a man cannot fill dung carts and do all sorts of work upon the farm, he will not make a good farmer.

842. Does the farm leave a profit?—Yes.

843. How much?—About £600 a year. It pays a good rent. Your see I am under drawbacks as to labour. Those three or four men I have are paid, and they superintend the students' labour; and then I pay students by contract, so my labour bill is bigger than it should be; and then I have to make work to a slight extent, but taking it altogether we have a difference of about £600 a year.

845. Your land is much better than ours?—Not a bit, but the climate is better.

845. Is that surplus after paying the professors?—No, that is the farm, not the teaching staff.

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846. How much land do you cultivate?—Six hundred acres.

847. How much is the garden and orchard out of that?—There is, exclusive of garden and orchard, 600 acres under the

848. Have you much garden and orchard?—Two or three acres.

849. And a portion under permanent grasses?—It is about 114 acres under grasses. The produce last year was 11,400 bushels of grain; the wheat averaged 44 ½ bushels per acre; that is 1885. This year it is not so big. I have not the returns for this year. That information is all given in the report with the prospectus. At the time the report was written there were 1,463 sheep upon the farm.

850. Have you made any experiments with grasses?—Yes, with a few of the English grasses, but I have not been able to carry them out as well as I should like.

851. Are there no results you can submit to us?—No.

852. Of course that is a necessary and very important point to see what grasses are best suited to our soil and climate?—Yes, undoubtedly it is a most important subject. There is one difficulty I see you may find crop up, that is getting the proper kind of students for your colleges. Of course we all know the opinion of the ordinary farmer as to colleges; they are the same here as everywhere else. There will be a difficulty in getting them to see the advantages of high education. It is so with us to some extent; and I am strongly of opinion, and I ventilated the matter down there with my own board (they not being a Government body), that you should connect this technical education, these technical schools with the State schools in some way, that is, draft a certain number of State school boys into these schools. I am very certain in my own mind you want to diffuse

an agricultural education amongst the masses of the farmers. You know a youth of sixteen or seventeen is of very considerable use to the farmer, and you have to induce that man, who is generally of no education himself, and therefore does not value the higher education, not only to part with that youth's services, for he can milk the cows and do other things, but after he leaves the State school you expect him to part with the youth and send him to college, and to pay £50 a year for him; and that goes against the grain with those farmers and selectors. At the same time that is the class of youth you want in the schools. I am sure all men in the colony that know the circumstances of the case would agree with me, or nearly all, that that is to a great extent the class of man we want in the schools. I think that, if it could be worked, the Government should be induced to offer in connexion with these schools a certain number of scholarships to be gained at the State schools. Say that there is a scholarship open to the boys who pass best in certain subjects at those schools. Whether the farm schools be made preparatory to the other, or *vice versâ*, I am very certain, from my experience in New Zealand, that unless that is done the agricultural schools will not be the success they should be. That is, first of all, you will not get the class of men you want; and there is another point I know the difficulties you have to deal with in the schools. You



may get, say, sons of well-to-do people likely to kick a little at the work; they do not care. I have had it said to me, "Oh, I am perfectly independent of this place," and so they are; and they are not so much under control, perhaps, as far as the work goes, as boys who get scholarships would be, as their parents find them in pocket money. My idea of those places is essentially to make cockatoos; and the youths I describe will not understand that. If I say you came here to be made into a cockatoo, they do not like it; but still that is essentially what we want; and we want cockatoos above the common cockatoo. Of course we want small farmers, but good farmers; and unless something of that sort is done to give a very considerable leaven at any rate to the students in the schools, they will not be the success they ought to be. A thing of that sort might be very easily done.

853. But one of the principal difficulties you raised was the high amount that had to be paid, £50 a year; if that were considerably reduced?—That would not have the effect; it is not only the £50 or £30 a year they have to pay, but there is the loss of the boy's services.

854. Do you think you could give us any hints that would help to bring in the class of students you refer to?—I should put it that two-thirds of the students who are educated at these colleges should be admitted from the State schools, and the other third should be left for farmers'-sons and others, who might wish to be admitted; that is, I think, if you are going to improve the general agriculture of Victoria, and that is what you want. I, of course, am well acquainted with this matter, I know what it is to have dilettante people ou a farm. I have to get the work done, and if I send out a certain man with a team of horses I know they ought to get so many acres ploughed, but you know what the class of man I have described is; if it gets very hot, he gets under the hedge and smokes, and the team comes in, having ploughed half an acre perhaps. If the man in charge has these scholarships' youths, they have to work, I do not say too hard, but they must work.

855. And by giving them so much an acre they have to work?—Yes.

856. And those who have plenty of money do not care?—Just so. On the other hand, the other men will earn four or five shillings a day every time they go out with the horses, and the other men do not earn sixpence; they do not care—"My father gives me a five-pound note." Some of the parents have asked me, "How much shall I give him." I say give him nothing; let him have just what he earns, and that is just what they should get.

857. Have you no way of dealing with the men who earn nothing?—If I can catch them I put them to weeding the front road, but then my difficulty is to catch them.

858. Still I do not think a wealthy man would send his son to the school unless he wanted him to learn?—I have had lots sent to me just to get them out of the road, and I have got into very bad odour, even here



in Melbourne, about it. I had a very distinguished visitor two or three weeks before I came away, and Le was interested in farming, and saying he had a lot of farm lands upon his hands. How was it that ho could not work it? I said "You spend too much upon labour." At the moment one of the students happened to pass. He had been with me about eighteen months. I said, "Here is a youngster, come and speak to him"; and I said, "That youngster all the winter has been working the American gang plough, double furrow, twelve-inch furrows, driving five horses by himself. Now have you got a man in England that will do that?" He said he did not think he had. I said, "That boy has been here eighteen months—ask him how old he is." "How old are you? " "Seventeen." "What depth do you plough?" "Nine inches." "How much a day? " "Two and a quarter acres." "Do you always plough nine inches? " "Not always." "How much do you do then? " "Three and a quarter acres." Now I say there is not a farm hand in England that would do it, and my visitor looked rather astonished.

859. Are there any other points that occur to your mind as to the difficulties?—There are all sorts of little difficulties in organization, and so on.

860. I think you have altered your system or labour from what it was when I visited your college some

years ago. I think your system then was to have a certain number of hours compulsory labour, then any work done apart from those hours was paid for?—No, I never had that. The first year I paid them so much an hour, but I found that the farm went back, so then I instituted contract work all through. Of course that gave a great deal more trouble in measuring up, but that is done in a great measure by the land survey classes. I find that hour work would never work at all. It was all "government stroke." It was absolutely necessary to give them their contract.

861. We are also making inquiry as to the vegetable products suited to the colony, both with and without irrigation; have you thought over that subject?—I have thought over it, but I do not know that I could give you very much information about products other than those grown in temperate climates. You have other experts who know much more than I do about olives and vines and so on. I have not the slightest doubt about the great value of introducing those crops, but I have not the practical knowledge that I have of the other crops grown. Sly idea certainly is that what you want to introduce is a much better system of farming than you have. I think you would find wheat growing would not be such a bad speculation if carried on properly; because I think in a very few years you will have to import wheat if you do no mind in Victoria. Of course there is a surplus now, but you are using seven million bushels now with the seed, and you grow that upon about a million acres. If you are growing a million acres of wheat in a colony like this, a very few years will see a diminution in the acreage.

862. Stripping it?—Stripping the land. We are all doing it; of course it is not peculiar to Victoria or South Australia or anywhere else, The whole world is stripping the wheat lands at present. What we want is to introduce a better system of agriculture altogether

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—a system of mixed farming, growing beep, though sheep are very low just now; but I think it might be done so as to produce your wheat upon a smaller acreage—get better crops and grow cheaper for a less price per bushel. I could laud the wheat from our farm in London—I reckoned it up, at a high freight, 25s., a freight I do not suppose you ever pay here, and it has been 9s. 6d. in parts of New Zealand—I can laud my wheat off that farm at about 3s. 5d. in London.

863. At 25s. freight?—Yes; that is a very important matter. Then again, here you do not seem to get on with your frozen mutton as we do, and I cannot at all make out why. I know the sheep are not the quality ours are, but why should not they be?

864. Is not that explained by the fact that your sheep are larger framed than ours?—Yes; but why should they be; why are not your lands improved—is that not possible; and if a better class of farming is carried out you would get better sheep—get crossbred sheep as we do. There is no reason why it should not be.

865. The home consumers perhaps do not know the difference in value?—They will not have it, I believe, and that is the reason I expect why your mutton is lower in price. Of course we have our turnip crop, and that gives us winter feed, but in Victoria I do not think winter is when you are short of feed. Of course what I am about to say may be impracticable—it is merely the idea that strikes me—but why cannot you grow food for summer as we do for winter? Our turnip crop costs us a good deal, but for instance, why could not a crop be grown and made into ensilage for summer use. It is only a short time in summer when you are short of feed; you do not want a great deal.

866. There is the labour question?—I know that, but it is not much that is wanted.

867. What crop have you in your mind?—Lots of crops could be used, but sorghum or maize would probably be the best, but our turnip crop costs a great deal of money, and yet if we get 2d. a pound for mutton we *get* on swimmingly; that is 4½d. a pound in London, but we are getting 5d. and 5½d. Now it seems to me that if you carry on two or three dry months in the year with ensilage you could get on better, and then the rest of the year you might have your winter feed for sheep, and might be able to carry a very much larger number of stock than you do—and stock of good quality.

868. In the cooler portions of Victoria it struck me as being strange that the turnip crop was never cultivated?—It ought to be cultivated.

869. What is the rainfall of Christchurch?—About 25 inches.

870. I think we have districts with an average rainfall like that, and we never seem to cultivate that crop?—I think it might be made a subject of experiment. That is where the value of these experimental farms comes in. If you had one in that part of the country to experiment with turnips, it would be useful, but it would be useless in the dryer parts of Victoria. In those school farms you would have to carry on a different system of agriculture altogether. I know the difficulty—

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it is the labour difficulty; but in New Zealand we have to grow turnips, and we make hay. That is gone into in that pamphlet, and we cart the hay to the sheep and eat off the turnips, and yet we make a profit on 2d. a pound; but there is not much of your country that would grow turnips.

871. But a great deal of our country would grow lucerne?—Yes, that is an exceedingly useful crop if it is

not grazed too hard; you want small paddocks, and shift the sheep or cattle from one to the other so as not to destroy the plant, and it is a most excellent plant for en silage. That is where the Council of Agriculture could be of very great use to Victoria, to carry out a series of experiments upon such matters as those. Try ensilage, for instance.

872. For instance, we can easily make one of those school farms without having all those great buildings, for scientific teaching; you can teach them that at some of the others?—That is my idea. I did put down some figures to see what they would cost, but it was very small.

873. I understand you to say that you try no experiments upon your farm?—We try none upon a small scale, only as part of the general farm practice.

874. You have tried English grasses?—Yes.

875. And lucerne?—Yes, it is no use with us, but all these reports in the pamphlet are experiments; there is the turnip crop, for instance.

876. Is your climate quite moist enough for the turnip crop?—No, it is too dry; for instance, this year there is hardly any one up our way has turnips, but I had the advantage of a water drill, and I managed to get turnips.

877. Does the turnip fly trouble you at all?—Yes, a good deal; we lose the whole crop sometimes.

878. Do you hand hoe your turnips?—No, we horse how them.

879. Does dairying produce pay with you?—Yes, this year cheese is about 5 ½d., and that is always profitable, but last year it was not so.

880. Are there many cheese factories now in New Zealand?—I sup pose about eight or ten or a dozen; they supply Melbourne.

881. Are they successful as a rule?—Some of them are very successful, and some are not so.

882. That must be bad management?—Yes, I think so, and bad position and unsuitable climate; those are the three things that are dead against dairying. On the South Island they seem all to have been a success, all but one at any rate that I know of. Much cheese is shipped for Melbourne.

883. Are there any butter factories on the co-operative principle?—No, not to any great "extent; there is not the demand for butter in New Zealand, and it is not so easily transported as cheese; it has not paid so well as cheese.

884. Have you used the centrifugal cream separator?—Yes.

885. Upon your farm?—Yes, I have one—not Laval's.

886. Are there any of the Laval?—Yes, a good few.

887. Are they giving satisfaction?—Yes, they work very well.

888. Have you tried the cultivation of fruits upon a



large scale?—They are only commencing now; the last two or three years the fruit mania has reached New Zealand.

889. Is it too early yet for you to express an opinion upon it?—Yes.

890. In reference to the students that you have, within your knowledge do they generally belong to farmers' sons or tradespeople's sons?—All sorts; we have a mixture, tradespeople, farmers, squattera, and professional men's sons, and so on; but I may say there are none who have passed but what have become farmers.

891. They have been farmers once?—No, they are all now farmers. I was looking at the evidence given by Mr. Cureton; he said a great many from the American colleges entered the law and all sorts of things, and it is stated that that is on account of what they are taught, but, so far as we are concerned, they are all farmers who have gone through the college and passed. Of course some men go there for twelve months and do not like it, and they start something else; but I do not recognise those at all.

892. Have the youths who have passed through your hands proved themselves exceptionally useful as farmers?—I think so; several of them are men in charge of very large places. I would trust them with anything. The only thing they are not up in is buying and selling stock, but they have a fair knowledge of book-keeping, a fair know ledge of land surveying, sufficient at any rate, and it is not any use to tell them what work is worth, because they have had to do it, and they know all the dodges.

893. You find those youths, when they leave your hands, readily find occupation?—Pretty fair; at present there is not a great deal of occupation for anybody connected with agriculture in New Zealand, but they have done very fairly indeed; in fact, as far as I know, they are all in occupation, some upon their own farms, and some employed by others.

894. Have you any knowledge at all of any that intend to follow farming largely, either by the assistance of their parents, or on their own means?—Some are managing large places, two or three.

895. I mean are they seeming to you to carry on a large system of farming as well as a scientific system?—Yes, no doubt some of them are. We have some very large farms in New Zealand, and I know two or three at any rate who are upon those large farms.

896. Have you had any demand from young men—men almost too old to go to school again—who would like to come for six months or so upon the farm?—Yes, some demand, but we cannot take them into the college above 21, and there is a difficulty with us because there is no accommodation in the neighbourhood. If they live outside they are allowed to come and attend lectures, and take part in the farm work and so on, but we are better without them really, but it is not practical men who come to us at that age; it is men who have failed at other things who come.

897. *By Mr. Dow*.—There are here some men, sons of farmers, who intend to follow farming, and have not had an education of this sort, who would probably want to attend one of the school farms for say six



months—have you had any experience of that?—We have had some, but the difficulty is in getting accommodation for them boarding outside, and we will not admit them inside—1 think properly. It does not do to mix up boys of fifteen and seventeen with men of thirty.

898. I gather from that that your college is isolated?—There is a village and a railway station.

899. Close to the railway station?—Yes, the railway station is upon the farm.

900. It is not very far from Christchurch, is it?—Fourteen miles.

901. You get, I presume, visiting lecturers?—Only one, a veterinary surgeon, but I would not have more at any price. They are no use. They live in the town, and they look upon the college as a nuisance. If you want a man to be of use, he must be a part of the college, and have his heart in it, and know every field.

902. But you would require so many?—According to my idea you do not—you want one man for each subject, and a good man.

903. But there are so many sorts?—No.

904. Veterinary science, for instance, you want a man, and you take him all his time?—That is the only difficulty we have, and we have not this man all his time, but the others we have all their time. You must remember there is a good deal of discipline to be carried out as well as teaching, and you must have the masters to carry out the discipline. Lights must be out at a certain time, and so on, and there must be somebody to see that those things are carried out. It will not do to have students out at all hours and lights burning, and so on.

905. Do you have any agreement with them that they shall go on with the course?—No, you cannot do that. There is an agreement that they shall conform to discipline and rules.

906. Does any other observation occur to you to make to us upon any subject that should be useful to us?—No, I do not know of anything.

907. If anything else occurs to you, we shall be very glad indeed if you will write to us upon it?—Yes, I shall be very glad to be of any assistance to you, having always a certain amount of affection for Victoria. Of course, my ideas are evidently a little different from those of some members of the Commission. In connexion with that, may I be allowed to say, not knowing much of what you have done, that I saw you had accepted tenders for the Dookie schools; but I would stop those buildings if you have any idea of carrying out my ideas. I would put the whole of that money towards carrying out a central college. I do not know whether I ought to express such an opinion, but 1 think there is nothing more objectionable than doing things in a hurry without a cut-and-dried scheme. You remember what a mess Dookie was made of before. You remember a lot of money was spent upon building, and a lot of youngsters were pitchforked in there, and they got no teaching, and they got the place a bad name. I have expressed my opinion as to what is a better plan, and if my ideas would hold water, or meet the ideas of the Commission generally, the bulk of the money would be better spent upon a central college than at Dookie. I do



not think you want half the expense at Dookie that you are committing yourselves to. About the arrangement of the buildings there, I have not seen the plans, but in the paper since I came over I saw they were to consist of a central hall for lecture purposes, a dining-room, and dormitories for forty students. That means that there are to be certain lecturers, I suppose; but you have made no provision for those youngsters after they have done their day's work. There are forty students and no provision. I would not like to take charge of that place. In six weeks they would want to know what they are to do, and that would be a very difficult position for the manager; and you would have very considerable difficulty in finding work for forty men upon a farm, unless you put them to clearing land; their parents would complain, and it is a difficult matter. They want to go farming and ploughing—that is the height of their ambition, and they will do as much as you like at that. I speak from experience with students for the last eight years. I know exactly the objections they will have to that kind of work, and they want farm work; but directly you put them to work that they think is made work—and they are sharp enough, and they will ask are they going to get any profit out of that work—they will not do it, and they get into bad habits.

908. What provision do you refer to in the way of rooms—do you mean amusements and so on?—No, I mean some rooms besides dormitories—a room to assemble in, for instance; and there is no provision for

teachers. If you send forty men out there without teachers, in three months they will all be wild—I know what it is. You need to be very careful in starting a thing of that sort to start it properly, and not get a bad name, because those youngsters are Australians, and they know when they are being properly treated. Even at our own place we are short of one thing—that is, the time of the blacksmith and carpenter, and you would not believe the grumbling I have to put up with because I have not money to get the blacksmith to come oftener. You would not believe the grumbling that there is that they do not get more instruction in that work.

909. Our difficulty is one of money?—I know that.

910. Would you advise us to wait five or six years before starting a college, or start Dookie with as good a provision as the means will allow?—Then you must start a small place first; but I understood this was to be merely a small farm in connexion with an agricultural college?

911. Our idea was that it might be some time before we got a central college, and we might have to go on with the place for the present and do as well as we can?—That explains the matter at once. Then you would shift your staff from there to the central college when you get one.

912. Exactly?—And build up your staff at Dookie.

913. Yes?—That is quite a different thing. There is another suggestion I would make to the council, and that is most decidedly I would add forestry to the agricultural teaching. I strongly advocate that for two

William E. Ivey Esq. *continued*, 22nd March 1886.

reasons—in the interests of agriculture and in the interests of the colony too. First of all, in teaching forestry, your science teaching is just the same as in any other branch of agriculture. And, secondly, I should advise the council to get hold of all the State forests for the endowment for a forest school. There is revenue from them that would start a forest school and the renovation and restoration of your forests as well; and I think it is proper that the whole of the forests should come under the Council of Education. I know what the forests are, and I know every inch of them, and I know what a trouble there has been in trying to do anything with them, and the sooner they are removed from the present control the better. But you can teach forestry and conserve the forests. Those are two good things; and beside that you get a revenue from it, and that is what you want. I do not know what revenue you get from your 150,000 acres, but I know when I was here there was very little land worth anything left in the hands of the Government; but your 150,000 acres are not worth as much as our 100,000 in New Zealand.

914. Would you make the schools of forestry separate from any other?—Undoubtedly not. What I would do would be to give education at the central college in forestry and agriculture. All you want to establish is one or two or three forest schools in the same way as you have for agriculture farm schools, merely for planting—send so many out into the forest to plant, and so on. It is as simple as possible.

915. Just the same as an agricultural farm and a dairy farm could he worked together?—Just so. I do not see any difficulties in it that are insurmountable. I know it would make the council of much more value to the colony than it is at present, and would give them more money to work upon, and would pay over and over again in the improvement of the forests. I may say there was a great deal of trouble in organizing the college in New Zealand, because there is no college of the same sort anywhere else. We had to strike out an entirely new line for ourselves. Of course, I remember the Cirencester College in England, and I know the weak points there, and I knew what to avoid in this one. Of course, I could make the New Zealand College a great deal better if I had more money. You have an advantage in this way, that we are a local institution and you have the whole colony to work on.

916. What is your annual revenue altogether?—Including sales from the farm—the gross revenue do you mean?

917. Take the revenue from the land and investments first and the farm separately?—It is rather difficult to say. I should have to go through the items minutely to get at the cost I should say about £3,000. I could write down the items with a little consideration.

918. If your pupils pay £50 or £60 a year, are you teaching them at a loss, or are they paying their own cost?—We are certainly teaching at a loss now. At £45 a year we taught at a loss, because £45 merely covered the cost of their board—in fact, it did not quite cover it. Then we have to pay several other items that you would not; for instance, we pay the fares by steamboat of students from other parts of New Zealand, for instance, from Auckland to Lyttleton, and that is an item of about £200 or £300 a year, and two or three other things

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come under the cost of the students as well as the actual cost of tuition.

919. If these figures are private, we will not ask them?—I can do better than that for you. I think I can make an estimate of what it would cost you.

920. Thank you, that would suit us equally well?—I shall be glad to give that.

921. You do not think that the main hall at Dookie would be sufficient for the students to use of an evening?—No, that would be a pandemonium.

922. How many rooms would be required?—I do not know. Have you separate bedrooms.

923. Yes?—Would you want as many as forty; could you not turn some of them into day rooms?

924. Some of the bedrooms are very small?—They will want a place, if they want to do any work, where they could go by themselves, two or three of them at any rate. I know what it is myself, that, if you have twenty or thirty men in one room, there is no possibility of doing any work.

925. Some may want to do bookkeeping, and so on?—Yes, and beside that they have an examination every Saturday, and they want to work up their notes, and then to make their botanical collections, and so on. Then you want a room where two or three men of like temperament can get together, but if they have the whole twenty or thirty nothing whatever can be done. The difficulty I should think with forty up there would be to find them farm work. I do not know the acreage that is now cleared.

926. Is it not very necessary to learn the art of grubbing trees?—I am afraid it would not be done. They would simply stand there with their tools used for grubbing trees, and be like the nigger—so very fond of them that they would lie down beside them.

927. The total area is 5,000 acres—430 acres have been grubbed and cleared; 250 acres have been broken up and are under the plough?—You will find that the foundation of a whole farm of this sort will be the number of horses you can employ. Of course, a certain number can be employed fencing, and so on.

*The witness withdrew*.

*Adjourned sine die*.

Monday, 5th April, 1886. *Present*:

- The Hon. J. F. LEVIEN, M.L.A., in the Chair;
- The Hon. J. Buchanan, M.L.C.,
- T. K. Dow, Esq.,
- D. Martin, Esq.,
- Joseph Knight, Esq.,
- James Baird, Esq.,
- The Hon. W. Madden, M.L.A.,
- Andrew Plummer Esq., M.D.,J.P.
- Charles Yeo, Esq.
- Charles Moore, Esq., F.L.S., examined.

Charles Moore, Esq. F.L.S., 5th April 1886.

928. *By the Commission*.—You are the Curator of the 5th April 1886. Botanical Gardens at Sydney?—My title is Director.

929. You devoted considerable attention to analyzing the different plants that can be grown in this colony commercially with success, I understand?—Yes, I am perfectly acquainted with them, and their cultivation, and their suitableness for the climate.

930. Have you prepared a list?—Yes, I have a general list, and then I have separated the lists.

931. Under different heads?—Under different heads; and if you will allow me, I would suggest what has just occurred to me, that I should read over those lists, and then any questions could be put to me with regard to the plants.

932. Thank you?—We will take the grain-bearing plants first. Of course, I have put down the wheat, barley, and oats, maize, rye, millet, lentils, and gram. I do not suppose there are any questions to be asked with regard to those, as they are all plants which can be cultivated, and profitably cultivated, in my opinion, in this colony. Lentils we have grown very little of in our colony. The gram is a most easily cultivated plant, and most useful for horse feeding. Then all the millets could be produced here in summer time just as well as in our colony. We have a warmer climate certainly, and we might produce them to a certain extent better; but all the others everybody in the room is well acquainted with. I may say I have selected those from a multitude of plants, and I have put down only the plants that I think could be profitably cultivated here. Those are the grain-bearing plants which, I believe, could be profitably cultivated here.

933. Is the gram grown in New South Wales commercially?—It has been grown, but it has not been cultivated largely; it is most easily cultivated.

934. It is largely imported, is it not?—Largely.

935. From India, I think?—A great deal comes also from the south of Europe.

936. What number of bushels would you get from the acre?—I am not able to say. If the evidence which I give now were given to me, I then could supply such information as you want upon that point. 937. Is it more productive than pease?—Equally productive with pease, and in some situations much more so.

938. Is it more hardy than the pea?—It will grow in

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poorer situations than the pea.

939. Do you know the quantity of gram that was imported into New South Wales?—I do not; but I said before, if the evidence is supplied to me in print, I will supply all that.
940. It is largely imported?—It is largely imported, and some years ago was to a very large extent indeed.
941. What is it used for?—For horse feeding.
942. It is not fit for human food, is it?—I do not think so, but I am not sure.
943. Is it good for poultry?—Excellent for poultry.
944. Do you know its commercial value?—I do not.
945. Can you say what it can be grown for per acre?—No; I say if the evidence be supplied to me, I will gladly supply that from authentic sources; it would be mere guesswork for me to do it now.
946. Have you grown gram in a small way?—Yes.
947. Did you find the plants grow well?—Very well indeed.
948. At what season of the year do you sow it?—At the early part of the season, just like other grains.
949. And millet?—Millet you require to sow early, of course; but sometimes we can get two crops a year, in our climate, of the various various sorghums.
950. Is this the broom-corn?—Yes, there are several so-called species of broom corn, but they all produce good grains, and then their profit is for other purposes; they make the millet brooms of them. It is a very useful plant indeed to grow in a country like this, for the grain is first used and then the heads come in for brooms.
951. Do the heads mature sufficiently here to use for brooms?—I think this climate would produce them almost as well in summer as in New South Wales
952. What is the grain used for?—For feeding any stock; cattle eat it readily.
953. And poultry?—Yes, very readily, and it is very fattening.
954. It is a species of sorghum?—It is a species of sorghum.
955. There are many varieties?—I suppose there are some half-dozen.
956. There are some species, and then there are the varieties of species. Does this plant that you specially refer to produce sugar?—Yes.
957. Would it be of commercial value for sugar?—That has been proved in New South Wales; very good sugar can be made from it and profitably; but since they have gone into the real sugar-cane, it seems to have fallen into disuse altogether.
958. They are making a sort of treacle, I think, from some of those sorghums in America, very largely?—They are.
959. Do those varieties bear seed of commercial value also?—Yes.
960. Is this grown largely in New South Wales?—I do not know to what extent; but it was grown very largely indeed at one time; and it has this advantage, that when cut green, as green food, it fattens swine



particularly; but the fat is not good when made into bacon, it is too oily.
961. Does the seed contain an oil?—No, the plant itself as green food supplied to swine.
962. It makes the bacon too oily?—Yes.
963. But the plant itself does not contain oil?—No.
964. Nor the seeds?—The seeds no doubt do in small quantity; but I it is used as green food; it contains a great deal more sugar than maize, and has more fattening in it.
965. It is sown, I suppose, at the season that would correspond with the season for sowing maize?—Quite so.
966. And lentils, is that a little flat tare?—Yes.
967. Are they grown largely with you?—Not very largely, but they are grown in some parts.
968. What are they used for chiefly?—Principally for feeding stock.
969. In the green?—It can be used in the green state, but lentils are mostly used in the seed for the fruit, a small pea.
970. Do you know the value of lentils per bushel?—I do not.
971. Can you tell us the quantity of rainfall required for the growth of gram?—The rainfall varies as much in our colony as it does here; and while we have from 45 to 47 inches on the coast, it varies as we go to the westward to about 8 or 10 inches; and so we have it through the intermediate places, the rainfall varying from the one to the other.
972. Do you know the rainfall that is required for the growth of gram?—I have seen it mostly cultivated upon the coast ranges where the rainfall is much heavier than beyond the coast range. We are not an irrigating country. I do not know a single farm that is irrigated in New South Wales.
973. That is one of the difficulties that we have here in collecting evidence; plants might grow with you on the coast side of the colony, and not inside where there is only 10 or 12 inches of rain to get the plants to grow; therefore I want to know whether you have tried them in the interior where there is little rainfall?—My

experience is up the coast range.

974. But, with irrigation, of course they would grow anywhere?—Yes, anywhere; we are dependent upon the rainfall for our crops. It we have plenty of rain, we get a good crop; if we do not, of course, we have very little.

975. How would gram be able to compete with oats at the present price?—I do not know that; but in introducing these three I had this idea, not that I say that they should be produced in preference to other crops, but something fresh, so that the farmer could get something else beyond what he has been accustomed to cultivate. I am not very certain how far these would compete with barley and oats as a profitable crop; that is the question; but these things might be introduced, and they might suit some situations much better than the grains they have been hitherto in the habit of cultivating. That is my only reason for introducing these things. I do not advise them, I merely submit their names for consideration.

976. I notice that we imported last year 1,345 centals of

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gram, valued at £496; that would be about 6s. 6d. a cental?—I shall now speak of other plants—plants useful for their fruit. I first put upon the list olives, carob, caper, hazel-nut, argan, and the hop. I repeat again that out of the numerous plants used for these things, I put down these as the plants which, in my opinion, could be cultivated in Victoria. I could give an increased list of plants which, as they would not succeed here, I do not recommend their cultivation. Now, with regard to olives, I am satisfied that in the poorer grounds, where nothing else would grow, where nothing is likely to grow, in the poorer rocky stony grounds, the olives would succeed admirably; and that they can be grown here there is evidence in your hand; and I also saw them at both Ballarat some years ago and at Sandhurst a week ago, and very fine olives, indeed. That, as a matter of course, gives no immediate return, it is a question of time; but many of the poorer tracts of country might be planted with them, as they might also with the carob.

977. I should like your opinion upon this branch of olives from Dookie?—The olives at Sandhurst were nearly twice the size of these. I brought one away with me, but I left it at the club.

978. Are there not many varieties, some large and some small?—Any number of varieties, but that is a very good crop.

979. Do you consider it a fine specimen?—Indeed I do.

980. Do they grow in New South Wales?—Very well indeed.

981. In quantities?—They are not much planted; we are even behind you in that I am afraid;. but that they grow I have evidence, and grow well, and fruit well, and have done for the last thirty-six years. We had two collections of olives introduced by Mr. Busby and the late Macarthur family, and those plants are mostly still in existence; at all events varieties of them; they were introduced forty, or nearly fifty, years ago, but they do not seem to have taken the fancy of cultivators.

982. Have you any good specimen trees?—Yes.

983. How old?—Forty or fifty years old.

984. What quantity of fruit would one of those large trees bear?—I could not venture to say; but they do not fruit regularly every year in quantity. There is always more or less fruit; in some years the crop is very heavy, and in others very little indeed.

985. Is not that a characteristic of the olive?—I believe it is.

986. Have you no idea, roughly, what quantity, what number of bushels you get from a large tree?—I do not know; I never reckoned. They fall upon the ground, and are raked off. One year, I made oil, very fine oil indeed—the very finest oil, Sir William Denison said, he had ever tasted in his life, and he had been in various olive countries; but I found from a newspaper paragraph from a lecture given by the Italian Archbishop of Western Australia, that the oil, when first made, should be taken into the dark and kept in the dark, and never see the light again, or it becomes rancid.

987. Has it only been made on one or two occasions?—I made it for years, but in a small way. Of course, if it were a crop and largely planted, it would be done on a very large scale.

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988. Are the olives prepared in the Italian fashion in salt and water?—I tried that, but it failed. The olive parts with the stone readily, but I cannot preserve it plump; but Sir W. Macarthur, at Camden, 36 miles from Sydney, succeeded in preserving some plump. But it is only the want of experience. The fruit is very fine, and parts with the stone very readily.

989. Have no olive yards been planted at all?—Not an orchard Old settlers planted individual plants.

990. You spoke of the caper. Is that the caper of commerce?—Yes.

991. The little pickled caper?—Yes. They could be grown here as well as in any part of the world.

992. Is that an annual?—It is; but, by cutting back, it can be made a perennial.

993. And is it grown for commercial purposes?—I am not aware of it. It is not in our colony.

994. Have you any idea what the value of the capers would be from an acre?—I have not.
995. You buy the seed I suppose?—Yes, and I think it is well worth doing.
996. How far apart from seed to seed would you plant them?—About 4 feet apart, or 3 feet.
997. At what season do you plant?—Very early in the season.
998. In the autumn, in fact, the first winter rains?—No, I say, if you planted in this colony, in the end of July.
999. In the spring in fact?—Yes, in the spring.
1000. Do you grow hops in New South Wales?—In some places; in favorable situations. But we are too hot for them.
1001. Are there any hop gardens?—There may be, but I am not aware of them. I know that the plant does not grow freely with us. It runs into leaf.
1002. Have you seen any of our hop gardens here?—No. The only ones I have seen are those near Hobart Town.
1003. On the Derwent and Tamar?—Yes.
1004. You spoke of some other plants, I think, too?—The carob, which is used largely in the south of Europe for feeding mules and horses.
1005. Would that grow here?—Very well indeed.
1006. We should be glad to have a little information especially upon this tree. We have some growing, I think, at Dookie?—Have you seen those?—No, I have not, but I believe many of them are
1007. I believe that leaf came from Dookie?—Yes. That is the carob.
1008. How long does it take to come to perfection?—That depends entirely upon the situation. In a good situation, they might flower in five or six years, but they would certainly take that time. But as it grows older it increases in worth.
1009. Is that very long lived?—Very long indeed.
1010. Is it a large tree?—We have some plants about
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25 feet high. But it is. generally a spreading tree, and does not grow up very high.
1011. It is a sort of bean, is it not?—Yes. It contains a great deal of sugar, and the children (I have myself done it when I was a boy) bought them and sucked the pods for the sugar it contains.
1012. What quantity of fruit would you get from those?—Upon those points I am not certain.
1013. Does it bear more than one crop of beans in the year?—No, only one crop. It is a peculiar plant. You can never be sure of it. It is not a hermaphrodite flower. It has male flowers and female flowers. In some cases you have splendid crops, and in some cases the trees never bear seeds. In some situations it bears a very large crop indeed. In the south of Europe, some twelve years ago, I saw splendid-crops.
1014. It is grown for cattle food, is it?—Principally for horse food and mule feed.
1015. Do they use the green bean or thresh them?—They pick them from the tree and thresh them.
1016. Can the horses masticate them?—Yes, readily. They are very fond of it.
1017. Are they about as hard as a pea?—About the same consistency.
1018. It is something like a large lupin, is it?—Yes, but much larger than a lupin seed.
1010. A tree, I suppose, would grow several hundred pods?—Yes, I should think a good-sized tree would, guessing at it.
1020. And commences to bear at five or six years?—It does in good situations, and goes on increasing in value as it gets older.
1021. At what distance apart would you plant them?—Certainly not less than 20 feet, and I should say 25.
1022. And while they were growing would you utilize the ground for something else?—In cases of that kind I would plant more thickly, and then cut every other one away.
1023. Is it an evergreen?—Yes, evergreen.
1024. Do you think that oranges, lemons, and limes could grow here?—I think so. You have got the frosts here, and we have not in New South Wales. The oranges grown in New South Wales are principally confined to within the coast range. I have seen in gardens at Goulburn, Bathurst and elsewhere, the orange tree growing well but not bearing so large crops as those nearer the coast.
1025. Why?—I do not know. I suppose it is the peculiarity of the climate that provides so little rain.
1026. But against that there are many parts of America where they grow them inland. Is it not a fact that in California and America the best crops are obtained inland, where they can irrigate them?—Yes.
1027. One gentleman here told us that the orange did best away from the sea, but it is owing to their being able to supply water?—Precisely-
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That is a different style of cultivation altogether. And it is a curious fact that the orange tree seems to

succeed best within a radius of something like thirty miles from Sydney Now They are cultivated very largely there, but we never suffer from frost. In the inland districts they suffer from frosts, and in America they suffer from frosts. That is, the young buds are frequently nipped-but the trees are not killed. It is a peculiar plant. I made inquiry in regard to its cultivation, or rather the disease of the orange, in the south of Europe, some eighteen years ago. It was a curious fact that a disease which was then carrying off our orange trees, I found precisely the same disease existing in Spain and Portugal, and as it disappeared from us, so it disappeared from the south of Europe, and had not reached the Cape de Verde Islands. I met a gentlemen in Paris from those islands who grew them very largely and knew nothing about the disease, It was a disease that rotted the base of the stem, and the tree went off.

1028. Not a scale?—Not a scale; but it is information worth having that, at Seville, when the tree was in full bearing, when I was therein September, the plants—fine magnificent trees—were standing in water; they make ridges so that you can walk through an orangery, and as soon as they have yielded a crop the water is run off. We in New South Wales know nothing of that. We never dreamed of irrigating.

1029. Was the land kept under water for a time?—Kept under water. We could not go on the ground. We were obliged to keep on those ridges in the orangery.

1030. Was the water round the tree?—The water was round the tree. It was a perfect basin.

1031. At what stage was the fruit?—Towards ripening.

1032. How long had the water been upon the ground?—I did publish it, but I forget now how long; but I know that as soon as the crop is taken off the water is allowed to run off.

1033. How is the water applied?—I suppose by irrigation.

1034. Would not it soak into the soil?—No doubt it does, but there must be always a supply to keep the water there.

1035. Some few inches were upon the soil—it was all underwater.—Scarcely that, but you could see the water there; it was thoroughly saturated.

1036. It was kept in a good state of irrigation?—It was kept in a good state of irrigation. We could not get upon the ground. My brother was there with me.

1037. Did the fruit look very large?—Very fine fruit indeed.

1038. Much larger than with you?—No, our oranges are quite as good as those.

1039. Is the orange considered a profitable crop with you?—Very.

1040. Do you grow lemons?—Yes.

1041. A very profitable crop also?—Very.

1042. And the lime?—Not so much of the lime as oranges and lemons. I think the lime might be grown, if they would take the trouble, just as well as the others; but there is not the demand for them that there is for the others.

1043. Oranges grow well upon the Murray Downs?—No

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doubt they would, from what I have seen, but I suppose they are subject to frost.

1044. Do I understand you to say that the disease is what is generally known as the Sydney disease?—No; it was a very peculiar disease that in 1867 destroyed almost all the oranges about Sydney.

1045. Killing a ring of bark just below the surface?—Yes.

1046. Is not that generally known as the Sydney orange disease?—It may be; I do not know.

1047. Do I understand you that that has disappeared altogether now?—Altogether.

1048. I think that you have also a list of some fibre plants to submit to us?—Yes, but I should like to mention one plant. In Morocco there is a plant called the Argan tree; it grows in the very poorest grounds, and yields a seed that sheep are exceedingly food of. It grows with us remarkably well, and yields a remarkably large crop of seed, and the sheep are very fond of it?

1049. Is it an annual?—No, a tree.

1050. How long is it before it bears?—Six or seven years. I mention it incidentally, because it is worth introducing into this colony.

1051. Can the seed be obtained here?—No, but any quantity can be obtained from Morocco.

1052. As to the grafting of olives, does not a very great deal depend upon the grafting of the young trees from the old trees?—Yes, of the good sorts; but there is another way of propagating by junks from the trees.

1053. But is it not essential to get the best fruit in the best way that young trees shall be grafted from a well known variety?—Yes, because the fruiting olive is a variety—it is not a species—therefore, if you get plants from seed, you are not sure of getting the variety wanted; you may get a superior kind, but the chances are that you get an inferior one.

1054. But it is essential that every tree should be grafted?—No, not essential; but if you want to get good sorts, as the Chairman said, there are a great number of varieties; if you want to get a good variety, you must

graft from a good plant.
1055. Either graft or take cuttings?—Yes, of course.
1056. We had some evidence from home lately in which great stress was laid upon that point—the absolute necessity of grafting every young tree; you get fruit in four or five years that way; whereas, if you do not graft, you have to wait twenty perhaps?—I daresay. It is very general; for instance, the orange tree, if you graft that, it may bear in five years; if you grow a seedling, it may be ten years.
1057. But if you grow from cuttings you get the fruit as quickly as by grafting?—Yes.
1058. And the fruit as good?—Yes. My experience is that you get in some years a good crop of olives; in other years a few only; you can just see the fruit here and there, and the next year you see a mass of fruit.
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1059. But my point is this, that, if you graft a tree you are more likely to get a crop early than the other way?—Yes, my experience has taught me that.
1060. And if you wish to obtain the same variety, would it be at all material whether you graft this olive on to some seedling or whether you take a cutting?—Not a bit.
1061. Does the olive grow from cuttings?—Yes, from what they call junks of large wood.
1062. I thought it required a layer?—It will grow that way; but take junks of wood two or three feet of it into the ground—it must not be a short piece—and lay it a little aslant, not perpendicular.
1063. What size do you call a large piece?—The wood ought not to be less than one and a half to two inches thick.
1064. You have some other lists I think?—Yes, I will not occupy your time, for it is impossible to discuss everything. As to fibre-bearing plants, I should mention that no plant will be profitable that will not yield an annual crop. Therefore, I put down the common flax, New Zealand flax, hemp, grass-cloth, and so on, Crotalaria, grown in India, the Esparto grass, and jute—those might be made to yield in this colony an annual crop every year. The American aloe or agave would require to be planted upon a very large scale to yield an annual crop—it is a very valuable fibre; but these, flax and others mentioned, being annual, except the New Zealand flax, crops of those could be had annually. Of course there are some very fine fibre-bearing trees and shrubs; but the question with me is, could they be made profitable or would they yield an annual crop?
1065. Would flax pay to cultivate, do you think—the New Zealand flax?—The New Zealand flax is an exceedingly useful plant in any property; it always gives the fibre, and always is useful to tie up things, but I do not think it would pay to manufacture from cultivated plants.
1066. It is perennial?—It is perennial; aud is an exceedingly useful plant—I do not know one more so.
1067. But, in view of the very large natural production of New Zealand, it would not pay to cultivate?—I do not think it would.
1068. Does the jute grow with you?—Yes, if sown early, and you 1069. Is it an aunual?—It is an annual.
1070. Grown from seed?—Grown from seed—it is an annual with us.
1071. Does it grow freely?—Very freely.
1072. How high does it grow?—About 5 feet high, or higher than that. It depends a great deal upon the situation.
1073. Have you ever heard of Soovas cotton-tree?—No.
1074. It is grown very largely in Florida?—I do not know it. Is it a tree?
1075. Yes, I think so. It is called "cotton-tree." It seems to be a variety that has been raised very recently. It is the Hibiscus esculentus, the Okro?—That will give you an annual crop. There are two species of hibiscus that will give you a good crop, and yield besides a very good vegetable.
1076. Does hemp grow well with you?—Very well
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indeed.
1077. Does that require a hot climate?—No, I have seen hemp cultivated with success in England.
1078. Would it grow here, do you think, without irrigation?—I am quite sure of it. Out of a list of plants used for medicinal purposes, I have selected for discussion the poppy and the castor oil out of those I have here, assafætida, colocynth, buchu, sarsaparilla, jalap, scammony, henbane, arnica, rhubarb, and galbanum. Those kinds might be cultivated in this colony, and out of those I think it would be worth while to discuss the poppy and the castor oil, for I am satisfied that both can be made to yield a profitable crop. The others are just questionable. They are all imported as medicines from other countries; but they could be produced here.
1079. Would you grow the poppy for the oil?—Yes.
1080. Or for opium—which?—Or for opium.
1081. Which do you think would be the better?—Certainly for both, for you have to get the poppy seed for both.
1082. Is the oil imported here?—I am not aware that it is produced in Australia in a commercial point of

view.

1083. Is the seed largely used?—The seed; that is to say you express the oil, and you get all the preparations made from the poppy—opium, morphia, and laudanum.

1084. Is that diffused through the oil?—The outside of the poppy yields the opium. The seed itself yields the oil.

1085. You spoke of rhubard?—Yes.

1086. That is the medicinal rhubarb?—That is the medicinal rhubarb.

1087. Is that the same variety that we use for culinary purposes?—It is very closely allied. There are various species of the rhubarb from which the rhubarb of commerce is obtained. Some of them are very large; but the Rheum undulatum, very nearly allied to the common rhubarb, also yields a good rhubarb.

1088. And for culinary purposes?—Yes, and the roots for medicine.

1089. But could you use the tops for culinary purposes?—Yes.

1090. Would the roots of the ordinary rhubarb act medicinally?—I have no doubt about it. Then there is the castor oil; an annual crop; a good crop might be made of the different varieties of castor oil.

1091. How many years does the castor oil tree take?—An annual crop can be obtained.

1092. But would it bear the first year?—It would.

1093. The tree is not an annual?—No; in fact, it is a perennial. But the best way to cultivate it would be to make it an annual. Sow the seed early, and get a crop, and it might be ploughed into the ground to enrich it.

1094. You recommend it to be made an annual only?—Yes.

1095. Are there any other plants or trees that you would kindly draw our attention to?—Yes.

1096. You spoke of different kinds of castor oil trees?—No, merely varieties of what are called the Palma Christi—Bicinus communis. The

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French have a great number of varieties, and some of them are very pretty coloured varieties.

1097. They are growing about the country, and not made use of?—Then there are some dye plants might be usefully cultivated here—the safflower, the madder, the indigo, the fustic, and sumach and then comes the mulberry and the ailantus for silkworms. Then the liquorice is largely imported, and can be grown here as well as in any other part of the world.

1098-9. How is it produced?—It is a running root, running under the ground.

1100. What soil is suitable for its production?—Light sandy soil.

1101. Does it want much moisture?—No.

1102. Is it annual?—No; it is perennial.

1103. But if you obtain some of the roots, would they yield produce the first year?—Yes. If you put a plant into light sandy soil it yields a crop the first year.

1104. Are the roots squeezed or boiled to get the juice?—I think they are simply dried.

1105. How is the property of the root extracted?—I think it is made a sort of demulcent. I am not sure, but it is largely used I know.

1106. Those black sticks that we buy?—That is an extract from it.

1107. How is that extract got, do you know?—I do not know.

1108. Is the root used itself medicinally?—Yes. Then there is the sunflower, and tobacco, and cotton; and then there is the mustard and rape, all of which are imported; there is no country more suitable for the cultivation of those plants than this country.

1109. Would not the aphis injure the rape?—I pay very little attention to aphis. For some years the whole tribe of the Cruciferæ, to which those latter plants belong, were attacked by aphis; but of late years we have not had any aphis in our country.

1110. Has tobacco made any strides in New South Wales?—Yes, it is very largely cultivated indeed.

1111. Is it increasing?—It is.

1112. Is the cultivation prosecuted generally by the Chinese?—NO; the Chinese do not, I think, cultivate much tobacco. They go in more for culinary cultivation.

1113. Have you a large protection upon it?—We have protection to the extent of two shillings and sixpence per pound for manufactured, and one shilling for leaf.

1114-5. Have you any excise in the manufacture of it?—Yes, we is one shilling per pound.

1116. Is it subject to any disease?—I am not aware of any.

1117. What parts in New South Wales does it grow upon chiefly?—All the way up the Hunter. In fact it is very generally cultivates as a part of a crop upon the farms, particularly within the coast range but it will grow beyond the coast range very well indeed.

1118. Frost is a great enemy to tobacco?—By sowing early and getting the whole summer you get the plant too far ahead to be injured by frost. Madder can also be grown. In fact, the list I have given here, I bave taken a great deal of trouble to go through it,



and all the plants I mention can be cultivated in Victoria. I have not drawn upon my imagination at all. I am satisfied from my experience that all those can be cultivated in Victoria. It does not imply that because a plant grows or exists it will necessarily be a profitable crop. For instance, in the Botanic Garden, at Sydney, we have coffee growing remarkably well and producing annually a good crop, but it would be ridiculous to recommend it for a profitable crop.

1119. Do you grow the tea plant too?—Yes; but there again, although it will exist in various parts of Victoria, I am apprehensive it would not prove a profitable crop. That is my impression.

1120. Have you been to the State nursery at Macedon?—I have.

1121. Have you seen the tea plants there?—About three years ago I think.

1122. Do you consider them good plants?—They were healthy plants, but I do not think an ordinary cultivator could make it a profitable crop.

1123. For what reason?—In the first place the labour is too much, but the principal reason is that our climate is too dry for it. We have heat enough, but not moisture enough.

1124. Do you think irrigation would make it succeed?—I do not think so. You must have a more moist atmosphere.

1125. The rainfall is pretty heavy at Macedon?—But you have not a moist atmosphere. But in Assam there is a very moist atmosphere. That is merely my impression, of course.

1126. Have you any memorandum with regard to any other plants?—The grasses and plants used have nothing very remarkable in them. I have mentioned here, independent of the English grasses and our native grasses, or rather fodder plants, because there is a very general idea that grasses include all fodder plants, which I do not mean. When a man speaks to me of grass, of course I understand him to speak of graminaceous plants, not fodder plants. But, in addition to what is usually produced, there are two or three that I think could be grown profitably; for instance, French honeysuckle, saintfoin, and lucerne, of course we know. And then the true buffalo grass, not what is called the buffalo grass here, because that is only called so from having been planted in Buffalo Creek, near Sydney, when it was first introduced. But the true buffalo grass is said to be very valuable, botanically called Tripsacum. I have very little information to give upon those matters. No doubt the French honeysuckle and saintfoin might be made very profitable green crops here.

1127. How is it grown?—Just as a usual crop.

1128. From seed?—From seed.

1129. An annual?—An annual. By keeping it down it can be made a perennial, by cutting it before it flowers.

1130. What is the seed like?—It is a pea-flowering plant. Both the saintfoin and the French honeysuckle are pea-flowering plants.

1131. Something like tares?—No, higher than that.

1132. It is like clover in the leaf?—Yes, but much higher. It would be valuable for ensilage, no doubt. I have a few trees here which I think might be introduced too, either upon State grounds or for those



who wished to plant for profitable purposes First the Bermuda cedar, the Virginian cedar; then the American Carya, the pecan nut, and the pig nut, closely allied to Juglans. I know, from my own experience, that those can be grown here. They will stand in almost any situation. Then there are the American walnuts and the common walnut, but the common walnut is not a success with us; but the American walnuts are valuable timber trees

1133. Do they grow more vigorously than the ordinary walnut?—They stand our climate a great deal better than the common walnut.

1134. Is the American walnut that wood that we see used for cabinet-making?—Yes.

1135. Is not that made from the tree that hears the fruit?—It is made from Juglans nigra and cinerea as well as from regia.

1136. They do not bear nuts?—Yes, you can eat the fruit of the former kinds, but it is not equal to the common walnut.

1137. It is not so large?—No.

1138. How many years does it take to come to any size?—They fruit in about six or seven years.

1139. I speak now of the timber?—Certainly not leas than from 25 to 30 years to make a good timber tree.

1140. Is this the walnut that is grown in England for timber?—No, that is the Juglans regia—the common walnut. Then, showing the peculiarity of our climate, the common ash simply exist with us; but some species of the American ash grow remarkably well, and will become very good timber trees. I was rather surprised at the success of those American ashes. I got some as an experiment, and they grew splendidly.

1141. Is the American walnut a native of America?—Yes.
1142. Has it been introduced into England?—I do not know. I suppose it has; but I have had it for the last 25 or 30 years.
1143. Does it grow more quickly than the ordinary walnut?—Very much more so.
1144. I suppose much thicker in the leaf?—No, it is a thinner leaf-much thinner; and it does not form such a shady tree as the common walnut. Then there are the various species of Pinus which are planted largely here; but other pines might be introduced, which might be more profitable for their timber than these are.
1145. What pines do you allude to?—The best lumber pines will not succeed here. Pinus Lambertiana and Abies Douglassii do not do well with us in New South Wales; whether they would do in Victoria I cannot say. They exist with us and that is all. I have a paant of Lambertiana, one of the best pines in America, and I have had it 30 years, and it is not more than 8 feet high now.
1146. I think it dies here pretty rapidly?
1147. *Mr. Guilfoyle*.—That is Lambert's cypress, that dies quickly. But Lambert's pine is not a cypress.
1148. *The Witness*.—Then the willows are not made use of as they ought to be in these countries (and these willows will groe in any situation) for basket-making. The osier and the common basket willow are being used in New Zealand. I saw them in use there, but here they could be grown just as well, and on every estate they



would be very useful.
1149. They require swampy ground, do not they?—No; they would grow on ordinary land. The common basket willow prefers moisture, but it is not necessary; but the golden osier will grow on very dry ground.
1150. Will the basket willow, as it is called, grow in water?—Almost in water.
1151. You could not get it to strike in water in the first instance?—I do not think so. You will see its roots extending down to water, but I never saw it planted in water. But it is a very useful one.
1152. Is the ordinary weeping willow the tree from which the charcoal for powder is obtained?—Any willow will give you powder charcoal, but it is made from the weeping willow, because it is the quickest growing willow. Then I recommend very strongly the introduction of the redwood of America—the Taxodium.
1153. Does it grow pretty rapidly?—Very rapidly. Then the catalpa is strongly recommended by the Americans for timber, but I cannot say from my experience that they are going to be a great success. They might succeed very much better in this colony than in New South Wales; and then there are our common gums. I am quite sure from what I have seen, both in this country and New Zealand, that the gum may be made to yield a good profit in from 25 to 30 years. I may just state a fact : I made inquiry before I came to this country, on behalf of the Government, as to the actual profit arising from the cultivation of the common larch, and by thinning it out at nine years, and thinning it out at fifteen years, and thinning it out at twenty years, at the end of thirty years it yielded a larger profit per acre than if the ground had been in cultivation. I am satisfied that the red gum and blue gum, if properly planted and looked after, would, at the expiration of 25 to 30 years, yield as good a return as larches do in the old country; but it must be done systematically, and thinned out properly, because you must plant close in the first instance to get them to grow straight; the blue gum invariably grows straight, but the red gum does not.
1154. What distance do you recommend to begin with?—10,20, and 30 feet—that is, plant out at 10 feet, and thin out to 20, and leave the trees at 30 feet apart to produce timber.
1155. Would you sow the seed broadcast in the first instance?—I prefer it. I have made the experiment, and it is a great mistake to suppose that transplanting gums can be a success; with me it has been a failure. I therefore recommend the preparation of the ground and sow the seeds where they are to grow—leave the strongest where they are to grow. That is my experience, and I am sure I am right in that. I have tried transplanting from the nursery. If you transplant from the nursery you must water them and look after them to get them established, but if you sow the seed where they are to grow, they are no trouble after the first thinning out.
1156. Have you ever seen gum seeds grown in a box in prepared soil and transplanted when they have been up a sufficient time to commence to get the outer leaf, take them out with a large ball about a couple of



inches in length, would that injure the tops, do you think?—It Will not injure them, but if you are planting very largely you have to watch those plants till they take root in the ground. If you do not, the first dry season that comes they will all wither and die, but that is not the case with seedlings. The seedling will take care of themselves. I do not know what is done in this country. We have reports in South Australia that they have been planting very largely with a view to re-afforest the country, and the report says it is a success. I am sorry to say that though we have distributed about 40,000 plants last year, I have not known of a single instance where the plants were planted for timber purposes—they were used simply for ornamental purposes. How far you Lave gone in this country to re-afforest the country I cannot say, but we have done nothing.

1157. The red gum would not do to plant in the same soil as the blue gum, would it?—The blue gum is the most rapid grower, but I take it that if the ground were fairly prepared by ploughing and harrowing either gum would grow well.

1158. The red gum likes the flatter and moister ground?—No doubt, but the danger is that after a certain time the blue gum goes at the top with us. I do not know whether it does so here. We cannot rely upon the blue gum of Tasmania growing at all well for more than six or seven years—it goes at the top; but I saw in New Zealand the blue gum very fine timber trees. It is not planted there apparently for timber purposes, but for ornamental purposes. You see it in hedge rows and elsewhere, but I am sure in New Zealand it will yield in 25 to 30 years a good and useful timber, and so 1 think it will in this country.

1159. What are your views upon wattles?—They are a very profitable crop, indeed. You can sow wattles upon the ground aud reap a crop from them upon ground that would be of very little use for any other purpose. Just as I recommend the olive aud the carob. I have those lists, but I do not think it is worth occupying the time of the Commissioners as others have to be examined, but if there are any questions you desire to be put I shall be very glad to answer them.

1160. Will you kindly read the lists to us?—There is the Bermuda cedar, Virginian cedar, Carya porcina, Carya alba, Juglans cineres, Juglans nigra, Juglans regia, Fraxinus species, American; Pinus, various species, useful for their timbers; Salix, various species, useful for basket-making. Quercus, cork oak, and other species, good for timber. The cork oak, that, by the way, is a thing that should be largely plantedin these colonies.

1161. For the cork or the timber?—For the cork; and it is a beautiful and shady tree. I am not aware that the timber is of any value. And then there is one of our native trees, Grevillea robusta, a valuable tree, because it splits so readily, and is useful for many purposes; for tallow casks it is very valuable. It is too porous for spirit casks. I will leave these lists with the secretary, and with regard to the information necessary to be supplied as to the quantity to be produced, I shall be glad to supply that from authentic sources when the evidence is sent to me. I think I have mentioned the plants that are most suitable to your colony.

*The witness withdrew*.

Francis Abbott examined.

1162. You are Director of the Botanical Gardens in

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Hobart?—Yes.

1163. You have had experience, of course, in testing the suitability of your colony for the production of what we may call novel plants?—I have had, generally, experience in plants, but I have not gone into them for commercial purposes.

1164. I suppose you have specimen plants?—Yes.

1165. Many of those referred to by Mr. Moore?—Yes, a great many.

1166. Do you cultivate gram, millet, or lentils commercially?—We have done, to a small extent. They will grow there, but I do not think they would be a commercial success.

1167. Do olives grow with you?—Yes, they grow, but they fruit very precariously; some seasons we get a heavy crop, and other seasons none at all.

1168. Have you ever manufactured oil?—No, never.

1169. Is the fruit allowed to go to waste?—It is allowed to go to waste.

1170. Do you think this colony well suited for their growth?—I should think so, upon the hill side and poor grounds. I imagine your colony is well suited to cultivate the olive.

1171. Do you think that the colony is well suited to the cultivation of the grains the chairman has referred to?—I think so. I have no doubt we ourselves, if the matter was taken in hand, could make a success of many of them.

1172. Are your gardens used merely for experimental purposes, or for ornamental purposes?—More as a botanic garden, but we introduce, of course, all plants likely to be useful to the colony.

1173. Have you grown any of the flaxes referred to by Mr. Moore?—We have grown a few roots at a time, but not for commercial purposes; but I have no doubt it would be a great benefit to Victoria to take them largely into cultivation.

1174. Do you think they would grow with us?—I am sure of it.

1175. Has the Government of Tasmania ever offered any bonus for the production of those new plants?—None at all.

1176. Have you grown any tobacco?—It used to be grown for sheep-washing purposes—not for commercial purposes.

1177. Is it not now grown?—No; other substances have come into use for the destruction of scab, and, of course, tobacco has given way.

1178. Have you travelled in this colony much?—Yes; during the last fortnight I have been about a good deal at Sandhurst and Ballarat and other places.

1179. Has it struck you that any plant in particular could be grown here with profit now not cultivated here?—Mr. C. Moore has already named, I think, pretty nearly all the plants that could be cultivated. I imagine the flax and hemp ought to succeed well in Victoria, and mustard also.

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1180. Do you grow mustard?—We have grown it but formerly it used to be attacked very much by aphis; but of late years that appears to have died out to a great extent They are not troubled so much with it now.

1181. It is cultivated, I suppose, in large fields?—No; it never has been in cultivation in fields—just an experimental patch in the gardens

1182. That has succeeded very well?—Yes, it succeeded very well

1183. Mr. C.Moore referred to the growth of walnuts—have you the American walnut growing?—We have not to any great extent. We have the black walnut fruiting this season.

1184. Is that the American walnut?—Yes.

1185. Does the fruit grow with you nearly as large as the other?—It is about the same size, but there is more shell and not so much kernel

1186. It is more elongated, is it not, than the other fruit?—No; of course the ordinary walnuts vary very much in shape—it is about the same shape, rather rounder I think if anything.

1187. Do you grow tobacco?—Not to any extent; it has been grown for sheep-washing purposes.

1188. You have never manufactured any?—No; we have attempted it, and with pretty good success, but we have not grown it for any commercial object.

1189. Is there any plant grown with you other than the ordinary plants and grain that we grow here to which you could direct our attention as being suitable to this colony?—I do not know that there is any that has not been mentioned by Mr. Moore, with the exception of the Pentzia virgata, the sheep plant of the Cape. I think more attention might be given to that than it has hitherto received, because it is a plant that is adaptable to dry localities and will not thrive in a wet locality, and yields a good deal of herbage which the sheep are very fond of; and the mutton from the Pentzia districts always brings a higher price than any other.

1190. Have you see the plant growing in this colony?—I have not, but I believe it is in the colony.

1191. Is it propagated from seed?—Either seed or cuttings; and it is a plant that trails along the ground and roots at every joint, and could be easily propagated by division.

1192. Is it like a grass?—No, it is more like a herb, like one of the compound aster plants.

1193. How could it be introduced to the pastures here?—It would take, of course, some little trouble to introduce the plant, but when once introduced it would look after itself, for its habit of crawling along the ground and rooting at every joint would protect it from destruction.

1194. It prefers a dry climate?—Yes; in fact it will not succeed in a wet climate.

1195. Supposing now a selector wished to introduce it, how could be go to work?—He could get either seeds or cuttings or divisions of the plant, and propagate from that.

1196. If he were to sow the seed very thinly over the the selection, would he be likely to get it that way?—I do not consider it would be a safe way.

1197. How did you introduce it?—We raised it from

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seed in a flower pot, and then transplanted it.

1198. You said that the mutton from the district where the herb grows brought more money than from other places—how did the farmers there get it?—It is a native to that district. It is at the Cape of Good Hope.

1199. Have not you introduced it to your colony?—We have it, but it has not been introduced upon the runs. It has not been cultivated with a view to fattening stock.

1200. Could small quantities of it be supplied from your colony?—Yes, I could supply small quantities of it, or seed.

1201. By the bushel?—Not by the bushel; we have not grown it to that extent.

1202. What is the seed like?—Very fine seed, something like small grass seed.

1203. Have you grown any from seed?—Yes, I raised it from seed.

1204. What is the commercial value of the seed?—I cannot say.

1205. At what time of the year would you sow it?—At any season, either now or early in the spring.

1206. Does it require much moisture to germinate?—Just ordinary, such as all small seeds require.

1207. Do you think it is seed that would germinate upon the surface?—I think not—it is too fine. Of course, if you sow it naturally upon the surface before rains, it would become covered, but when the seed can be obtained only in small quantities, I think the safer plan would be to raise it in boxes and transplant.

1208. Does it seed itself upon the ground—if you were to plant say a plant on every two or three rods of a field, would it spread and the seed from it so cover the ground?—I cannot speak to that from experiment, but I

should imagine it would if the district suited the plant. No doubt nature provides for the growth of the seeds.
1209. Are you making any effort to introduce it to the dry parts of your colony?—I intend to do so.
1210. Does it yield much fodder or is it very rich in fattening properties?—It would yield a good deal of fodder; it covers the ground, and as fast as it is eaten dowu it springs up again.
1211. Does it cover the ground?—Yes.
1212. Will it stand grazing?—Yes.
1213. Grazing would not kill it?—Grazing would not kill it.
1214. It is not related to the Cape weed?—No. Of course seed could be obtained from the Cape in large quantities.
1215. It is not injurious to the soil is it?—No.
1216. Can you easily destroy it by ploughing?—Yes, easily because it does not strike deep into the soil—it runs more upon the surface, rooting as it goes.
1217. But it does not strike a root under the soil?—No, no underground stems to any extent.
1218. Is that a grass you would recommend for a dry climate?—It is not strictly a grass, it is a fodder plant. It is one that I think attention ought to be paid to, because I think it would suit the colony very well.
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1219. Is it good for dairying?—I catmot say as to that; it is more spoken of as a sheep food.
1220. Have any of the sheep farmers examined it and what do they think of it, if they have seen it?—I have not heard any of the reports. It is grown, I believe, to a small extent, in one or two parts of the island, but I have not heard what is thought of it but it? reputation at the Cape is well known.
1221. Do you agree with Mr. Moore's views upon the subject of the fruits suitable to this colony?—Yes, I think so. Nothing struck me that I would differ from him upcu at all.
1222. You grow fruit extensively in Tasmania?—Yes, the ordinary
1223. Do you adopt any method of preserving and drying them?—No, nothing beyond ordinary jam-making at present.
1224. Have you not gone into drying apples upon the American system?—No, not at present; but no doubt it will have to come, for the markets get glutted now, and there is no outlet for them.
1225. Have the orchards there gone into cider-making at all?—Not lately. There does not appear to be much demand for cider.
1226. It has been tried?—It has been made.
1227. Is the production of fruit now in excess of the demand?—It has been the last season or two. The small fruits, raspberries, this year have been allowed to rot upon the orchards, because they would not pay.
1228. What is the commercial value of a hundred-weight of raspberries?—We are giving from ¾d. to 1¼d. a pound for them.
1229. I should think they would want a very large proportion of that to pick them?—That is just it. It used to cost fd. a pound to pick them, and therefore this year they were allowed to drop from the canes in large wuantities.
1230. Is it the same with currants and gooseberries?—Yes. This season they are all at a discount—and plums were two or three shillings a bushel—you could not get much more.
1231. Were they saleable at that price?—Yes, any quantity at 2s & bushel if they were in good condition, but they would only take the best fruit for that.
1232. For jam-making?—For jam-making.
1233. Have you any idea what number of bushels an acre would yield?—It is almost impossible to say, for the crop varies so much, according to the soil and locality, but you might get from 50 to 200 bushels to the acre, according to the age of the trees and the quality of the soil.
1234. Is there an increase in the area now being put under fruit?—In fruit trees there has been a great increase in the last few years.
1235. And are the older orchards being destroyed?—Many of them—many, no doubt, will he destroyed now on account of the codlin moth that has got such a hold upon them, and I do not think it is possible to clear some orchards.
1236. Are not you putting the Act in force?—It is a dead letter at present. Several districts have declared themselves to be clean districts, but no action has been taken in reference to the others.
1237. Is orchard land of special value with you?—Yes
Francis Abbott, *continued*, 5th April 1886.
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1238. What is it worth per acre, say in a good season, on a line of railway?—You mean the purchase value?
1239. Yes?—That varies very much indeed—from £50 to £200 an acre for good orchard ground.
1240. Can you find persons to purchase ground at £200 an acre to grow fruit?—Not fresh unbroken laud—I

was speaking of an orchard.

1241. Orchard land—what is that worth?—That would be about £50 an acre, I suppose, near a line of railway.

1242. I suppose those would be the rich bottoms, valleys, and so on?—Yes; not exactly bottoms, but rich lull sides, with slight undulations.

1243. Are you still planting fresh areas every year?—At present they have been planting largely.

1244. Do you think that this colony, or portions of it, is as suitable for growing fruits as Tasmania?—No doubt there are portions of it that would be, but, speaking generally, I imagine the hot winds would interfere very much with the production of fruits.

1245. Have you no hot winds in Tasmania?—We have a few, very slight.

1246. Do you think this colony is well adapted for the growth of raisin grapes?—Yes, I think so.

1247. And oranges, and lemons, and citrons?—I cannot speak much of oranges and lemons, but I imagine upon the lighter soils the oranges and lemons would do well where they have sufficient moisture.

1248. If YOU were going to engage in the cultivation of fruits in this colony, what part would you go to?—I am not sufficiently acquainted with the colony to say.

1249. Do you grow grapes for wine?—Not for wine, no.

1250. Only for fruit?—Only for fruit.

1251. Is the area under vines increasing?—I do not think so. With the exception of Maria Island, which has been taken up by Mr. D. A. G. Bernacchi, I do not know of any increase.

1252. Are they planting the vineyards there?—Yes, I believe the vineyards.

1253. Are there any planted now?—Yes, I believe he has planted a good many thousands this last season.

1254. Have you seen them?—I have not seen them, but from report. I believe they are doing very well.

1255. What timber trees would you recommend the introduction of here?—I have no doubt that the redwood of America would do very well, but I should imagine it would be upon the moister grounds; naturally, I think it grows in swamps in America, and upon the alluvial flats.

1256. Something the same as our red gum?—I should think so. The black walnut, no doubt, would yield very superior timber, but it would take some time to mature it. Speaking of my own plant, we have had it, I suppose, thirty years, and it is not more than 25 feet high at the present time.

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1257. And has it a thick wood?—A diameter of about 16 inches.

1258. It has a very small growth for that time, has it not; do you consider it a good growth?—Only a moderate growth.

1259. What do you think of the catalpa?—I have no doubt it would do very well on the railway cuttings in many places, and might eventually be utilized for sleepers. It is spoken of very much in America for that purpose.

1260. It is stated that they are planting catalpa along the railway lines to supply sleepers for the future?—Yes; it grows very rapidly especially the variety speciosa. I have that. The old variety did not stand long with us. It died out in about thirty years. The speciosa appears to be hardier in constitution and greater in rapidity of growth.

1261. Do you think it would be desirable to plant the catalpa along our railway lines?—I think so.

1262. Do you know any other timber that would be more suitable for that purpose than the catalpa?—No, I think not.

1263. Would that be superior to red gum?—I have not had much experience with red gum, but catalpa is said to be almost everlasting, It is soft somewhat, very rapid in growth, and used as posts it is said to stand an indefinite period.

1264. What is your view with reference to wattles?—I think it should be cultivated in every available space you have, railway cuttings and ground that is not utilized for other purposes.

1265. Do you think it is a valuable crop to any farmer?—I have not the shadow of a doubt about it; it comes on in a very short period, and there is always a revenue from them.

1266. How would you cultivate them?—I would just soak the seed and cast them broadcast upon the ground.

1267. Upon ploughed ground?—Upon ploughed ground.

1268. When would you thin them out?—That depends upon the size of the plants; as soon as they are large enough to handle.

1269. You would thin out early?—Comparatively early.

1270. To what distance apart?—To 10 feet apart.

1271. Some persons advocate allowing the wattles to grow a foot apart, or even more thickly for some years; what do you think of that?—If the timber or bark can be utilised in any way, which no doubt it can, of course upon grounds that would carry the trees it would be desirable, not otherwise; some grounds might not carry such a crop.it might be too dry for such a close crop as that.

1272. I suppose the idea there is to prevent spreading and get them straight up?—Yes.

1273. There might be a double object, one object being to keepdonn the grass so that the trees might not be destroyed with fire?—Yes; it might be.

1274. Have you cultivated any wattles in your colony at all?—No; we have so many naturally, we have had no need to do it; hut the destruction is so great we shall have to do it before long.

1275. Is not a foot or 2 feet apart too thick for the trees to stand?—The trees could not attain any great size at that distance apart.

1276. Do you think about 3 feet to begin with would be

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a good distance?—I should be inclined to thin out to 3 or 4 feet at first, and then after that thin out the more prominent trees and leave the others to go on.

1277. It has been said that certain trees take the lead, and that though they are somewhat thick, the smaller trees would remain and get age, and when the larger ones were removed they would come up in turn; what do you think of that?—They might do that, but I imagine it would have a tendency to stunt the smaller trees.

1278. It would be better you think to have them tolerably thick to run them up?—I should adopt that course myself, and then thin them out once or twice.

1279. The wattle likes plenty of moisture, consequently it would need to be a wet climate?—Yes, but not exceedingly so, only a moderate amount.

1280. Twenty to 30 inches at least?—Say from 18 to 20 inches.

1281. Does it strike you that any special plant might be cultivated here with advantage other than those ordinarily cultivated?—I do not know of any but such as have already been referred to by Mr. Moore; he almost cut the ground from under my feet.

*The witness withdrew*,

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1282. *By the Commission*.—You are the director of the

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Botanic Gardens here?—Yes.

1283. I think you have made the subject of fibres and fibre plants one of special attention?—I have given it a great deal of attention of late, in fact for some years I have prepared something like 90 kinds of fibre from introduced plants and plants indigenous to this colony, and I have here with me specimens of each fibre named, and I have also a descriptive list of them as well as dried specimens, which I will open now and show you if you wish.

1284. We shall be very pleased if you will do so—[*Parcels were produced and their contents exhibited by the witness*]?.—These are from plants grown in the Gardens, and have been prepared in a very very simple way indeed, by ordinary maceration, steeping the stems in water, rubbing off the outer covering of the bark and pulverizing them by hand; there are ninety kinds of them. These were done by the ordinary workmen in the Gardens under my direction with the help of an assistant; and I may tell you that not very long ago, just before I sent my collection of fibres to the London Exhibition, I asked an expert to examine them—Mr. Miller, the rope manufacturer here, I suppose one of the greatest rope manufacturers we have in the colonies—and he pronounced some of those fibres to be worth at least £60 a ton.

1285. Which were they?—Especially any of the abutilous and of the hibiscus tribe. Without telling Mr. Miller the names of some of the fibres, I asked him what he considered was the value of them, and he

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said he paid at least £60 a ton for fibre quite inferior to our Australian ones; those were introduced from India

1286. What is this—[*pointing to a specimen*]?—That is the New Zealand lace bark; it is useful for making twine; we have made some very good twine and rope from this. I have taken the trouble to not only dry the plant, and put a piece of fibre to each specimen, but I have also given a description of each. With the abutilon that I spoke of, those plants which are so easily grown we can produce at least a ton and a half to the acre, worth £60 a ton.

1287. What age were these?—In two years the first crop yields something like 21cwt.; we estimated that, by watching the first growth of the plant (watching its growth all through); and the second year one torn and a half.

1288. And the cost of producing it in this state?—That is a very small matter; to plough an acre of any of the abutilons I do not think it would cost more than £2 a week for three months; that is to include the making of the cuttings, planting, and ploughing the ground.

1289. Cuttings?—They are grown from cuttings very easily.
1290. What kind of soil do you use?—Any ordinary sandy soil or loam.
1291. Have you a specimen of the plant here?—Yes, here is one—"Abutilon venosum (Lemairé) Veined Lantern Flower. Order Malvaceæ, Brazil. A very fine species, of robust habit; yields a very superior fibre. Two crops of 'canes' may be readily obtained in a year in Victoria by proper management. Assuming that each plant gives an annual yield of 100 canes, the weight of clean fibre from which may be estimated at ½., this would give a gross yield of more than 21 cwt. to the acre, the plants set 3 feet apart. The commercial value of this fibre, according to experts, is from £40 to £60 per ton." The plant is well known no doubt to you all; it is found in almost every garden in the colony; nearly all the family of the plant is useful for fibre.
1292. Is the fibre got from the stem?—Yes, from the stem-bark torn off the stem.
1293. The bark or all the way through it?—The bark.
1294. Only the bark?—The bark. You cut the canes as we call them—perhaps it is a wrong name—the branches, strong straight branches, steep them in water for a few hours, and then tear off the bark, dry it in the sun, get rid of the vegetable outer coating, and there is the fibre; just simply by combing it through the machine you get this—[*exhibiting a sample*]. This is such an extensive collection of fibres that I do not know which way to set to work to mention even some of the more particular ones. Next to these abutilons, which I consider the best of all, come the sterculias, trees which grow here very readily indeed. I should say that in three years we will get fibre from some of the sterculias two yards long, especially from our Victorian one, better known as the bottle-tree.
1295. That is indigenous?—That is indigenous.
1296. How is it propagated?—By seeds.
1297. At what age would the trees bear seed?—Here I suppose a tree will take at least five or six years to bear seed. I have noticed them up in the mountains. I do not think they could be
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less than five or six years old when they produce.
1298. You speak of fibre being worth £40 to £60 a ton; for what purpose would it be used?—For rope making and anything that is useful for tying material, and it would be useful, I should think, for mixing with cotton, and with other things, and working up into clothes, and so forth. I know that some of the species of these particular plants I am now trying to describe are used in India very largely, and they are spoken of by Dr. Royle.
1299. Are there any of the fibre specimens before us that could be easily grown by an ordinary farmer?—Nearly all of them, in the most simple way. I must tell you that some of the plants which I have before you are found in the woods and forests here; they are apparently coarse grasses; they are not real grasses, but they appear like grasses. You may see sedges and things of the kind growing on the banks of, creeks and in fern gullies. These specimens we have prepared are useful fibres useful for paper-making; they could be very easily grown by divisio of the root; I speak now of grass-like plants; but with regard to shrubs, and I suppose half the fibres before you are from shrubs or trees, they could be very easily grown with very little care and attention. One or two weedings in twelve months is sufficient for them, especially if grown from cuttings, which is very simple. The cuttings may be grown in the open ground, or under glass; they are 18 inches or 2 feet long; if stuck in the ground, you will produce a shoot over a yard in length in one year.
1300. And this would produce something like £40 worth to the acre after it is made into fibre?—Yes. The first year might not and possibly would not be as profitable as the second and third years. I believe the more the plant is cut down the stranger and larger the shoots, and therefore the more fibre ever year. I think that you could not get the abutilons much stronger than they would be after the fourth year.
1301. I suppose the shoots would be cut and put under water?—The shoots would be cut, taken to a stream or waterhole at once, or even a butt, or anything that they could be steeped in, and then, just as the sugar-cane is treated in Queensland, allow the plate to shoot up again from the stem.
1302. Having steeped the stems and shoots with leaves on and everything?—Yes, the sooner they are in the water the better.
1303. You squeeze them?—No, simply leave them in the water tied in bundles, just as New Zealanders prepare flax; steep the stems in water thirteen or fourteen days; some of them require steeping longer than others; and I may say that some of the flbres upon the table require boiling; but some would strip after merely steeping, just as you strip the bark from a willow.
1304. Would you strip the bark from each stem separately?—Yes, that is the only way.
1305. Is not that a very large amount of labor—No, it is a labour for women and children.
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1306. Flax you do not strip each separately it is scutched?—No, that is beaten out; but each man would prepare a cwt. or 2cwt. of the bark in a day with his own hands, and women and children would do it just as

well; perhaps they would not do the quantity.

1307. It strips off very easily?—It strips off very easily, you just push the nails of the finger and thumb into it, and sometimes the whole bark strips off at once as you would strip the bark from a willow.

1808. Can any of the indigenous grasses be used?—Yes, a great many of them would be useful for paper-makers. We have prepared thirty or forty kinds of paper in my laboratory from Australian grasses and other plants—rough paper, of course. I did not bring the specimens to-day, because I thought these fibres were quite enough to deal with in one day.

1309. What would this fibre be worth prepared in large quantities?—It is very hard to say. I sent them to Mr. Ramsden, of the paper mills, but I never got an estimate what the value would be. He pronounced some of my paper to be very fair; but I had only very crude appliances with which to carry out my experiments. But with regard to fibres, I can speak positively, because we grew most of them in the Gardens, prepared and tested them.

1310. You spoke of one of the first as being the most profitable to grow?—In speaking of one plant I speak of a family of plants. We have fifteen or sixteen species of the abutilon; these and the sterculias—a very closely allied family—seem to be the most profitable and the most easily prepared.

1311. It is the annual shoot that you prepared?—Yes, the annual shoot; but first of all, in commencing the production, it would be necessary to have a special plantation of those things from which a stock could be obtained, so that one would have to begin two years before, at least, in getting the plantation ready. One must have a stock to start with.

1312. You would have the cutting, I suppose, a foot long?—Each cutting should be be foot long, I think. Of course, a great deal would depend upon the sort of soil you had to deal with, because, if it were a very dry soil, the deeper the cutting the better; if in a moist soil, a shorter cutting would do.

1313. Do they very readily strike?—Very readily. A cutting abutilon or hibiscus will strike if put in in the month of May, outdoors in about five or six weeks or two months at most. It may be necessary sometimes to strike cuttings in frames.

1314. And would 90 or 95 per cent, grow?—You may safely reckou upon that; they are very easily struck.

1315. Is this plant cultivated for the fibre in any part of the world!—One species or two of the hibiscus and abutilon have been cultivated in America of late years, and I really think that some hints were go from the report of the first specimens I cultivated six or seven years ago. I have read one or two reports. The Washington reportsgive me credit for introducing them. I do not think that the abutitions were ever cultivated in India before, but the sterculias, some



Indian species, were cultivated before that in India.

1316. The estimate of value has been from an expert you have spoken to here; do you know for certain that this would be worth from £50 to £60 a ton?—Yes; that is if I can depend upon what the expert has told me, and I think his name is known to you all, Mr. Miller, the rope manufacturer here; and without telling him that these fibres were Australian, nor even prepared in my laboratory, I asked him the value of the fibres. He wanted to know where I got them, and I said, "No, nothing, till you tell me what you consider to be the value of the fibre here." He said, "I may tell you this, that I paid £60 a ton for fibre not a bit better than that." "Now, will you be good enough to tell me what quantity of fibre you can produce here upon an acre of land?" The thing I have thought seriously of since is, that it would not be a bad idea to form a company and grow these plants upon an experimental farm. Indeed, I would willingly be one of a company, as I have faith that it would be a success. Why, even if we only got £30 a ton for those fibres so easily grown in poor, sandy soils, it would be profitable enough.

1317. Would it grow better in good soils?—Much better; there would be larger canes, and more moisture in the plant, and the preparation of it would be easier in every respect. It is always the case with fibre plants.

1318. Do you think with irrigation it would be better grown?—Decidedly.

1319. Do you think it would do without irrigation?—Yes, but the yield would not be so much. With irrigation I consider you would get two-thirds more of a crop.

1320. Would it grow well in heathy country?—Yes, if well drained; drainage is a necessity to the cultivation of almost everything except bog plants; some of those are bog plants, and some of these fibre plants grow upon the hills. One species is a zerotus, another a cyperus; those will grow upon the hills, and give a very silky fibre; I have them here amongst these samples. The dracænas too are valuable; here is one very valuable, and I daresay it will be interesting to Mr. Moore—a plaut of the same order, Doryanthes excelsior, the spear lily of New South Wales and Queensland; both species produce very fine fibre indeed.

1321. How is that propagated?—By division of the root.

1322. It is something like the New Zealand flax, is it not?—It is not at all unlike the New Zealand flax, and will grow upon dry hills.

1323. What quantity would you get out of an acre, do you think?—The way we had to go to work in making an estimate was very difficult: we had to count the number of leaves upon the plant; when we had to be guided only by the growth of one plant, it is very difficult to estimate, but I think we reckoned it at about 16 cwt. to the acre; not being so fine a fibre as some of the others I have brought before you, I think it would be quite equal to the Pita hemp of America, made from the agave; indeed we twisted it and tested it by putting weights upon it,



and found it quite strong. It was my intention to have asked a few experts to test this fibre before you, so that you could hear exactly their opinion, and particularly Mr. Miller; in fact, he has not had a chance of seeing one half of those fibres.

1324. Would it be profitable to cultivate this fibre as against the fibre, say, of New Zealand flax, that grows so plentifully in New Zealand?—We all know that New Zealand flax is a very valuable fibre, but sometimes there is a great difficulty to get rid of the gum that exists in such quantities in it, and I read lately a paragraph somewhere that a chemist had found out some acid by which he could get rid of this hard substance. We have prepared samples of fibre of that, and I know from experience that we had to boil it sometimes twenty-four hours before we could tear it to pieces. The ordinary cold water steeping is not good enough to prepare New Zealand flax. It does very well for the New Zealanders, who simply make a rough rope of it.

1325. Would boiling take it out?—Boiling does not take it all out.

1326. Would that injure the fibre at all?—That is one particular point; sometimes you have to boil it so much that you do injure the fibre, but we have fibres quite equal to the flax that will grow far more readily. You could not get a crop from New Zealand flax in two years, or even three, in this climate; you might in four years. You see the great advantage is to have something that would grow quickly and turn out a profit soon.

1327. Have you any English flax here in this collection?—No, I rather went in more for plants near us. I have tried our Australian linum. We have produced a very pretty and silky flax from that. It is a common weed.

1328. Does it bear a seed?—Yes, very much like the English linum usitatissimum, its flower is blue. It is very pretty, and we originally grew it for a garden flower. The dracamas grow in almost every garden here, called by some people palm lilies. They belong to the lily tribe. Here is a specimen of it; there are many species. We find these grow very readily here, and those would be quite equal to jute in strength and quite as easily worked. Speaking of fibres, we tried jute the first year I came here. I tried it, aud I found that it made a wonderfully quick growth. I found jute five feet high in four months. Of course it is a summer crop; the frost is injurious to it. When I was up in Carpentaria, some three years ago, I noticed in my rambles across from Cooktown—I went that way with some black trackers, and noticed nine or ten species of jute between Cooktown and the Dividing Range—the Indian jute.

1329. They must be indigenous to the continent?—Yes.

1330. What is the seed like?—It is a little four-valved, or sometimes five-valved, pod; it belongs to a very interesting family.

1331. Do you know the commercial value of jute fibre per ton?—No, I do not know, but Mr. Miller, who I hope will attend one of our meetings here, will be able to settle that matter.

1332. Have you any idea "what quantity of jute fibre

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you can get to the acre?—I never had an opportunity of testing it. Had I known so much of cultivation of fibre when I had the jute I would have found it out somehow, but we had a want of water in the Gardens at that time, and I lost it, but I mean to try hereafter; but when I tell you there are fibres among these said by experts to be equal to jute, and more easily grown, I hardly think it is worth while to pay attention to jute, except as a summer crop.

1333. Is jute grown largely in India?—Yes.

1334. How is it grown there?—The seed is sown broadcast. I believe they prepare the soil very well. They plough it, and harrow it, and brush harrow it, and sow broadcast. It is like wheat, when you sow it thick it runs up to stems, often five feet high.

1335. Do you know how it is prepared?—What I have read of it is that they prepare it by simply tying it up in bundles, leaving it in water so many hours, taking it out and preparing it by machinery. Of course cultivators find a very rapid way of preparing fibres when they make up their minds to grow them as crops; I should very much like to see fibre-growing tried here, and I think if the Government are satisfied with what I tell them about these fibres, they should offer a reward for the first few tons of the best kinds now produced.

1336. The consumption of jute fibre is enormous, of course?—Yes, I believe it is; but they are finding out so many other fibres now that are quite as good as jute.

1337. Are not all the sacks, and gunny bags, and covers, made from jute?—I do uot think they are all made from pure jute; I think a great many other fibres are mixed with them, for I have torn many bags to pieces myself, and examined pieces under the microscope, and I find they differ very much indeed, just as much as the bast of the mallow differs from one of the fine fibres of the abutilons.

1338. The price of manufactured jute in bags is very low indeed, and any fibre produced here would have to compete with it, would it not?—I think some of our Victorian grown fibres would run jute out of the market altogether, and that I believe is the opinion of Mr. Miller. I have written a very short paper upon fibres that would not take many minutes to read, and would throw much light upon the subject, I think. I have also written a paper upon oil-producing plants.

1339. From the description of some of those plants, it seems to me that they would do admirably upon the Murray Flats?—I am sure they would do upon the Murray Flats; I have an eye upon the Gippsland Flats, where the hop grows so splendidly, and I think most of the fibres would do there, and all through Gippsland, both upon the hills and upon the river banks.

1340. Of course the Murray climate is very different from the Gippsland climate?—It is; but I think the abutilons, hibiscus, mallow, and cordylines or dracænas seem to adapt themselves to any climate. The cordylines are nearly all natives of New Zealand, from which fibre is prepared, and they do just as well here.

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1341. Will you kindly read the paper which you said you had prepared?—Yes, I shall he glad.—[*The witness produced and read the same, as follows*] :—

*"In the minds of many, if not of most, of those persons who have not devoted the attention to the subject, it deserves the material productive wealth of Victoria and, in fact, to a greater or less extent, of the whole of the Australian colonies is comprehended in the three articles, gold, wool, and wheat, inclusive to a lesser extent of tallow, hides, coal, wine, potatoes, barley, maize, and other'cereals may, perhaps, not be surprising that there should be a large amount of ignorasnce with regard to this matter in the minds of the great bulk of the population in Great Britain, considering the paucity of the information available on the subject, and considering the lamentable, if not culpable, ignorance of things colonial by no means unfrequently displayed in high places; but that there should exist such a lack of knowledge on such an important subject in our very midst, is somewhat surprising, and not more surprising than it is to be deplored. True it is that of late years the eves of many of our agriculturalists have been opened to the fact that the soil and climate of Victoria are suitable to the cultivation of a large number of vegetable products hitherto unthought of; and although some of these have received considerable attention, and been grown successfully, still the list of new industries worthy the notice of the farmer is by no means exhausted. Prominent among these is the one which I have the honour to bring under your observation, namely, the fibre-producing plants, a complete list of which from which fibres have been prepared at the Melbourne Botanic Gardens laboratory, I beg to lay before you, together with a number—about 90—of specimens, showing the natural leaf or stem of the plant, and the fibre produced therefrom. It will be observed that great proportion of these plauts are indigenous to one or more of the Australian colonies—very many to Victoria—and that in all cases they may be grown with more or less success in this colony. It is unnecessary, nor even did time serve, would it be requisite for me to enter into a detailed description of the entire collection, and I therefore restrict myself to a few general observations on the whole subject, particularising a few kinds which I think might be grown in Victoria with advantage to the colony and profit to the producer. Varieties of these plants may readily be grown in all parts of the country, some delighting in rich loamy soils others in wet clay of alluvial mud, and others again in light sandy ground. The preparation of the fibre is simple in the extreme in most cases, being simple maceration or steeping in water tor a sufficiently long period, usually eight or ten, but sometimes thirteen or fourteen, days, and then scraping with a knife or other implement, an operation easily performed by children or other persons not sufficiently strong to perform the more laborious avocations of a farm, and affording them light and profitable employments. Of the value of these plants from an industrial point of view, there is no doubt, and it may suffice if I mention that I have from time to time submitted specimens of prepared five to various experts in Melbourne and other places, all of whom agree that they possess a high commercial importance; one of these, a gentleman deeply interested in the matter—in fact, one of the largest, if not the largest, manufacturer of rope, cordage, &c, in Australia—speaks in the very highest terms of tho sampel shown him, and assures me that some of the fibres produced from the Victorian-grown plants have a current value raiding up to £60 per ton. Take the veryfirst specimen submitted as an example, the Abutilon Bedfordiarnum, or Duke of Bedford's-Lantern Flower.' This plant grows very rapidly in this colony, especial with the aid of irrigation. The fibre is prepared by simple maceration of from serven to ten days or more, according to temperature, and with good cultivation aided by irrigation, may be produced at the rate of from 15 cwt. to a ton per acre of good quality, and worth £30 per ton. The second specimen, the Abutilon venosum or Veined Lantern Flower." yields a very superior fibre of more than21 cwt. to the acre, which will realise from £40 to £00 per ton. In fact, all the abutilions are of high value, and may readily be grown in these colonies. The agaves or 'American Aloes,' of which three specimens are submitted, grow freely in most parts of Victoria, and yield a strong and useful fibre, differing in quality,*

*however according ing to the variety. It is prepared by bruising and macerating the lives boiling or steaming. The Anigozanthos flavidus, or 'Swors Lily' produces as much as 38 cwt. of fibre to the acre. It is prepared by boiling in a caustic solution until the outer coating of the leaf is sufficiently digested to admit of its easy removal by scraping with a knife. It thrives in a sandy loam, aud may propagated in an limited quantities by division of the roots aud from seeds. The corchorus, or 'Jutre' has a considerable number of varieties growing in Australia, some*

*W. R. Guilfoyle, Esq. continued, 5th April 1886.*

*of which will doubtless prove of commercial importance. The Canna gigantea, or 'Large Indian Shot Plant/ grows freely in the warmer parts of Victoria, and produces a strong fibre, closely assimilating to Manilla hemp. The rhizomes furnish a good kind of arrowroot; the refuse from the root stocks, after the arrowroot has been extracted, can be converted into strong paper, as has been demonstrated by experiments at the Melbourne Botanic Gardens laboratory. Of the well-known cordylines, or 'Palm Lillies,' eight specimens are submitted. These (especially the Cordyline Australis, and the Cordyline indivisa, which frequently attain a height of 40 feet, and which yield two tons of fibre to the acre) are well adapted for the manufacture of ropes and other materials requiring strength, the refuse or tow furnishing a good paper pulp. The Maoris use the two varieties named for making the matting or cloth known as 'Toii.' The doryanthes, or 'Spear Lilies' of New South Wales and Queenslaud, yield as well as a fibre useful for rope, coarse cloth, brush, and paper making, a dye or pigment, somewhat resembling dragon's blood, which may yet prove of commercial importance. The well-known Phormium tenax or 'Flax Lily,' of New Zealand, grows freely in Victoria, and would, there can be no doubt, amply repay cultivation.the more so as land of little or no value for other purposes, such as swamps and tracts of country subject to floods, might be utilised for its growth. It produces, as is well known, a fine strong fibre of recognised high commercial value. In these remarks, I have selected for special mention some of those plants which are perhaps best known. At the same time it must by no means be imagined that the others are of no importance—are not in point of tact, many of them, of equal commercial value. The specimens I have the honor to submit, and the remarks thereto appended, will, I venture to think, prove to the contrary. The fibres have all been prepared from plants either grown in the ordinary way in the Melbourne Botanic Gardens or collected in the forests, and have been extracted from the leaf or the stem, as the case might be, without any special appliance out of the reach of the ordinary farmer. As I have previously pointed out, any of the plants named will grow freely in Victoria under suitable conditions, and one great advantage they possess is that they will flourish in land partially or totally unfit for other purposes, while another is that the preparation of the fibre is so simple that it may be performed by children, requiring as it does neither skill, strength, nor expense. The cultivation requires no great expenditure of labour, no great outlay of capital, and no particular attention while growing, while the profits are sufficiently remunerative and tolerably certain. In fact, I venture to question whether some of our farmers whose land is not of high-class quality, and who do not find wheat-growing a profitable undertaking, would not be wise if they, to a considerable extent, were to abandon the cultivation of cereals that will not pay for the growth and preparation of fibre that will. At all events, I have no hesitation in saying that every farmer would find it to his interest to utilize such odd lots, such as swamps, creek banks, edges of lagoons, mud fiats, sandy patches, or other comparatively useless places he may have on his land for the cultivation of one or more of these plants, which would require so little care, time, and labour to yield him a remunerative return. The following list is descriptive of the various fibre-producing plants now growing in the Melbourne Botanic Gardens, giving the scientific and popular name and habitat, and in many cases the most suitable soil, method of cultivation, quantity of product and value, and mode of preparation of the fibre."*

That alludes to this descriptive list which I have here.

1342. Perhaps you would place at the disposal of the Commission the list you have referred to?—I shall be most happy; but I intended, after reading this paper, I would detach these slips and pin them together for publication, if necessary. They have the botanical and common names and description of plants, how grown, what soil, and how the fibre can be prepared—all particulars about them. This has been a labour of love to me. For the past thirteen years in Victoria I have paid a good deal of attention to these things. This is the result, and I hope to hear, after the London Exhibition is over, that all who are interested in fibre plants will approve of such a collection.

1343. You spoke about some flax that you have here, a native flax?—Yes.

W. R. Guilfoyle, Esq. *continued*, 5th April 1886.

1344. You spoke of it as having a blue flower?—Yes

1345. Do you know the Ordinary wild flax which grows so plentifully in most parts of the colony; it bears a blue flower?—Yes, I know it. There are three species of flax indigenous to this country; two of the species, I think—I am not quite sure—very likely Mr. Moore can set me right upon that point, but I am not sure whether the white one is not found in New South Wales, but the blue one I have seen I never thought much of as a fibre plant for quantity, The fibre however is silky.

1346. The blue flower has a great deal of seed?—Yes, it produces a great deal of seed.

1347. You said you had another paper upon other plants?—Yes, but it is a very lengthy paper; I shall be happy to read it if you iike. I may tell you what it treats of—some seven or eight kinds of oil-producing plants, the olive and sun flower, the sesame, ground almond, the castor oil plant, and others.

1348. Perhaps it would be rather too much to expect from you to read that to-day, but as it is so important a matter, the Commission would be very glad to get the information. You can supply us with it upon another occasion?—Very well.

1349. We have some specimens of olives grown up at the Dookie fann, and you see the state of growth they are in now?—Yes.

1350. The names are all carefully recorded in the farm journal, but unfortunately they were planted without any labels, consequently we do not know which the name refers to, and the question I want to ask is what would be the best means of getting these names attached to the proper plants?—The best plan, as far as our collection is concerned, would lie to collect your specimens and send them as fresh as possible to the gardens during the time that olives are bearing. We have something like thirty correctly-named species. Possibly this is a seedling; I do not recognise that as a named species.

1351. It is specially imported?—Their name is legion; you know, like apple trees, they are always rearing new varieties; we may not be able to name it. The most like it is one we got from Sir Samuel Davenport; it is now, I believe, fruiting in the gardens. I may be allowed perhaps to take a portion of this specimen and compare it; but I must say what we saw the other day at Sandhurst were some splendid olive trees there. The trees did not seem to be more than six or seven years old, and the fruits were very large. It would take five of these fruits to make one of those.

1352. Have you seen the trees at Dookie?—No, I have not been to Dookie. I promised myself to go there. Those specimens at Sandhurst were very prolific.

1353. Do you remember the kinds imported by the Government, did they pass through your bauds when going to Dookie farm?—I do not think they did. I found in the garden about ten or twelve species when I went there, and I increased that by something like twenty others or more. I got a number from Sir Samuel Davenport, and a number from Mr. E. B. Heine, who was very fond of cultivating the olive, and I imported some very fine kinds myself from Spain; and, in

W. R. Guilfoyle, Esq. *continued*, 5th April 1886.

laying out the new portion of the Gardens I intend to make a plantation of olives and to move some from the bank of the lake. It is far more easy to remove an olive tree than many imagine. You can transplant them at almost, any age. I have removed them, at any rate, at fifteen years old.

1354. Of the fibre plants which are so numerous I am not quite clear as to the sort that you would recommend as being the most suitable to commence with by a selector to cultivate, the one, two, or three kinds which you would specially select, and the districts in which you think they might be tested in the first instance?—I would recommend abutilons. I lay more stress upon them than any of the others because of their silky and easily worked fibre. There are seven or eight species of them. I think here upon the flats, or in places where we could irrigate upon the sides of hills, they would do just as well. And the same remark applies to some of the trees. Some of these fibre plants would grow without any trouble, such as those Queensland Doryanthese, for instance, upon swamps or bogs of no use for any other cultivation. I think they would do well there, but I am sure most of them can be made to grow where irrigation cannot be got, and yield a plentiful crop, an abundant and paying crop.

1355. You think irrigation is very desirable to increase the producing power of fibre?—Of anything, but fibres in particular. I think when Mr. Miller is asked as an expert his opinion of the value of these fibres, and what he could use them for, then would be the time, perhaps, to-mention the particular plants and their culture; but I know that these things would succeed.

*The witness withdrew*.

*Adjourned sine die*.

# Tuesday, 13th April, 1886.

*Present*:

- The Hon. J. F. Levien, M.L.A., in the Chair;
- Charles Yeo, Esq.,
- James Baird, Esq.,
- The Hon. W. Madden, M.L.A.,

- D. Martin, Esq.,
- Joseph Knight, Esq.,
- The Hon. J. Buchanan, M.L.C.,
- Andrew Plummer, Esq., M.D.

James Miller examined.

1356. *By the Commission*.—You are the proprietor of

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large rope works and jute factories here, are you not?—Yes.

1357. You manufacture a very large quantity of different fibres annually?—Yes.

James Miller, *continued*, 13th April 1886.

1358. Several hundred tons, I suppose?—Yes, several hundred tons.

1359. Have you seen any of the fibre that has been prepared here by Mr. Guilfoyle?—I saw one sample of fibre prepared by him. I saw several samples, but I think I only saw one merchantable sample.

1360. We shall have the advantage of showing some to you presently. You have some fibres with you to-day, I believe?—Yes—[*producing the same*].

1361. What is this fibre?—That is Italian hemp—a hemp grown in Italy.

1362. Is that largely used by you?—It will be for the future.

1363. What is manufactured from that?—All sorts of things—best cordage, twine. We can manufacture it into canvas.

1364. Is it largely consumed?—I may state that fabrics similar to linen can be made from it.

1365. What is that worth per ton?—That is worth £40 a ton.

1366. In its rough state?—Yes—£42 10s.

1367. By "in its rough state," you mean in this condition?—Yes.

1368. What name do you give to it in that condition?—Just its ordinary raw condition.

1369. Unscutched, is it?—It cannot be used without being scutched.

1370. Is this an annual plant?—I believe so.

1371. Do you think it would grow in this colony?—I do.

1372. In the Northern area?—I think in parts of the Goulburn Valley it would grow very well.

1373. Are you aware whether the plant requires much moisture?—I believe it does—considerable moisture.

1374. And heat?—Yes. It grows in all parts of Italy.

1375. Do you know how long it takes to mature?—No, I cannot say that.

1376. Is it largely grown in Italy?—Very largely grown in Italy.

1377. Is it not a most valuable crop?—I dare say.

1378. Is it not a leading crop with them in Italy?—I should think it was.

1379. Have you any idea of the quantity produced in Italy?—No, I have not.

1370. Could the seed of it be obtained here?—I should think so, but not without importing it.

1381. Is this the same plant as that which produces the ordinary hemp seed of commerce that we see here?—I think so.

1382. That is a little round seed about as large as a tare?—Yes, I think it is the same seed.

1383. Is the seed valuable for feeding purposes?—-I do not know anything about that; I know that oil is extracted from the seed.

1384. Do you know whether it is costly to prepare to this stage?—I should think not. I do not think it can cost much to prepare; but I do not know much about it at all.

1385. You do not know the process that is adopted?—I think just the ordinary process. The hemp is pulled and steeped in a tank for six or eight days to get a sort of fermentation to make the

James Miller, *continued*, 13th April 1886.

woody part separate from the fibre—[*producing a sample*].

1386. This is the woody part?—Yes.

1387. You do not know whether that has been tried in the colony?—No, I am not aware, except I have seen small parcels growing in the Botanical Gardens.

1388. Do you know the Italian rye grass?—Yes.

1389. You know it grows much taller and larger than the English rye grass?—Yes.

1390. Would the Italian hemp be as much larger and stronger than the English hemp?—1 should think so, but I do not think any hemp is grown in England now; it was grown at one time, but it is not now. Hemp is largely grown in many parts of Europe, but the Italian is the best hemp. This sample—[*producing another*]—is grown in Norway, Sweden, Germany, and Russia.

1391. Where is this from?—From Russia.

1392. What is this worth per ton?—A very little less than the Italian. That is a good useful fibre too.

1393. Is it pretty uniform in staple, all that is produced in Russia?—No, there are various qualities; this is about the best, we can import.
1394. What is this worth per ton?—From £35 to £40 a ton.
1395. And the Italian?—From £40 to £42 a ton.
1396. In point of strength, which is the stronger?—The Italian, that is why the difference in value exists. Italian hemp costs more to manufacture than the Russian hemp; it is of a finer quality.
1397. Is that owing, do you know, to any difference in the variety of the hemp or more to the different treatment?—It seems that the hemp that grows in Italy has a solider softer sort of nature: there is a freeness and springiness about the other fibres that is not at all characteristic of this.
1398. The consumption of hemp is not nearly so large as the consumption of jute, I suppose?—No, jute is a much larger article than hemp.
1399. But could very large quantities be consumed?—Yes.
1400. Say a few thousands of acres in the year?—Yes.
1401. Of either of the hemps?—Yes, of either of the hemps.
1402. Do you know how much an acre would produce?—I think about half a ton.
1403. Do you get seed also as well as the fibre?—No.
1404. If you grow one you cannot grow the other at the same time?—At first, when we commenced rope manufacture, we did import some seed.
1405. But I ask this, would the crop that produces fibre, at the same time and at the same crop produce seed also?—No, it is like growing hay and corn from the same crop; the hemp must be pulled for the fibre when it begins to grow yellow at the roots.
1406. Just turning?—Just turning.
1407. It is chiefly from Russia and Italy that you import?—No, our principal hemp is from Manilla; but those kinds are best adapted for growth in this country.
James Miller, *continued*, 13th April 1886.
1408. Do you know how much is imported annually?—No, I do not know, but I believe it would be £8,000 or £10,000 worth annually.
1409. £38,648 worth?—But that includes Manilla hemp and jute.
1410. No, jute is separate?—Then it would include Manilla hemp as well. That includes all sorts of hemps.
1411. You think that hemp might be grown here to advantage?—Yes, I am perfectly satisfied it could.
1412. It requires moisture and heat?—Yes, it requires moisture and heat. I think any well irrigated farm could produce good hemp.
1413. But it takes a lot out of the land, does it not?—I do not know much about it, but I should think where a great long plant like that fibre is grown, it must be very exhausting to the soil.
1414. You have some jute here?—Yes. I do not know anything about its culture, but it requires a great quantity of moisture. I believe it would grow here.
1415. Is that also an annual?—Yes : and it grows very quickly. It is only six or eight weeks; that is all. A gentleman from Calcutta told me the other day it took six weeks to grow.
1416. What is it worth?—From £12 to £15 a ton, according to the quality.
1417. Do you know the yield per acre?—No.
1418. Would it be more than that of hemp?—I could not say; but I should think it would grow about the same.
1419. It is a coarser thing, is it not?—No, not coarser at all; it is equally soft.
1420. It requires great heat, I believe?—Yes; Manilla hemp is the same way.
1421. You do not know whether jute has ever been tried in the colony?—Yes; Mr. Bosisto told me it grew well in the colony. He brought down a great quantity of seed, and I tried some in our back garden, but we could not get it to grow.
1422. Is the seed similar to the hemp seed?—No, it is a little black seed.
1423. Perhaps it requires soaking, perhaps even in warm water?—It might.
1424. You have some flax here?—Yes.
1425. Was that grown here?—It was grown in Adelaide.
1426. Is it grown there very largely?—No, not very largely. We bought three tons and a half of Adelaide growth, and paid £37 a ton for it.
1427. It has been tried in the colony, I think?—Yes; better flax than this has been grown in the colony.
1428. Was it successful commercially?—At the time there was not much demand for it.
1429. Would it require machinery to bring it to this state of perfection?—No, I do not think it would. I believe that in France they have discovered some means for dispensing with steeping altogether now. They have some chemical application instead of steeping.

1430. And the outside wood is decayed?—No, the inside

James Miller, *continued*, 13th April 1886.

wood is decayed.

1431. Can you produce the seed and the fibre of this?—No.

1432. The same condition applies as to hemp?—Yes; a rough sort of flax is produced to get the seed, but it is of no use, comparatively speaking, as an article of commerce.

1433. Is there only one variety of flax?—There are lots of varieties. It varies from £120 a ton. Samples of Belgian flax were here on exhibition in 1881 at the price mentioned, viz., £120 per ton; it is used for fine lace.

1434. But are there different varieties in sort?—I do not think so.

1435. It is all the one seed?—I think so; that is, it is all the same family of plant.

1436. I think I have seen flax seed of different sizes, some very large flax seed, two or three times as large as the other?—Yes.

1437. Is it a stronger variety that is used for growing this fibre than the ordinary variety. Of course you know it is grown very largely in Ireland?—I know it is very largely grown in Ireland, and it is grown very largely in Russia, and it is grown very largely in Belgium and in America.

1438. The seed is imported here, I think, from India?—Yes.

1439. Are those the leading fibres that can be produced in this country?—Those are the leading fibres that can be produced in this country.

1440. Of all, you seem to place more weight upon the Italian hemp?—Yes, and the Russian hemp too. If we can get good agriculturists, we should be very glad to sustain a certain amount of expense in experiments ourselves.

1441. To import the seed?—Yes, and to bear part of the expense of cultivation.

1442. Would it be possible to obtain any information as to the process of sowing and growing and dealing with it generally?—I should think there are any quantity of books to be found in the Public Library connected with agriculture that all the information could be got from.

1443. It requires floodings up to at least fourteen inches per annum to grow hemp successfully. You must have irrigation?—You must have irrigation.

1444. As to the use of flax, I believe it is only imported here as twine for a binder. Will you tell us which is the most generally used, the Manilla or this, for that purpose—that is to say, harvesting?—McCormick's machine uses Manilla almost exclusively. The Woods' machine, I think, prefers this, though they use the other; and the same with the Horns by machine.

1445. Those are the two kinds that are generally used, and Italian hemp?—Yes, and the Russian hemp. This is the sort of fibre that is used for the Woods' machine principally, twine made from this.

1446. Is it largely consumed for that purpose?—Yes.

1447. We would like you to give us your opinion upon the fibres that were presented to us the other day by Mr. Guilfoyle.—[*Mr.*

James Miller, *continued*, 13th April 1886.

*Guilfoyle produced certain samples and handed the same to the witness*.]

1448. *The Witness*.—But in a large part of Russia where hemp is grown they cannot have fourteen inches of irrigation.

1449. But they may have 40 or 50 inches of rain though?—In that case they would not require irrigation.

1450. Are there any of those fibres of Mr. Guilfoyle's that strike you as of commercial value?—Yes. This fibre would be very good, I should think, for brushes.

1451. Which fibre is that, Mr. Guilfoyle?

1452. *Mr. Guilfoyle*.—Yucca.

1453. *The Witness*.—We could spin that stuff.

1454. Have you any idea of what the value of that would be?—I could not say; it is a new fibre. This is better; it is softer.

1455. What is that fibre?—I do not know.

1456. *Mr. Guilfoyle*.—That is another kind of yucca, the Yucca gloriosa, the Mexican hemp.

1457. Is that an annual?

1458. *Mr. Guilfoyle*.—No, a perennial; in a few years you can grow a plant eight feet high, 200 leaves to each plant.

1459. *The Witness*.—We import some of this hemp; we have four or five tons of it coming now. It is taken from Mexico to New York, thence to England, and thence sent here. It costs us £25 a ton laid down here; but in England it is only worth £18 or £19 a ton. But it is not known to me by the name of Yucca gloriosa. This is a short fibre. The fibre is valuable according to its length. That is a good fibre.

1460. *Mr. Guilfoyle*.—That is Yucca aloefolia; but this happens to be rather a short sample.

1461. *The Witness*.—I should say that is not ripe—it is too green.
1462. *Mr. Guilfoyle*.—What do you think of that cerotis, or tussock grass, for paper-making?—It may be good enough for that. It is pretty strong.
1463. Now come to some of the fibres you examined long ago, the xanthorrhea?—They use that in New South Wales.
1464. The Victorian bog grass, a native grass, or rather a rush; it is not a grass.
1465. *By the Commission*.—Is it plentiful?
1466. *Mr. Guilfoyle*.—Very plentiful. We find it covering the hills towards the Yan Yean—hundreds of acres of it.
1467. What is that worth, Mr. Miller?—Not much; it is too weak.
1468. *By Mr. Guilfoyle*.—For paper-making?—It might be tor paper-making.
1469. Now, that bulrush, Typha angustifolia?—That is found upon the margins of swamps.
1470. *By the Commission*.—Several of the fibres you are passing you do not express an opinion upon, because they are not for rope-making purposes?—No.
1471. But they may be worth something for other purposes?—Yes.
1472. *By Mr. Guilfoyle*.—This is one of the bottle-trees;

it grows very freely here indeed; will you kindly test that?—That would make a sort of cordage or rope; but my recollection of it is, that it would be so scattered that it would cost more to get it in quantity than to cultivate good hemp in the field.
1473. We could not get a crop of that under three or four years. It happens to be the bark of a tree, but it grows very quickly, say in three or four years it would produce a very good crop of bark?—We have dressed some of this before now. It is not a bad fibre.
1474. *By the Commission*.—What fibre is that?
1475. *Mr. Guilfoyle*.—It is the flame-tree of New South Wales and Queensland, a much quicker grower than the one Mr. Miller passed an opinion upon just now.
1476. *By the Commission*.—Is that a good fibre?
1477. *The Witness*.—Very good.
1478. What is that worth per ton?—I could not say; it requires some test to be made; but it dresses something similar to Italian hemp.
1479. *By Mr. Guilfoyle*.—This is the African hemp, which would produce a ton and a half to the acre easily, and with irrigation two tons to the acre?—That is a very good fibre indeed.
1480. *By the Commission*.—Is the seed of that like the ordinary hemp imported here?
1481. *Mr. Guilfoyle*.—No, it belongs to a different order. It belongs to the order sterculiaceae.
1482. Is African hemp a more prolific crop than the other hemp?
1483. *Mr. Guilfoyle*.—Yes; it could be realized in much greater quantity. It is a shrub. If cut down, it produces a crop every year.
1484. It is perennial, not annual?—Yes.
1485. *By the Commission*.—What is that sterculia hemp worth, Mr. Miller?—Probably £20, at any rate.
1480. It is better than jute?—Yes, indeed; but I do not know whether it could be spun with the same machinery as jute; it is hard and harsh by jute. If we had a hundredweight of any kind of hemp we could dress it.
1487. *Mr. Guilfoyle*.—By steeping this bark for seven or eight days in water, a stream or creek or water hole, we can produce an enormous quantity of fibre in a day or two—simply maceration, no soda or anything?—That is a very good fibre.
1488. That is sansivera, the bowstring hemp from India; but it does not grow very fast here; it would take four or five years to get anything like a fair crop. I think you said it was a good fibre?—It is a good fibre.
1489. Here is the Sida retusa produced here?—We have got it sometimes in hundredweights from Queensland; it dresses well and is very soft.
1490. *The Commission*.—Is that an annual?
1491. *Mr. Guilfoyle*.—It is called in Queensland, Queensland hemp; it is a perennial; it is very close to the abutilon tribe.
1492. *By the Commission*.—For what purposes could that be used, Mr. Miller?—Engine-packing.

1493. *By Mr. Guilfoyle*.—String?—Yes, any kind.
1494. Fishing line?—Yes, highly probable, and clothes line and rope, or it could be woven into anything.
1495. There is a variety of grass here, the poa; we could gather that without cultivation at all?—That is not strong, but it would make good paper.

1496. Here is the "Victorian tree-hemp," or "Ribbon tree" as we call it, found in many places along the banks of our rivers and streams; it is the Plagianthus pulchellus. This other is the Plagianthus betulinus from New Zealand. Have you ever found that in the market?—No.

1497. *Mr. Guilfoyle*.—I may say this is hardly a fair test of this fibre, we have had such crude appliances to prepare it; some were in the water too long, and some not long enough.

1498. *By the Commission*.—What is that fibre?—That is a good fibre.

1499. *Mr. Guilfoyle*.—That is Phormium tenax, or New Zealand flax.

1500. *By the Commission*.—What is that worth per ton?

1501. *Mr. Miller*.—From £16 to £18; but this would not be worth so much as that; it is not properly cleaned.

1502. *Mr. Guilfoyle*.—That variegated form of the New Zealand flax is far more easily prepared than the green form, and proves to he a very much stronger and better fibre. I do not know whether Mr. Miller has ever come across more than one variety of New Zealand flax?—Yes, there are several varieties.

1503. *Mr. Guilfoyle*.—This is a sort of hemp-like plant we hare grown here from a small specimen indigenous to Lord Howe's Island, a species of the iris family. I cannot say much about it; I do not know what Mr. Miller thinks of it.

1504. *The Witness*.—Is it much like New Zealand flax?

1505. *Mr. Guilfoyle*.—It is much longer in the staple; but this is a small sample of it?—It seems to be a good fibre.

1506. *By Mr. Guilfoyle*.—This is the coast sword-brush; any quantity of that can be got without cultivation. What do you think of that as a fibre for rope-making?—It is fairly strong, and it could be woven. I have no doubt that in England they could work up all these things.

1507. Here is lavateria, tree mallow, one of the mallow tribe?—If it was longer it would dress as fine as the Italian hemp.

1508. We can get that three yards long.

1509. *By the Commission (to Mr. Guilfoyle)*.—Does it grow here naturally?—No, it is a native of Europe; but it grows here very freely indeed.

1510. Is it like a mallow?—Like a huge marsh mallow.

1511. *By the Commission (to the Witness)*.—Is that a good fibre?—It is a good fibre. Mr. Guilfoyle at one time showed me a dressed sample of it; I thought it was as fine and good as this Italian hemp.

1512. Would that be worth £30 a ton?—I think it would, if it were a, proper length.

1513. *Mr. Guilfoyle*.—I see I have made a note here. I found by a very rough calculation, rather under than over the mark, that 21 cwt. 2 qrs. 12 lbs. of this could be got to the acre in soil not

James Miller, *continued*, 13th April 1886.

very moist—sandy soil—fairly good soil.

1514. *By the Commission* (*to Air. Guilfoyle*).—Could you reap an annual crop?—You could reap an annual crop.

1515. It is a tree mallow, in fact?—It is a tree mallow, in fact.

1516. Perennial or annual—Perennial; it is not a long lived plant; it would last from two to five years.

1517. *The Witness*.—It is very irregular, some of it very weak and some very strong.

1518. *By Mr. Guilfoyle*.—It has not been well prepared?—Yes, that would destroy it; what did you use in it?

1519. Caustic soda?—That would destroy anything.

1520. The cow-itch tree is here; it is indigenous to New South Wales and Queensland?—I should think it would do well for paper.

1521. This is the Queensland nettle; the fibre is always of a dark colour; the blacks make fishing lines of it?—That is very strong.

1522. Tritoma uvaria; I should like to have your opinion of that fibre?—It is too hard; there is a lot of gum in it; it is not properly cleaned; it is very strong.

1523. This is called the torch lily, known in gardens as the red-hot poker plant, and really it suggests one. It bears a bunch of flowers upon a tall spike, with very long foliage, a beautiful flower, and this can be produced in very great abundance; the crop of that would be some-thing enormous?—You can separate a lot of this gummy substance from it.

1521. Can you get rid of that by boiling; if you recommend it, I will prepare another sample and send it to you?—Well, you might try that, it is a good fibre.

1525. This is another variety of the same genus, Tritoma recurvata, "recurved torch lily"; it does not produce so large a crop as the other; you say it is a better fibre?—It is a better fibre, but the staple is short.

1526. It yields 18ewt. lqr. as we estimate it from plants in the gardens.

1527. *By the Commission*.—Are there any others that strike you especially?
1528. *Mr. Miller*.—Fourcrova gigantea is a very harsh thing; it will not spin.
1529. *By Mr. Guilfoyle*.—It bears an abundant crop?—I do not think they use it in America, except for paper.
1530. *By the Commission*.—What weight of that could be produced to the acre?
1531. *Mr. Guilfoyle*.—I should say at least two tons.
1532. *By the Commission (to Mr. Guilfoyle)*.—Annually?—Annually.
1533. Is it grown from seed?—Yes, or from division of the roots; it throws out a great many suckers.
1534. Have you any idea of the value of it for paper-making?—I do not know, but almost all of these fibres would be useful for paper-making.
James Miller, *continued*, 13th April 1886.
1535. *The Witness*.—I do not know anything about it.
1536. *The Commission*.—£2 or £3 a ton, probably.
1537. *Guilfoyle*.—I should say for paper-making it would be worth £5 or £6 a ton. This is one of the cordylines of New Zealand, Cordyline pumilio. It grows here very freely. It is one of the class called palm lilies?—That is a very strong fibre.
1538. *By Mr. Guilfoyle*.—I should say at the very least you would get two and a half to three tons of fibre to the acre?—I should think that would pay very well.
1539. And it is so easily prepared, simply by steeping in water for a few days, plant four feet a part, 7,722 plants to the acre. This would not be altogether an annual crop. It would take three or four years to develop a crop of this.
1540. *The Witness*.—Would it be perennial after that?
1541. *Mr. Guilfoyle*.—It would be perennial after that.
1542. *By the Commission (to Mr. Guilfoyle)*.—You could not cut an annual crop of that?—You could cut the leaves, as it throws out from the bottom of the stem numerous lateral branches, and those could he stripped. I should think you would cut a couple of tons of this to the acre every year.
1543. After three or four years?—After four or five years.
1544. *The Witness*.—Is this easily prepared?
1545. *Mr. Guilfoyle*.—If my memory serves me, it has to be steeped in water eight or ten days; or perhaps it could be prepared much quicker by boiling; I think one of our samples was prepared by boiling. Cordyline Australis was prepared in that way.
1546. *By the Commission (to the Witness*).—Would it injure the fibre? to boil them?—Almost invariably when they boil fibres they use soda to soften them, and that spoils it always; but the fibre would sell very well; it might fetch £20 a ton, like New Zealand flax.
1547. Have you ever seen that fibre in commerce?—No, never.
1548. Do you know if it has ever been used before?
1549. *Mr. Guilfoyle*.—I feel sure it has never been used; it is a New Zealand plant, and in no book have I found anything about it as a fibre plant, except that the natives use all these plants for lines an string.
1550. *The Witness*.—But they prefer the Phormium tenax to anything else.
1551. *Mr. Guilfoyle*.—Canna gigantea, the Indian Shot-plant—that becomes a perfect weed here in the Gardens; it produces seeds and bulbs.
1552. *The Witness*.—That looks very like hemp.
1553. *By the Commission (to Mr. Guilfoyle)*.—That is not an annual, is it?—No, it is a bulb, perennial, producing a crop of leaves every year.
1554. Is it prepared by steaming or boiling?—No boiling; simply steeping.
1555. Would it shoot up three or four times if cut in the year?—We only get one crop of this; it is, in fact, a sort of arrowroot.
1556. Very subject to frost, is it not?—Yes, frost will
James Miller, *continued*, 13th April 1886.
injure many of then.
1557. It is almost like the caper plant, is it not?—The seed-pod is not unlike the caper, but it belongs to another order botanically.
1558. Have you any idea of what it would produce to the acre?—1 do not think we have made an estimate of that.
1559. *To the Witness*.—Do you consider that a first-class fibre?—No, it is not a first-class fibre.
1560. Is it not very strong?—No.
1561. *Bg Mr. Guilfoyle (to the Witness)*.—Here are four varieties of abutilon; will you just examine them and pass an opinion upon them?—If they could be produced in abundance, I have no doubt they would be equal

to jute.

1562. You see the length of the staple of Abutilon striatum?—Yes, that is a good length, but it is no stronger than jute.

1563. Here is another variety of abutilon; it is Abutilon venosum?—That seems tu be very irregular. Some is strong and some weak, hut both of these would do as cheap fibres; but they are not worth much.

1564. *By the Commission*.—Which of these fibres, in your opinion, is the most suitable to experiment with—to grow?—Some of the first ones, I think.

1565. Are there any two or three that strike you particularly?—These fibres of the cordylines, if they could be produced longer, would compete successfully with New Zealand flax.

1566. *By Mr. Guilfoyle*.—Here is doryanthes?—*Mr. Miller*—it would not bo strong enough; it would not spin.

1567. Have not you used the spear lily of Queensland?—Is this it?

1568. This is it?—It must be badly prepared.

1569. From what you know of it, is not that a good fibre?—I have never wrought any of it. I know Mr. Knight, of Sydney, has wrought some of it. It in used instead of the coir ropes. I dare say it would do For that purpose.

1570. This is fourcroya?—I do not think that is worth anything.

1571. Lavatcria alba, the velvet mallow?—If that is properly cleaned and prepared, and retains its softness, it would be a very valuable libre.

*The witness withdrew*.

# W. R. Guilfoyle further examined.

1572. *The Witness*.—I noticed in Havter the other day

W. R. Guilfoyle, 13th April 1886.

that the value of fibre imported in 1883-4 was £70,310. This—[*producing a sample]*—is the sheep-bush of the Cape that was spoken of the other day by Mr. Abbott as a fodder plant, and here is a tea plantgrown in the Gardens—[handing in the same].

1573. *By the Commission*.—Is that Chinese tea?—That is Chinese tea.

1574. Does that, grow vigorously here?—Very vigorously. It is a vigorous growing plant, but I fect certain it would never produce a crop

W. R. Guilfoyle, *continued*, 13th April 1886.

large enough to pay. We have not the climate for it. Tea will never pay here.

1575. And we have not the labour for it?—We have not the labour for it. The sheep plant will only grow in hard clayey soil. It is a composite plant : every shoot that drops upon the ground takes root, and if left to itself would he hard to eradicate.

1576. Would there not be danger of its running over the whole country?—The cattle would he very glad to pet at it whenever they could. The reason they have to paddock it at the Cape for cultivation is, that the cattle and sheep would very soon root it out of existence if they could pet at it, they are so fond of it; but I think we should have a better chance of growing it here successfully than they could in Tasmania; it suits our climate better.

1577. Is it suitable to a dry climate?—It will not grow in a wet one. It must have a dry clay soil. 1 have watched the tea plants very care-fully in the Gardens, and sent specimen plants to people in the country to try, and they have never been able to make much of them. We have made tea from the plants grown in the Gardens.

1578. Has anything else occurred to you since your last examination that you would like to say to us?—Not at present. I have a paper to read on various vegetable products which I would like to read at some future time. I have something to say ou oil-producing plants.

1579. Mr. Miller, in giving evidence about Russian and Italian hemp, spoke of the difference between them; what is the difference. Is it a different plant, or a difference in soil that produces the difference?—I really do not know. I forgot to ask him what was meant by Russian hemp; it maybe just a local name; but the Italian hemp, of course, is a species of linum.

1580. Does it require a very rich soil?—It must have a certain amount of manure to keep it going, and it must have moisture; it will not grow without it.

1581. Is it adapted for the warmer or the cooler districts of Victoria?.—The cooler districts seem to suit it better than the very warm ones.

*The witness withdrew*.

# John D. Custance, Esq., examined.

John D. Custance, Esq., *continued*, 13th April 1886.

1582. *By the commission.*—What are you?—The Go-13th April 1886 verment. Profesor of Agriculture in South Australia, and Principal of the Agricultural College at Roseworthy. 1583. Have you had opportunities of seeing various experiments conducted with plants that are not ordinarily grown?—I have been conducting experiments there for the last four years.

1584. The Commission would be glad if you would give them the result of these experiments which were conducted under you supervision?—Under my own supervision at the experimental farm at Rose worthy?

1585. Perhaps you would tell us the particular plants



with which you experimented, or which have been grown?—If you will permit me, I will he very pleased to make a statement, showing you what has been done there.

1586. Yes, we shall be very pleased?—I have not been able to collect full Information with regard to these experiments, but I have here the chief results that we have obtained in a very plain and practical form, more easily adapted to farmers, than from a scientific point of view—that is to say, the information that, we have collected, we have embodied in as practical and plain a form as we possibly could, with the sole object of inducing farmers to improve their system of farming in South Australia, and to induce them to grow some plants that would really be of practical benefit; and I should like it to be distinctly understood that in explaining what we have doue, I do so purely from a practical farmer's point of view. In the frist place, I think that the increased production of other plants than wheat and an improved system of farming are so intimately connected, that I feel obliged to mention the importance of not separating the two subjects; because for the growth of a greater variety of farm plants profitably, which of course is the point to be attended to, more attention must be given to the proper treatment of the land and the utilization of the produce. By deep cultivation—that is, by deeeply stirring the land with the cultivator by means of steam power (that is the steam cultivator), the use of the drill and horse hoe, keeping the land free from weeds; the proper application of cheap manorial substances, such as mineral phosphates, which is a very important point, indeed, and nitrate of soda; the growth of root crops ploughing in or of feeding off green crops, such as mustard, spurrey, buckwheat, &c.—I believe laud can be cropped continually; in fact, can be kept in better condition than by merely allowing the laud to ho uncultivated for a time, weeds nourishing, and the sub-soil, to a great extent, deprived of the beneficial action of rain and air, I think improvement in farming must be effected, not by any one particular remedy, but by a combination of things, each assisting in bringing about the much desired object of obtaining greater produce and greater profit from a given area of land. Under the present depressed condition of agriculture, it is of national importance that some improvement in the system of farming, by which more produce may be obtained, and more profit gained, should he encouraged, that this may be accomplished most successfully. I think farmers require some encouragement to try simple experiments for themselves, such as, say, plots of a quarter acre or half acre each of crops not generally cultivated, such crops being adapted to the soil and climate. My efforts in this direction have been most favourably received, and I feel convinced good results arc being obtained in South Australia. The Agricultural College at Roseworthy supplies information by letter to farmers who send inquiries regarding crops, method of cultivation, &c, and small samples of seeds for trial plots. Visitors to the farm have the advantage of seeing the various crops grown on the farm, and obtaining information from the Professor of Agriculture regarding the operations and experiments conducted there. Lectures of a practical character are delivered



in various districts of the colony, assisting in the dis semination of useful information, often induving farmer to try new crops and methods of cultivation, which, perhaps, but for the discussion awakened by the lectores would not have been thought of. In these and other ways agricultural pro-gress and improvement may he much promoted. The first crops I would mention, of vegetable crops other than wheat, properly adapted to a dry country, are root and fodder crops. Last year, at Rose worthy, our rainfall was only 13 inches. I put in for a reference a table of the rainfall for each month, which may be of use presently Under that rainfall we cannot accomplish very great results; it is not to be expected; but we have done a great deal, even with the poor soil and the small rainfall we have at Rosewortby. It being understood that these crops that I now recommend, I recommend of course for a similar locality—poor soil—that is, not a rich soil by any means, and what I may call a deficient rainfall. First I would mention root and fodder crops. 1 have proved the utility, even under the circumstances mentioned, at Roseworthy, of growing those crops during the last foot years, because they provide a supply of green nutritious food during summer, just when we most need it, and clean, or assist in cleaning the land, to improve the condition of land for wheat growing. It is my opinion, from experiments conducted at Roseworthy, that laud thus cropped is in a healthier condition for grain production, wheat grown on land after roots being less liable to suffer from red rust and other parasitic fungi. On poor sandy calcareous soil, last year, after man golds, 32 bushels per acre of Chevalier barley were grown, tibe sample being of first-rate quality for malting purposes. This year the best piece of wheat on the farm is after thousand-headed kale, the land having been cropped for many years, the cropping for the last five years being—1881. wheat; 1882, potatoes; 1883, kohl rabi; 1884, kale: 1885, wheat; 21 lbs. of seed wheat per acre were drilled in rows fifteen inches apart, and though this is the worst season we have had it Roseworthy for twenty years, the yield of wheat was 16½ bushels per acre, and the wheat was 67 lbs. per bushel. I mention these facts to show the benetits to be derived from the growth of root crops in im-proving the condition of the laud for grain crops. Of the various root crops that we have experimented with, mangold-wurzel takes the first place under the conditions for withstanding dry summer weather; good crops have been grown each year without any irrigation. Early in August we drill about 2 lbs. of seed per acre on well prepared ground the drills being 30 inches apart, and the plants thinned to about fifteen inches apart in the drills. The horse hoc is used to keep the land clean and well pulverised. Mangolds may either be PulPed and mixed with straw chaff for horses and cattle, or fed oil the ground by sheep. We have done both. Pulped mangolds mixed with chaff may be stored for months in a shed if trodden down firmly and a little salt added. Sugar beet may also be successfully grown without irrigation, and the refuse pulp from the factory used on the farm. Kohl-rabi is a very hardy crop and useful for sheep feed during summer; this crop has been grown without irrigation at Roseworthy.



Carrots and turnips have also yielded good crops, but from the expeuse of raising carrots where wages are high they cannot be recommended as a farm crop. Thousand-beaded kale is a plant I especially recommend amongst all fodder plants. I think that is the best that can be successfully grown without irrigation. I will put in a list of 100 plants that Ave have tried, and I do not know one superior to thousand-headed kale. It produces a large quantity of nutritious food, and food much relished by stock. You may grow, according to the quality of the soil, from 20 to 30 tons per acre without irrigation. The plants grown last year at Rose worthy on poor soil were from three to four feet high, and measured sixteen feet in circumference; and, of course, it being a very leafy plant, the weight was not so much. They weighed from 15 lbs. to 20 lbs. each. The seed was drilled half a lb. per acre during April, in rows 45 inches apart—the plants thinned to about two feet apart in the rows. The crop was ready for feeding the beginning of November. Now, as soon as the heads are cut off in November, the plants begin to sprout, and give you a splendid second crop just in the middle of summer. They may be fed off by sheep or pulled by hand, and should we be fortunate enough to get a little rain, we can get a very good third crop in the end of summer. I believe, but I have not tried it, that the plant would last three or four years. I think I may say confidently, from actual experience, that it is the most valuable green crop under our conditions that we can grow, and it is especially valuable for sheep. Next to that the large drumhead cattle cabbage is also noticeable for the weight of green food per acre that can be grown. Its habit of growth resembles the common cabbage, therefore it is not so well adapted for feeding off by sheep as the thousand-headed kale. Other fodder crops that have been grown hero without irrigation, and would, if properly sown at the right season, do well in Victoria, I have picked out from 100 in my first, report to the South Australian Government in 1882. I have marked those plants that I can most confidently recommend—the Melilotus leucantha, Bokhara clover, is a plant that does best with us in the summer time. It grows during the summer, and keeps green. I have tried it with sheep. There is a popular objection to it, but that chiefly arises from allowing it to grow too rank. If it is properly used I do not not know a plant for feed that will stand during summer and give as good a crop. It must come first. John D. Custance Esq. 13 April 1886.

1587. Is this the perennial red clover?—No, it is a different order. Melilotus leucantha, Bokhara clover; Medicago sativa, lucerne; Trifolium hybridum, alsike clover; Medicago lupuliua, yellow trefoil; Trifolium incarnatum, crimson clover; Onobaryehis sativa, saintfoin; Vicia sativa, vetch; Dactylis glomerata, cocksfoot; Achillea millefolium, yarrow; Plantago lanceolata, plantain; Lupinus angustifoiius, lupin; Sinapisalba, mustard; Brassica napus, rape. I do not menu to say, by giving this list, that nono of the others would do, but those are the plants that I can confidently, after four years' experiments under the conditions I have mentioned, recommend as being really useful to farmers. There



is nothing theoretical, nothing scientific about it at all. They are simply and really that every practical fanner ought to grow. There are, of course other crops that, may bo grown, either for the grain or for folder; sorghum, for instance, grows with us most luxuriantly during summer. It has done this summer with hardly any rain at all. We have cut it three or four times, and found it most valualde.

1588. And without artificial watering?—None of my remarks have anything at all to do with any water, and the experiments were made upon poor sandy -soil. Sorghum, if if only obtains a fair start before the dry weather sets in, will yield an abundance of hutrious green food during the middle and end of summer. The seed also is available for feeding stock, and the canes can be utilized for the manufacture of syrup, but I do not think for sugar. I tried a very large breadth in Japan, but there is a difficulty in the crystallization of the sugar. I do not at all recommend sorghum For sugar, hut for syrup I can recommend it. The great advantage of sorghum, 1 think, is this, at least this season we had it so with us, that just at the time when you are put to the greatest pinch for green food for cows, by chatting the sorghum with the straw we can improve very much the quality of the milk, and, consequently, the butter and cheese we make from it, and it enables us to utilize our straw, which is a very important point indeed, I think. Millet has suc-ceeded well, both for fodder and seed. Maize makes a valuable green fodder chaffed with hay or straw. The varieties known us Cobbett's corn and sugar corn do best here (that is, at Roseworthy) for the purpose of obtaining grain, which is useful for feeding poultry, pigs, and, when crushed, as food for horses. Bengal gram, dhoura, and other similar plants would probably prove useful in some localities. I do not think it is necessary for me to go into details about some of those plants because they have been mentioned to you before. With regard to another series of plants, what I may term oil-producing plants, from a practical farmers' point of view, I should put flax first. This crop may he grown for the sake of the straw for paper manufacture, also the seed being utilized for oil and oil-cake, or the seed may be boiled, mixed with chaff, for feeding purposes. The growth of flax for both seed and straw would probably prove remunerative to farmers, provided a market could be found for the straw as material for the manufacture of paper. The manager of the Ely paper works near Cardiff has tried flax for the manufacture of paper with satisfactory results. The price he paid for the straw direct from the threshing machine was £4 10s. per ten. The following extract from the journal of the Royal Agricultural Society of England, vol. 18, 1882, may he quoted as supporting the idea that the establishment of a paper manufactory would be advantageous:-"The Ely paper works make one class of paper only, newspaper, of which they turn out 75 tons weekly. To effect this, about 3,000 tons of esparto grass is used annually, at a cost of from £5 to £7 per ton, and 2,000 tons of straw and other materials. If I have shown that flax can be grown at a profit of £4 10s. per ton for the straw, and 8s., or even 7s., per bushel for the seed, the British farmer will still want security that he will obtain a market for his produce before going



into the business. Facts speak louder than words, and the announcement by Mr. Reed, manager of the Ely paper works that he would be prepared to take 1,000 tons of flax-straw at £4 10s. per ton during the ensuing season should be pretty conclusive evidence that he finds if an economical substitute fur esparto grass."

1589. Was that at Adelaide?—No, in England. I merely quote it to show that flax straw may be, and absolutely is, used For the manufacture of paper. The value of the imports of esparto grass into England in 1881 was (192,328 tons) £l,275,707. I merely wish to make it quite clear to farmers. I do not know how it is here, but with us flax, grows luxuriantly, and the only reason it is not cultivated is because there is no market for the straw. It is no trouble to any farmer; it grows with very little trouble. A ton and a half per acre may be obtained very easily. The seed may be used in feeding, and if £6 can be got for a ton and a half of flax, it pays very well. Another plant I would mention is the sunflower. This plant is one that can be easily grown, In suitable localities the yield of soed would be from 40 to 50 bushels per acre; the yield of oil may be estimated at a gallon per bushel. The seed, besides yielding oil, is useful for feeding poultry, pigs, sheep. &c. The stalk also contains a very fine libre, used by the Chinese for mixing with silk fabrics. The Russians manufacture from the stalks potash, from the seeds oil and oil-cake, used for feeding purposes. The flowers produce very fine honey as well. In the town of Saratov there are a number of oil presses for the extraction of oil from sunflower seed. The ground nuts (Arachis hypogæa), besides producing about half their weight of oil, the seeds may be used as food, the plant also being a good fodder plant. I have tried it at Rose-worthy. It is mentioned in the list I have put in. The ground nut is cultivated in India, United States, Brazil, and Africa. The cake remaining after the oil is expressed from the seeds may be used for feeding horses, cattle, and pigs. Under this list of oil plants I cannot omit the castor oil plant (Ricinus communis), because it grows so luxuriantly with us. I obtained the seeds from the Aladras Government, and experimented with them. Two kinds of castor seeds are chiefly grown, known as large and small. Seeds of these two kinds received from India, where the plant is extensively grown, have been experimented with at the Roseworthy farm. The small castor seeds yield the largest quantity of oil. Official returns state that 24,145 acreds grown in the state of Kansas yielded 301,380 bushels of seed. And another (til plant we have tried is sesame (Sesamum indicum). Three varieties of sesame seed are cultivated in India—the white, red. and black. The white variety yields the finest oil. It is a quick growing plant, attaining maturity in about four months. Sesame oil is largely manufactured at Marseilles. The commercial value of the seed in England is about £2 10s. per quarter. Another class of plants that I think we could grow, but I have not had time to work them out, is plants for distillation. Several of them grow most luxuriantly in the driest districts (I speak, of course, for South Australia). Rosemary



(Rosmarinus officinalis) grows most luxuriantly, and yieds by distillation a strong essential oil, used in the manufacture of eau-de-eologne and other perfumes. A few acres of it, when once planted, the cultivation is most simple. The shoots are simply stuck in the ground, and it is one of the hardiest plants we have tried. Lavender is another one. The flowers and leaves of this plant are aromatic, yielding the oil of lavender so much used as a perfume. It is easily grown, very hardy, flourishing best on what might be termed sandy loam; and there are many native shrubs and plants which might be grown by farmers for the purpose of supplying scent manufacturers with the material for distillation. Then with regard to irrigation. None of those crops that I have mentioned have been irrigated, they have been grown under ordinary farming condition?, and they have been recommended to the fanners of South Australia because we have been successful with them under the same conditions as the practical farmer has. I do not wish it to be inferred for a moment, because there are some plants in the list that I have not mentioned that they will not do. I merely mention those plants that I may confidently mention as being those that the farmer may profitably cultivate. With regard to irrigation, I think it is hardly necessary I should make any statement, because the effects of irrigation are certain if properly applied. I have seen the effects of irrigation in the east, and there can-not be the slightest doubt of the beneficial effects to be derived from irrigation if it is only properly carried out, and the right plants grow under irrigation. There are a number of miscellaneous crops that I feel sure can be successfully grown by farmers. To give you unexampled the present time brown mustard seed is worth 10s. a bushel in Adelaide. A farmer can sell any quantity of it, and mustard is a plant that would grow very easily. There are many plants, most of them mentioned, I think, in this list, that the farmer I am sure could profitably grow. Those experiments have been continued from the commencement at the Roseworthy farm, and although the full result is not given here, as it is only an annual report; the third report is for 1384, and in that the details are given, and here is last year's report, which contains fall information with regard to the result of last year's experiments, the farm, crops, and also full particulars in regard to what I may term the Department of Agriculture; the things are not separated with us the whole thing is worked as one.

1590. You put in those four reports?—Yes. I also brought downs's photograph of the college. That is what we term our head quarters in South Australia. The form surrounds it, and all matters in the colour affecting agriculture and the farmers come to that institution.

1591. You spoke of a steam cultivator: do you use steam for cultion valing?—We have tried it as an experiment. We have not the tackle belonging to the farm.

1592. Is steam cultivation adopted at all in South Australia? would be only in exceptional cases. It is not generally adopted.

1593. Is the thousand-headed kale that you spoke of like the cabbage—a coarse sort of cabbage?—It belongs to the same order. The leaves have some resemblance, but it grows in one mass of leaf.

1594. Is it not affected by the aphis, the same as the



other cabbage?—I have not found it affected.

1595. Are the other plants of the brassica tribe at all affected by the aphis?—In some seasons, very much indeed.

1596. And this is not?—I would not for a moment suggest that this is exempt. You see it is a fresh plant. No doubt it will be affected in time as it gets more generally cultivated.

1597. How many years have you tried it?—Two years at Rosewortby.

1598. And it produces a large weight of green fodder?—Yes. We sold half an acre for £18 the first year.

1599. Can the seed be purchased in South Australia?—I imagine so. We obtain our seed direct from England.

1600. You do not grow the seed?—We do not. I do not think it would be advisable.

1601. Does not it run to seed here well?—A few plants do. Out of an acre, you see one here and there running' to seed.

1602. Could not it be propagated from the little shoots; would not they grow?—No.

1603. Will largo cattle or sheep eat it?—They are very fond of it; horses, cows, sheep, and pigs too.

1604. The thousand-headed kale it is called?—Yes.

1605. Have you tried any experiments with Indian gram?—We have tried small pieces and it has done very well indeed. I have not tried it upon an extensive scale. I spoke favorably of it in the reports handed in.

l606. Have you any idea of the amount of seed it would yield per acre?—At Rosewortby, I should estimate the yield at 25 bushels.

1607. A larger yield, or as large a yield us peas?—It seems to do better than peas with us.

1608. Peas are not very extensively grown with you, are they?—They are not.

1609. Is it too dry for them?—Yes, it is too dry for them.

1610. You spoke of the straw of flax for paper; would not it be better to turn it to a better use for fibre?—We have tried it at Lindorf, but it did not turn out successful at all. There was some difficulty about it.

1611. Have you any idea of the acreage of flax that is grown in South Australia?—There is very little grown as far as I am aware, very little indeed.

1612. Has not the Government offered premiums in the past for the production of plants?—For the libre, I believe so.

1613. Has that ever been produced; has the premium ever been claimed?—I believe not.

1614. Or the sunflower; has a premium generally been offered for those novel things?—I am not aware that any premium has been offered for sunflower. I do not think so.

1615. The almond grows very well in South Australia?—It grows excellently at Rosewortby and many parts.

John D. Custance, Esq., *continued*, 13th April 1886.

1616. How many years is it before the tree bears with you?—It would come into fu11 bearing you mean from the time of planting?

1617. Yes, from the time you plant out I suppose a young tree or would you sow the seeds?—We plant out yearling trees generally Before you get payable crop it would be live or six years, I imagine.

1618. Do you know the production of almonds, the quantity produced in South Australia?—I do not.

1619. Has mustard seed been grown by the farmers there?—They attempted it. A number of farmers tried to grow it last season, but the season was so very dry that they were not yery successful. We grow it successfully upon the farm.

1620. You fourni the mangold to be an excellent crop to precedes wheat crop?—Yes.

1621. Does it grow large in this dry area?—We grow mangolds up to 45 lbs. weight each.

1622. But in ordinary cultivation?—Under ordinary cultivation.

1623. But under ordinary cultivation—say a field of 50 or 1O0 acres, you could not expect to grow mongolds of that size?—Twenty tous to the acre I should expect.

1624. But you would hardly expect that weight in an arid district, would you?—I consider Roseworthy to he a very arid district, and we have grown them each year to that weight there. We get good crops. Then we deep cultivate the land and we manured them.

1625. And you sowed them pretty early?—Sowed them the first week in August.

1626. Have you tried pulping the mangolds and mixing the pulp with chaff to preserve it, as you recommend?—Unfortunately this season has been so dry that we were not able to preserve it. We pulped and used it with straw chaff.

1627. The mangolds would have to be taken from the ground and given to the cattle in that state, as it was. You could not turn sheep upon them in that state, could you?—We have sown a few acres in the wheat paddock, and then after" the paddock has been stripped mid the straw taken away, we have hurdled off the mangolds and let them eat a small piece every two days when they were upon the stubble, and the; ate them clean out of the ground and did not leave the smallest spot.

1628. Have you cultivated the sugar beet?—Yes, all the varieties we could get. I have a list of them in that report.

1629. Have you ever tried to make sugar from the roots?—We have not.

1630. Nor even an experiment upon a few roots?—We have not 1631. Have you any knowledge upon the subject?—No practical knowledge.

1632. Do the farmers cultivate mangolds in large areas, or only acre or two or three?—The mangold is not generally cultivated—only a farmer here and there does it.

1633. Are there no instances where a man has cultivated a paddoek, say, of 50 or 100 acres to precede wheat?—I believe there are one or two farms near town where the soil and climate are better.

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They may have been grown extensively, but that is an exceptional case. I was speaking, of course, of farmers generally in the drier districts.

1634. Do they combine grazing with agriculture a good deal in South Australia?—Numbers of fanners do, but I would hardly like to say it is done generally. It is done in certain localities.

1635. Do you think that, having observed at your experimental farm the success of those plants that you have spoken of—this kale and some others—the formers will be likely to go in for cultivating?—I believe they are doing it, from numerous inquiries that I have respecting those plants from fanners.

1636. Is it. not a surprising filing that flax is not more generally grown than it is?—There is no market for the produce.

1637. There would be a market for the seed, would there not?—I think not at present.

1638. For linseed?—I do not know that there is a market for linseed in South Australia.

1639. Yes, or in this colony; it could be easily sent here, or even at home. You export wheat, and flax seed would be largely imported into England from India and other places?—Yes.

1640. Would it not pay a farmer to grow flax better than wheat, even for export. Do you know the quantity of seed that can be produced to an acre from flax?—Of course it depends a great deal Upon the soil and situation. As to the yield of flax, I imagine we should be able to produce three or four quarters.

1641. About 32 bushels. That would have a very much larger com-merciai value than wheat even for export, would it not?—I do not know the present price of linseed in London. Of course the market in London is fluctuating, and it must depend upon that as to whether it would pay or not.

1642. What manure do you chiefly use?—We use all the farm-yard manure that we can get, and we have not used any manure upon the business portion of the farm. The manures we have used have been simply for experimental purposes. We have used all the manures that we could obtain, a list of which you have in each report.

l643. Some of those are imported and some manufactured?—Yes.

1644. Do you think the fact that farmers generally do not go iu for those outside manufactures is their want of knowledge of the way to produce the crop?—I think if they saw a thing would pay them they would at once go in for it.

1645. If they could ensure getting a much larger crop of wheat by either fallowing the land, or by growing those green crops, is it not extraordinary that they do not adopt that course?—Many of them do not believe that they would obtain a larger yield of wheat.

1646. The experiments that you have conducted, then, and that have been chiefly successful are those to which you have referred, the introduction of this kale and the rotation of crops?—I have only referred to one series of experiments, and that is with regard to what we term

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new plants or new crops. We have a large number of experiments. We have experiments with regard to varieties of wheat, oats, barley, with regard to manures, and many other things.

1647. Particularly with regard to new crops, or to the introduction of crops that are not generally grown?—I have referred to that one series only, known as series "A." plants which were commenced and con-tinucd ever since.

1648. Have you made any experiments, or have you any experience in vine-growing?—No.

1649. Wine is largely produced in South Australia?—Very largely.

1650. Arc the vignerons successful?—I believe so.

1651. Is the area under vines increasing annually or diminishing?—I cannot, remember the figures with regard to the actual area, but I do not think there are as many acres under cultivation now as formerly.

1652. What I mean is, do you see new vineyards being planted generally?—I have not noticed any. Of course occasionally here and there I have, but not to increase the area under cultivation. That is my impression.

1653. The producers of wheat are not in a very flourishing state just now, I think?—I am sorry to say they are not.

1654. Is it not surprising that they do not launch out into some of the other sources of production?—You see to do that, of course, they require the knowledge and the inducement to enter into it and the capital, and then they want cheaper labour.

1655. I have you any orchard attached to the experimental farm?—We are about planting one. We have commenced planting a vineyard. There is a small garden attached to the farm. We tried apricot trees and almond trees, and they do very well indeed, and there is a small piece of grape vines.

1656. llave you had any experience in growing fruits to test their commercial value?—Not a large experience. We have dried a few muscatel raisins for home consumption.

1657. Produced upon the farm?—Produced upon the farm.

1658. With satisfactory results?—As far as the flavour was concerned, most satisfactory, but the appearance is not quite up to the manufacture article.

1659. Do any of the farmers in your country go in very largely for poultry—make a specialty of it?—In an exceptional case or two they do; very seldom do you come across a farm that keeps a lot poultry; the majority of them do not.

1660. Do they hatch by the ordinary process or do they use the in-cubator?—The incubator is used on several farms that 1 know of but it is not generally used.

1661. But upon any farms, do the farmers devote themselves almost exclusively to poultry?—I think not.

1662. What is the rainfall at Roseworthy?—Last year?

1663. I want the average more for a series of years, if you have it?—For the last year it was 13 inches.

1664. You said that was an exceptional year, I think,

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a had year; what is the average?—About 16 inches would be the' average.

1665. And what is the soil there—in it good soil?—I have put in a full report of the soil; it varies very much indeed. We have a very poor sandy soil; then we have a calcareous loam, shallow, only a few inches; then wo have a little stiffer loam; and then we get on to a deep stiff clay. That is upon a farm of 800 aeres.

1666. You have a great variety of soils?—We have a great variety of soils.

1667. Have you made experiments in grasses?—I have experimented with all the grasses that I could obtain from anywhere.

1668. Have you come to a decision as to which of the grasses are best to use in the climate and soil of Roseworthy?—Of course I cannot carry the full particulars in my head with regard to so many experiments, but all the results are briefly announced in the four reports, and the names of the grasses given, and the different purposes, such as for permaneut pasturo and sheep feed. Several plants are pre-eminently adapted for sheep feed, and keep green all the summer.

1660. Are the details all given in the reports?—The practical part is in those reports: they do not give all the details.

1670. Do you strip your wheat?—Yes.

1671. Do you recommend that?—I am obliged to do it, because I have not any means of threshing it. I would not if I had a threshing machine, because we have to cut all the straw afterwards; we cut it into chaff and feed all the horses upon it.

1672. That is the straw, after it is stripped?—Directly after we have stripped a paddock we put the mowing machines into the paddock and cut it and put it into a stack, and then cut it up.

1673. You utilize the straw after the stripping?—Yes, I adopt that method because it is not in my power to do it any other way, not because it is the best method.

1674. Have you introduced the early wheat, the one coming to maturity earlier than the ordinary wheat, in December?—We have two or three early wheats, I may say; two that are very much earlier than any that we have tried, and we have tried all the varieties of wheat that we could obtain. There are 35 in 1884 that we tried, and the earliest was what is known as Lidian wheat—a wheat that is obtained from India.

1675. A red wheat?—A white wheat. I sowed 20 lbs. of that wheat on the 23rd of June. It arrived at maturity in November. The Indian wheat we harvested on December 5th—weeks before the others—and it. yielded 24 bushels per acre. Last year I experimented with another variety—what is known as the early baart wheat. I sowed 21 lbs. of it only on an acre, and obtained 16½ bushels; a very early wheat, too. The adjoining paddock was almost destroyed by disease. This was old land, and the adjoining paddock was the second crop.

1676. Have you tried that early wheal which was grown in Southern Africa?—Yes.

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1677. Willi what result?—That is what I just referred to. It is on page 19 of the report for 1885.

1678. Was it a success?—Perfectly successful.

1679. When did it mature?—It was harvested on November 20th it was sown ou May the 19th, much earlier than the purple straw, which was the one generally grown, and this was harvested with a stripper which makes a considerable difference, and they might have reaped it ten days before that.

1680. And is it a good milling sample?—I believe so. I have not had sufficient quantity to send to a mill, because I had to sell all I could sell at 10s. a bushel; there was such a demand for it.

1681. You then had a good quantity of it?—Only 16½ bushels. I only had one acre, and only sowed 21 lbs. altogether.

1682. You cultivate South African wheat?—And the proper name is the early heart wheat.

1683. We had a gentleman from South Africa here who spoke very highly of it indeed?—Yes, he went over this, and was surprised to see it. All that we grew we saved the seed.

1684. And you can recommend it with confidence for your climates—Yes; that and the Indian wheat, I think, are the two earliest; but we have two inore this year. There are four wheats that I am very much pleased with, and I expect to do something with them. The third is the soft white wheat; I have not had time to name it. We get time small samples of wheat, and then we pay attention to them and raise them. Ward's prolific is a very good wheat too.

1685. Is it an early wheat—Yes. Ou page 19 I give the four wheats that so far have been, 1 think, the most promising for what is really required, and it would be a very valuable thing include if an early variety, and a Strong variety and new, could be grown by farmers.

1686. That is the one point, because then they begin to ripen atibe time when now we get destruction; when they bloom they get the but winds?—Yes; I have been trying to effect this, but it takes time to effect a thing of this sort.

1687. As to the kail, how do you feed that?—We feed it in different ways. If we are short of food for the pigs, we pull it and take it to the pigs in the styes, cows the same.

1688. And what weight per acre do you get from it?—The weight per acre would be about 18 or 20 tons, the first crop—a fair crop would come to that. Then you see the beauty of the thing is that you get a good second crop that grows during all summer. What it would do with irrigation would be simply enormous; it is such a suitable palnt for irrigation. There is not much fear of inexperienced people going wrong in irrigating kail and drumhead cattle cabbage, but they would be in danger of that with other plants.

1689. Have yon in your mind any plants that stand ont prominently as suitable plants for irrigation?—Thai would vary upon what you want the plants for; but for ordinary farm purposes, those plants that I mentioned, with the addition of Italian rye-grass. Itlalian rye-grass, I think, is the heaviest cropper with plenty of irrigation. Lucerne is very good; kale, mangolds, Swede turnips, and plants of

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that description are the best, that you get the greatest weight per acre from, and they do not want so much skill as wheat, And fruit trees, and vines, and things of that description. When I say skill, I mean there is not the danger of making a mistake in the quantity of water and time of application, and the mode of application is different with crops grown in rows. You plough a furrow between the rows and give them it thorough good soaking; you would not injure the plant by letting the water run round the stems.

1690. Are your reports obtainable?—Yes.

1691. Are they sold by your Government or distributed?—Distributed gratuitously for the benefit of the farmers. I have only one of each with me that I brought to put in. but I have. I think, one or two copies in my portmanteau at the hotel. I am quite sure the Commissioner will be very phased to send yon a dozen copies, and I should be Also very glad to answer any further questions in writing that you may be pleased to send to me.

1692. Have you got complete sets of your reports?—I have not. They have been so much asked for I had a difficulty in getting one for you; but I should think it would be worth while to have them reprinted in book form, and a summary of them; that would be the best plan.

1693. You spoke of deep cultivation carried out on your farm; is that merely for experiment, or is it that you find it profitable to do so?—I find it protiable to do so. I could not grow the crops that I have done unless for the previous deep cultivation of the land.

1694. Have you found out by accounts that it pays to cultivate that way?—Yes, certainly: and so have some of my neighbours—practical farmers.

1695. And you would advise generally that wheat ground, or ground that has been worked out by deep cultivation, should be renovated by a rotation of crops and the root crops or kail crops which you spoke of would be a very good way to renovate the land, and also bring it back to its usual strength, if not to improve it; what I mean is, has your deep cultivation been on worn-out land or new laud?—On worn-out land. By deep cultivation, I do not mean deep ploughing; I mean the use of a cultivator or implement with tines only.

1606. You do not bring the subsoil to the surface?—No.

1697. You do not recommend that?—No.

1698. I suppose your soil is a tolerably good depth; how deep is it?—It varies very much upon the farm. Part of the farm we have only four or live inches of soil, and then it is on limestone, and then on another part of the turra eighteen or twenty inches of good soil.

1699. Part of this colony is very shallow; your system would be the best system for heavy clay land?—The best tiling possible for it I should say.

1700. In the management of your farm—I should like to know how it is managed, whether you or any other gentleman is the head of the department—do you carry out the whole of the instructions of the farm,

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or is there a farm manager appointed to work under your instructions?—I have the entire management of the Agricultral College, and what we term our Department Agriculture, and the other commission that I hold is the Government Professor of Agriculture, which includes other duties. I have assistants, a farm manager and an assistant teacher, I engage them and I can dismiss them. They are under me, and the sole management of the institution and the work is in my hands, with the excetion, of course, of the financial portion. The annual vote for that is made by Parliament, and anything of any importance must receive the sanction of the Commissioner.

1701. What I mean is this—if you wish to have any experiment carried out you simply give the farm manager an instruction how you wish to have it done?—Most of these experiments I have conducted myself. I have not been able to do so the last six months, but previous to this I drilled those things and attended to them myself.

1702. Have you many pupils?—Twenty-eight; the college is full.

1708. You are not able to attend to the whole of this business your-self; do you look after the pupils and experiment upon the farm as well?—I have a farm manager, a competent man of my own appointor, who can carry out my orders, and I have an assistant in the collage, and we have visiting lecturers; but I have to work every day from half-past six in the morning to ten at night.

1704. Are you a chemist?—I am an agricultural chemist.

1705. In reference to the grass production from the northern portion of the colony, what grasses keep green any long period of the season; you have not touched upon that, but I believe it is given in you report, you say?—I was afraid, of course, to go into details, for if I allowed myself to go into details we should he here two or three hours more. Of course I alluded only to the skeleton of the affair.

1706. Do you cultivate Italian rye-grass?—We have grown it experimentally, hut we have not any water, and it wants water to grow it profitably with us.

1707. I believe you cultivate the citron tribe rather extensively? Personally not, but it is grown in the neighbourhood.

1708. Do they export from Adelaide to any extent?—I am almost afraid to say "yes" or "no" to that, but I do not think they do.

1709. I want to get at this—is that a production that you would recommend the Commission to iuquire about as far as collecting evident goes?—They grow very successfully. There is an orangery within a few miles of us, just on the other side of the ostrich farm.

1710. You say the rainfall was 13 inches?—That is hurt year. The average would be 16.

1711. I suppose the orange cannot be grown without irrigation?-The place I refer to is irrigated. I have tried a few trees in my garden, but they will not do without irrigation.

1712. *Mr. Guilfoyle.*—Can you tell me the value of the sunflower oil in the market. Is it as valuable as olive oil in Adelaide—I do not know, I do not think there is a quotation for it. I do not remember seeing one.

1713. You say 40 bushels to the acre, and a gallon to

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each bushel?—Yes, roughly.

1714. Even at 6s. a gallon that would be very profitable?—Very profitable. I may say that I shall be very glad to supplement my necessarily very brief information given to-day by written answers to questions if you think fit to submit them to me.

*The Witness withdrew.*

*Adjourned to to-morrow at half-past Two.*

# Wednesday, 14th April, 1886.

*Present* :

- The Hon. J. F. LEVIEN, M. L. A., in the Chair;
- The Hon. W. Madden, M.L.A.,
- The Hon. J. Buchanan, M.L.C.
- Andrew Plummer, Esq., M.D.,
- D. Martin, Esq,
- James Baird, Esq.,
- Charlea YEO, Esq,
- John D. distance, Esq., Professor of Agriculture, South Australia, further examined.

1715. *By the Commission.*—Has anything occurred to your

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mind since yesterday in regard to the vegetable products other than wheat that it would be desirable to cultivate here. Clause 5, Series C, "Manure."—I see you have made some very important experiments with manure at your farm, and with remarkable results?—They were commenced in the first report, and they have been, continued ever since during the four years, and to understand those results you want to study very carefully those four tables. It does not do to come to a conclusion from reading one report. That is only one chapter in a series, and the most important, I think I may almost dignify it by the name of a discovery, because I did not know it before, and I do not know that it was generally known—is the very great difference at Roseworthy and in South Australia generally with regard to the effect of nitrogen. It is altogether different there from what it is in England, You will notice that we have applied nitrogen in every shape and every possible way that I could think of, but it has not given us results at all to compare with the results of phosphate of lime; and that is why I stated yesterday that one of the most important things, as far as farming is concerned, would be the discovery of natural deposits of phosphate of lime. We got 22 bushels last year with simple phosphate, with only 8 inches of rain.

1716. I see with farmyard manure the result was an enormous quantity of straw and not much wheat?—The wheat was affected by almost everything you could mention, red rust and shrivelled up—completely eaten up with disease.

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1717. It is very striking that where you use the phosphate the seem to have been in every instance successful?—That is a most remarkable feature of the experiments I am very clear about it; it is not a thing I am in doubt about. It is perfectly clear, and experiments tried in other parts of the colony by practical farmers support that conclusion.

1718. A misture of phosphate with ammonia gave those results? That is, we got no result from the extra quantity.

1719. The list as given here of the various manures used, and the difference is simply astonishing, as stated in your table?—Yes. These experiments have been most carefully conducted on land on an equal quality, land that had never been manured before, and carried out under my own personal supervision, and I guarantee the accuracy of the results. In some cases where they seem rather difficult to underdstand there is an explanation, I mean there are discrepancies, which there must always be in a number of experiments like that.

1720. The general results you have arrived at from your experiments is, that it is desirable that phosphates should be used for the growth of wheat?—Practically it doubles the wheat crop; in many case three to four hundred weight of mineral phosphate would be sufficient. I have not mastered the nitrogen question here, but it is a very difficult question. All I can say with regard to the practical results is that we do not seem to get any practical results from it worth what we put on in manure, Now in England it does, it is our most valuable ingredient. Here it seems to me, speaking as far as practical farming is concerned, the phosphate takes the place of nitrogen; you cannot explain it. I have not had time to work out the question thoroughly.

1721. Are mineral phosphates naturally found in the colony?—I do not know; we find them all over the world. In England they are known as coprolites, and they are found in the south of France and is America. Thousands of tons are imported into England every year, ground up and sold at about S3 a ton.

1722. Did you apply water with the nitrogen—do you not think it was the extra quantity of rain in England that made the difference? -The plants of course could not grow without it, it is an essentail thing.

1723. You say you were deficient also with stable manure; that would be on account of the want of water?—I do not think so, because the other plots were adjoining.

1724. Our experience in England is that land manured with farm-yard manure docs not give the same amount as land not manured, because if it is a wet season the manure does good, but if it is dry season it does more harm than good; the nitrogen seems to be too forcing with the superphosphates, and there does not seem to be enough moisture in the ground to support the excessive quantity of straw?-I speak of nitrogen in the form of nitrate of soda and other which produce most excellent results in England. I have not been able to get any results worth talking of from those salta. Of course is we give an excess, and in the case of farmyard manure, the straw is diseased, and the grain is diseased, and we do not get a

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payable grain crop.

1725. Did not yon get a payable crop from the nitrate?—No, it does not seem to give us any effect, it seems as if the plants had got a sufficient supply of nitrogen without the application of it.

1726. I thought you were speaking more of the yield of grain than of the crop of straw; the appearance of the crop was good, was it not, with the superphosphate?—It was magnificent to look on; the other where the farmyard manure was—you have seen a very bad case of red rust; then imagine one ten times worse. You would have some idea of the farmyard manure crop; that is, of course, with a very heavy dressing with farmyard manure.

1727. You spoke yesterday of root crops and so on, but there are two points that seem very remarkable. You say you grow maize; maize planted on the 26th September, with a rainfall of 1.35 inches, produced a fair crop, giving a supply of nutritious green food when chaffed with straw for horses and cows; then even with a little rainfall you would recommend that crop for that purpose (page 20 of the report for 18S5)?—Yes, it is perfectly correct. I was very much astonished, if anybody else had told me I should have thought there was some mistake, but seeing it I was bound to believe; but I must also mention that the land had been previously deep cultivated and manured. I had a special deep cultivator that I got made at Gawler. We generally run that through the ground twice, and that had been done twelve months previously, and though we had not the usual quantity of rain in the previous winter, and only the rainfall you have mentioned, we had, for what were the circumstances, a most luxuriant crop of corn (that is, Cobbott's corn) that made most excellent chaff.

1728. And the same as regards sorghum?—The sorghum was much better than the maize, because it grows three or four times. We cut ours three or four times this year, and then feed it off with sheep.

1729. And for summer feed you recommend on all farms, even in dry districts, the growth of those two things to get summer feed?—Speaking from results actually obtained this last season where there is any rain at all, if the land has been well prepared previously, and the crop properly sown, it ought to be good.

1730. Do you use bullocks or horses in the cultivator?—Horses. 1731. How many horses?—Six.

1732. What depth do you go?—We first plough five inches, then we run the cultivator one way three or four inches down, and then do it the contrary way, and try to get down another inch or two if we can, about ten inches. If I walk behind the cultivator and can thrust down a foot rule ten inches easily, I am quite satisfied.

1733. I see from your returns here you find that the keeping of pigs upon the farm is very profitable?—It has been up to the present time. We have been selling them at five guineas each, that accounts for our profit; the ordinary pigs and bacon are very fiat with us.

1734. Is there any special crop that you think the farmers could grow here, any outside crop that they do not grow which they could grow



profitably?—You see I know very little indeed about Victorian farming; practically I do not know what crops are grown, but I should imagine that the great point is the market. I do not know. I bave not, of course, given any consideration to the question. It is no use a farmer growing a crop unless he can sell it at a profit. I am sure many crops can be grown, as far as growing is concerned, but the difficulty is to get rid of the produce when it is grown.

1735. Have you had any personal experience, or any meant of per-sonal observation as to the growing of sugar beet for sugar on the Continent?—Not practically.

1736. It is grown, you know, very largely indeed?—I understand the process.

1737. And the quantity grown every year—I do not know for the last year or two, but it has increased enormously in the last few years something like a million and a half tons of sugar, I think, are produced from sugar beet?—That is in Germany.

1738. Yes?—We tried it in England, and it did not succeed.

1739. It is grown largely in Russia, Russia produces a great deal of wheat, and if sugar-beet growing is profitable therein a wheat growing country, should it not be profitable here to the farmers in the dry districts?—I believe sugar beet can be grown successfully because for the production of sugar you do not want large roots; small roots are better than large ones for the crystallization of sugar. The question is of course the labour—that is the difficulty. The beet can be grown very well, and sugar manufactured from it very well, but whether it will be a profitable thing, as far as the farmers are concerned, is a question that depends on the cost of labour.

1740. The season within which it would be necessary to wort the ground for beet-root, and also to take the beet up from the ground for the purpose of being sent to the factory, would be the dull season, would it not, as compared with the harvest?—You see frost will kill the young plants; they must be sown after any danger from frost is over.

1741. Then you would sow after the wheat?—Yes, we sow early in August.

1742. And you would reap after the wheat?—Yes.

1743. Therefore it would alternate very well with the wheat crop?-Very well indeed.

1744. You told us yesterday that mangolds was an excellent crop to precede the wheat crop?—Yes.

1745. Do you think then it would be feasible for farmers generally to go into the growing of beet as a fallow or as a crop to alternate with wheat? _PROvided of course that a factory were put up and roots could he sold, say at 30s. a ton and the pulp returned to the farmer and used with chaff for feeding purposes, it would pay. It would pay a farmer to sell the beet at 30S, per ton.

1746. Then upon the question of labour—could an ordinary farmer upon 000 or 700 acres of land pay wages and produce wheat at the present price?—At 4s. a bushel.

1747. It is not 4s, at the farm, I think, is it; it is about



3s. 6d. I think?—We are asking 4s. now.

1748. If you like, put it at the present current rate at the port?—Say 4s.

1749. At the port of shipment?—Yes.

1750. Could he pay the current rate of wages, the interest upon the capital, and the cost of his land, and general expenses; could he produce the wheat at a profit?—I think anything over ten or twelve bushels, provided he had not a lees crop than twelve bushels he could, taking of course the average for a number of years; I am taking the cost of putting it into the ground, and then twelve bushels at 4s. is £2 8s. I think that would leave him a profit.

1751. A great deal of the labour necessary in beet cultivation is small labour; by small labour I mean the labour of boys or women; would it not be?—The seed would be drilled in rows; the plants could be thinned by boys with some one to look after them, and see that it is done properly, and they would have to be horse hoed, and perhaps hand hoed once if the land is tolerably clean, and then they would have to be pulled and cleaned and taken to the factory; the cultivation is very simple.

1752. And it would vastly improve the wheat producing capacity of the ground for the ensuing crop?—In this way, J think that the cultivation that would necessarily take place in growing the crop would improve the land and the change. It is well known that a change of crop is beneficial. After a root crop or say a crop like lucerne or red clover we get a better crop of wheat than if we had allowed the land to lie idle.

1753. Do you know the percentage of sugar that you would obtain from well-grown beet in a dryish district?—From 5 to 10 per cent.

1754. You say it pays better to put in a green crop of some kind than to let the land lie idle?—No, I did not mean to say that; what I meant to say was this, that supposing you take two paddocks that are equal, one yon allow to lie idle two or three years, just run a cow or two and sheep over it, another paddock you put lucerne into or clover or anything of that kind, and at the end of this period you plough both paddocks and put in wheat, you get a far better crop after the lucerne or red clover than you would from the one that lay idle—that is a known fact; no one can dispute that for a moment.

1755. I think you said that if 30s. a ton could be obtained from sugar beet it would pay?—It would pay the farmer to deliver them, a few miles from the factory.

1756. Do you know the price given upon the Continent?—£1 a ton.

1757. Why should not they pay here at £l a tou?—You get labour there at 2s. a day, here you pay 6s, a day.

1758. But they pay labour to produce wheat to compete with us?—They do not produce wheat in England to compete at the present time.

1759. But they do produce it, and they produce barley and oats to compete with us. What would be the coat to the farmer of cultivating an acre of beet-root, if he had to pay for labour—would it be 30s.?—

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No, I would not put it down at that to the farmer It is rather difficult to say in a moment the exact cost of different operations; you must run them together. There is plough ing, and cultivating, and harrowing, and rolling, and sowing; one ought to make a calculation to be accurate upon these points as to the exact cost, Roughly, I might say it would be about 15s. to 16s., the actual cost to the farmer.

1760. It would vary in certain districts?—Yes.

1761. But £1 would be excessive, you think?—I think it would be very fair.

1762. What would be the cost of sowing and cleaning an acre?—The actual cost is given in one of these reports; on page 11 of report 1884. It is roughly £1 an acre for ploughing, harrowing, rolling, drilling and thinning.

1763. All those operations?—Yes.

1764. Is that for land that had been subsoiled—does that provide for the extra deep ploughing?—No, only one ploughing for 8s., barrowing, rolling, drilling the seed, horse hoeing, and the thinning.

1765. But it would be necessary to have the land deeply ploughed?—Not so necessary for sugar, because you do not require to grow large coarse roots; a small healthy root contains more sugar than a large root.

1766. If you put down the price at £1 then, it would be ample for the ploughing and preparing the soil?—For putting the crop into the ground for sugar it must of course vary; but I think £1 is very fair indeed.

1767. Then you have to clean it and hoe it?—I allow for that; 5s an acre is allowed here.

1768. That would be £1 5B. Then you have to take out the crop; what would it be worth to put it into bugs, say a crop of ten tons-I suppose that would he a fair crop?—For sugar I think it would because you cannot force the roots; ten tons for sugar is as good as twenty for feeding. It would cost you to pull those and to cart them £5 by contract.

1769. How much would an acre of such land be worth if it had be rented by a tenant fanner?—An acre of laud that is capable of producing ten tons?

1770. Yes?—In what locality?

1771. Any locality that would be accessible to a railway.—In Victoria or South Australia?

1772. I think the relative values would be pretty much the same; say if you like in South Australia?—In South Australia a year or two ago—I cannot say what it is worth now—you could easily have obtained a rent of 5s. or 6s. an acre for it.

1773. Say 6s. an acre; that would embrace the whole expense?—You see in this I could give you, if I had time to prepare it, the exact thing; but it is very difficult at a moment's notice to think of all the items; but, as far as I can see, that is about the thing.

1774. Then you would get ten tons of beet-root delivered at the factory at £6 lls.?—Yes, I believe that gives a very fair practical idea, but it is difficult to give every item at a moment; it looks

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to me a little understated.

1775. That struck me?—Yes; and yet I do not know that it is.

1776. If you were going to start fanning for yourself, what crops would you put in in South Australia?—Barley, pease, mustard, and all the root and fodder crops; all the crops that I mentioned yesterday.

1777. What I meant was this: you are a professional gentleman, and one who thoroughly understands the whole of the cultivation in every respect, and also have a view to what would pay you. My desire is to find out what line of farming you would carry out as a whole?—There is no one particular thing that would suit us out here. You see by growing a lot of fodder crops I get food for my stock, and I get some manure, and, taking the thing as a whole, one thing helps the other. It would enable me to grow say twenty bushels of wheat to the acre, where my neighbours are only growing three or four, and if I can only get rid of that at 5s. a bushel it would answer my purpose. Perhaps one particular crop or operation may be conducted at a loss, but I do not consider that, but I consider the total result of all my farming operations.

1778. That is to say you believe in varying your crops, not adopting the system of fanning that is generally carried out in South Australia, that is wheat fanning?—Of course that has come to an end in South Australia; they cannot do it; look at last year, three or four bushels; they cannot do it.

1779. I merely want to know what you would do, it might be a guide to farmers who do not understand the theory as well as you do?—I shall he very pleased to send each member of the Commission a copy of the 1885 report where it is stated.

1780. Will you kindly give the information now, as you have the paper before you. At page 19 you say that practically you would grow early baart wheat, the soft white wheat, purple straw, Ward's prolific, thousand-headed kale, mangolds, maize, and sorghum?—Yes, but that does not give the system of farming; it merely mentions the crops. The system that I advocate is the system of trying to grow one of those good varieties of wheat on a small area, but growing a double yield per acre; that is, take 50 acres, and instead of getting four or five bushels off 100 acres, get 20 off the 50 acres; and the cheapest way you can get the land into condition for that is, I think, the way I have indicated, by deep cultivation, letting in the air, and letting in the rain, so as to get moisture into the land. When it is very hard—when it is shallow ploughed—the rain runs off. The land is not in a healthy condition where it has been only cropped one crop, and never knocked about The presence of a large quantity of iron in the soil conduces to that too, because if the air is excluded it is prejudicial to vegetation; but if it has plenty of oxygen, which it gets from the atmosphere, it is beneficial. You cannot keep the land in healthy condition unless you knock it about well, and grow other crops; and I consider it is the cheapest way of doing it. Horse-hoe the land, and keep it clean; it



will give you the heaviest crop of wheat or barley or what-ever you grow. It is better than the fallowing of the land. 1781. So, to sum up the whole thing, you recommend first deeper cultivation?—Yes; of course, there are exceptions.

1782. Then you recommend the early maturing wheat, speaking now of a dry district?—Yes.

1783. And you recommend certain kale and other crops for fodder?—Yes.

1784. And root crops and maize and sorghum for summer feed?—Maize and sorghum for summer feed; but they belong to the same order as wheat, and they are not so good as a preparatory crop for wheat as rape and those things.

1785. And you recommend the keeping of stock upon a well-managed farm?—Yes, most decidedly Upon the few hundred acres we have we keep 500 sheep, besides pigs and horses, which of course we could not do if we did not grow crops for them, and the farmers said we could not do it.

1786. If you had a farm of your own, would you commence farming flaxes or any particular fruit trees?—I could make flax growing very profitable indeed, provided I could sell the straw as I mentioned yesterday, but I could not do as it is, because the labour costs too much in the preparation of the fibre.

1787. Do you believe in fruit growing?—Certainly; it is a very profitable branch of farming indeed.

1788. You would lay out a portion of your farm?—If I had water to irrigate the trees I certainly should. I am speaking, of course, of the place where I am living.

1789. In the northern portion of our colony the soils are very heavy. The surface soil is not more than from one to three inches in depth, as a rule, and any depth below that is a strong marly clay, full of lime and salt, but a good clay, and very flat level country. Is there any of your soil similar to that that you are working?—I do not thinks so.

1790. It is so heavy and strong that you have to work it dry. It is difficult to cultivate deep, though with steam strength or extra bullock strength it could be cultivated wet?—We have a paddock that we cannot get upon in the winter time, it is so wet.

1791. My reason for asking that question is this, that I wish to ask you what you recommend would be best suited for soil of that sort. We simply grow wheat, because the country is so dry that we call grow nothing else at present without water?—If land will grow wheat, it will grow other things.

1792. It grew me 22 bags of Calcutta oats to the acre, over eight acres last year, but I put water upon it?—Yes.

1793. Do you know Dr. Charles Davis, is he an Adelaide man?—I do not remember him; I do not think I do know him.

1794. I notice in a paper which he read before the Chamber of comm -erce, he gives as the cost of producing an acre of sugar beet £5 6s.; under the estimate which you have just ronghly submitted, that was said to be £6 11s.?—But where is that?

1790. This is at Adelaide, in South Australia. I do not

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call attention to it to urge any discrepancy?—But he is putting on five bushels of bones, 15s., and three hoeings at 8s. for an acre; a man can do only half an acre a day, and you pay him 6s. a day.

1796. I thought you put the entire cost of cleaning at 5s.?—There is a very great difference. I put mine down for horse hoeing, I own do four acres a day myself with a horse hoe. He has put down three hoeings, and I do not know what he means; he has put a guinea for pulling up, and I can get it done for 10s. an acre by contract, there is not much difference in the two. There is this point that should be noticed, that my estimate is based upon the actual cost to the farmer. If yon ask me to prepare you a proper estimate I should put in a great deal more, because I should put down the same price as I would charge a man for doing the work, which would he about double, as a matter of business. You see the actual cost to the farmer and the charge you would make to do the work for another person are two different things altogether.

1797. Assume that £6 11s. is the cost to the farmer?—I should not be inclined to put it at less than that.

1798. And that he produces ten tons for which he gets at the continental price, £10, is not that evidence conclusive that he would have a very handsome profit for cultivating an acre of beet?—You have got, you know, a certain amount of risk to allow for. You cannot take it as an actual fact that he will get ten tons. He might only get five or six.

1799. Is ten tons considered a heavy crop?—A fair crop of sugar beet, a very different thing from mangolds grown for cattle, would be, I consider, ten or twelve tons.

1800. You might estimate, or rather, I would ask you, could you estimate, ten tons as a fair average crop?—Of beet?

1801. Yes?—I think so.

1802. Then if you take ten tons as a fair average crop and even take an excess of what you estimate, say, take £7 in round numbers as the coat, he would have then a profit of £3 if he could find a market for his beet at £1 a ton?—Yes.

1803. You could find an unlimited market if the factories were set in motion?—A factory, of course, would have to he guaranteed the production of a certain acreage of beet; otherwise it would not pay to run a factory.

1804. I mean that there is as unlimited a market for beet-root as there is for wheat, when it is manufactured into sugar?—I imply that under the condition of having a factory that would pay the farmer to grow beet-root at £1 a ton. Of course it would pay him a great deal better to get 30s., for then he could grow a crop upon a smaller area.

1805. Does the cultivation of beet-root strike you as one that could be profitably engaged in, provided the means of manufacture are provided in the colony?—Provided the farmer gets not Jess than £1 a ton, I believe it would he profitable to the farmer to grow beet-root. At any rate, if I were offered £1 a ton I should be inclined to put in twenty or thirty acres at Roseworthy myself. I believe myself he ought to have

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a little over £1 a ton to make it safe. I may, perhaps, mention one point, and that is, there is a plant, the French honeysuckle, that I did not mention. I believe it has been mentioned to yon. It is a leguminous plant, and grows most luxuriantly with us, and for fodder I believe it is a very good thing indeed, I did intend to mention it. We have grown it most successfully.

1806. Even with your small rainfall?—Yes.

1807. It grows like the clover, does not it?—Very much like a strong red clover, with a very handsome flower, called Maltese clover. That is the popular name with the farmers with us.

*The witness withdrew*.

*Adjourned sitie die*.

# (*Taken at Ballarat*)

# Friday, 18th June, 1886.

*Present* :

- The Hon. J. F. LEVIEN, M.L.A., in the Chair;
- A. Plummer, Esq., J.P.,

- Charles Yeo, Esq.,
- Baird, Esq.,
- The Hon, W. Madden, M.L.A.,
- Joseph Knight, Esq,
- T. K. Dow, Esq. D. Martin, Esq.,

David Wilson examined.

David Wilson, *continued*, 18th June 1886.

1808. *By the Commission*.—What are you?-Farmer and dairyman.

1809. Is the leading feature of your business farming or dairying?—Dairying.

1810. Coupled with agriculture?—Yes.

1811. Has your experience been confined to this district in the vicinity of Ballarat?—I have been sixteen years in the Ballarat dis-trict, and twenty in the Geelong district—that is my experience in the colony.

1812. You have devoted considerable attention to dairying?—This last sixteen years specially to dairying.

1813. Have you found it a profitable branch of your business?—Generally so.

1814. I think you have prepared a paper?—I am prepared to read a statement to the Commission of my views upon the subject, and the paper will speak for itself; and after I have read it, I shall be happy to answer any questions that may be put.

1815. The Commission will be glad to bear the paper—[*The witness read the same as follows] :—*

*"As I understand the object of this Commission is to ascertain if there is any other profitable way that the people can promptly and remuneratively draw a living from the land other than gram-growing, and as I have been dairying in the colony for over thirty years, I have been requested by several of the*

*David Wilson, continued, 18th June 1886.*

*produce merchants to call your attention to the dairying industry, with a view of showing that there is no more profitable and no speedier or surer way under certain circumstances than dairying properly conducted.*

*"If the Commission will kindly allow me to give my evidence in my own way, and if there is anything that I neglect to state or have not made plain, I shall be happy to answer any questions after, as I would like to sheet home to the minds of this Commission the magnitude of the loss that we are sustaining yearly in the business. But the first difficulty that meets me to show my case is there are no statistics, and Mr. Hayter, perfect as he may be in every other branch of colonial industrial statistics, has left the dairying comparatively neglected.*

*"For to know how many dairy cows there have been, and are in use yearly, their produce in milk, butter, and cheese, is as essential to the knowledge of the dairy and its profits as the elaborate returns we get from public and private sources of the growth of our grain trade; and I hope the time has come when we shall have them in future, so that any statistic I may quote will be obtained principally from the press.*

*"The dairy industry of Victoria continues in a position which must be as unsatisfactory to the producers as to the consumers in the articles of butter and cheese. The glutted market of one season is followed by the famine of another with amazing regularity, and yet no departmental steps are taken to alter so objectionable and unprofitable a situation, The Weekly Leader, of 9th May, 1885, in reviewing the butter market, says—The difference in the quality of samples of colonial butter is really most extraordinary. Our quotations this week are 6d. to 1s. 6d. per lb. wholesale, a difference of 200 per cent, and no one who has opportunities of seeing and tasting the different qualities can wonder at it. Butter may be obtained at some of the leading shops in town which could not be excelled, for which 2s. fid. or 3s. per lb. is obtained, while in another place it is sold of most disgusting quality, to which the oleomargarine of the United States is vastly superior.'*

*"For the remainder of the truthful article, I would commend the perusal of it to the Commissioners. We were told six years ago by one of the Melbourne firms that they sold 1,500,000 lbs. of butter in take year. One-third was good, one-third inferior, selling at half price, the remainder only fit for making soap; and to show we are still going on with this woeful waste of the best of all human foods', again quoting from the same paper, we were told last year that the butter exported from Victoria amounted to a total value of £60,000; and when to this is added the immense quantity required to supply the colony's home consumption, some idea is conveyed as to the important position held by the dairy portion of the farm. As a matter of fact, whatever losses may be sustained from failure in the cereal crops or other causes, it is generally admitted that the produce from the cows of the farm is one of the few sure things depended on to pay current expenses and help to keep matters going throughout the year.*

*"From this point of view, everything pertaining to this particular branch of farming industry assumes special importance, and no phase of agricultural operations demands a larger share of special attention. And, still farther, to show the Commission the toss the country is still sustaining between good and bad butter, we were told last year that three firms sold 1,500 tons of butter averaging 10d. a pound, or a total of £140,000, while one of our leading dairymen obtained an average, in the same sale-rooms, the same year, of la, 5¼d.*

*"Presuming that this 1,500 tons had averaged the same, the total sold by the above three firms alone would*

*have been £241,500. Here is shown a loss, as between well-made and badly made butter, of £101,500 to the producers by the sale of three firms in the city of Melbourne alone, in one year, so that you can judge for yourselves what this must mean over the colony.*

*"Then with regard to cheese, it is much about in the same position. There is a great deal of good and a very great deal of bad; and one of the peculiarities of this branch of the business is, that a dairyman or a dairy woman will make a good cheese now and again, and half-a-dozen bad ones, and they don't know why, for want of a proper system of appliances, such as Ramsay's patent cheese vats and heaters, aud although the factory system has worked a great reform in cheese-making in Victoria, still it has not succeeded as one would have expected. My own impression is, that the factory system and appliances, applied to moderate and large private dairies, where there is a family, would be much better for this country. It is our hot-wind nights that spoil the transit of milk to our factories for cheese-making.*

*"Then there is another phase of the subject I should like to impress upon you, that is the quantity we might and ought to produce, and, if the male portion of our*

*David Wilson, continued, 18th June 1886.*

*farming community were to beatow a portion of the time, patience and perseverance in conserving water and growing forage for cows that they do in growing grain, our increase of dairy produce wold be at least 100 fold; and I am afraid the time is a at hand, whether they like it or not that they will have to do it, with the prospects we hare for grain and wool in the future. But I suppose the question that the Commission want to consider it what steps can be taken to impress upon the farmers the way of extensively opening up an increase of quantity and quality of this valuable product of the land? And what are the diffculties that he in the way of its accomplishment? These I will endeavour to name, and then suggest a pian to overcome them.*

*"First, then, is the scarcity of milkers, dairymaids, dairymen, or boys, skilled or unskilled. Go where you will, you cannot get them when you want then more especially females; and, if you do get one, they will not stop any length of time the job, because, as a rule, they are only milkers, and know nothing of dairying as a profession.*

*"Hence they have no inducements, in a pecuniary sense, to stick to the billet, and so take the first chance of ben eating themselves in some other line. So Ik dairying in Victoria is pretty well confined to married farmers with grown-up families and although I am not without hope of getting a good practical milking machine, still we must do something in the meantime; and what I think would remedy this to a large extent is, if the Agricultural Council would attach dainies to all the school farms they mean to start, admitting male and female pupils for a short session, and teaching them all the latest improvements connected with the manufacture of first-class butter and cheese, according to modern labour-saving principles. But I would not expect that our milking labour would be very largely recruited from this source, because I think, as a rule, the most of the pupils attend-ing the farms for a few weeks or months, learning to work the cream separator, steam cheese rats, and other appliances adapted to this hot climate, and in pre-pared to pay a fee for it, would go back to be bosses in their own dairies.*

*"Therefore, I would suggest that there should be at least one dairy farm estab-lished of, say, 2,000 acres, where there would be room for cultivating winter and autumn forage, combined with the natural grasses, to carry from 200 to 300 cows keeping 100 milking all the year round; and to obtain the milkers for the dairy would have the Council to apply for all the industrial school boys and grils, above ten years of age, and, perhaps, a good draft of reformatory boys and girls, if the other was not sufficient, taking your managers from the advanced pupils in your model farms.*

*"There is nothing to prevent children of ten years and upwards learning to milk a few cows night and morning, and get their schooling at mid-day. It is only what is going on every day in private circles. And if the Government would give a portion to the Council of what these children already cost the State for mainten-ance, added to the profits of the dairy, and a premium obtainable from UM farmen for certificated dairymaids and youths as they go out.*

*"This, I think, would be a financial success to the Council, as well as the blessing of taking those children from the old haunts in the back blocks of the cities to which, sooner or later, a great many of them go, and making healthy and happy colonists, and supplying an undoubted want in the dairy labour market.*

*"There is also another effectual way that this Council or the Department of Agriculture, or both, can diffuse informatiou for the benefit of dairy producers that is our agricultural shows. Agricultural societies offer prizes from year to year for the best butter and cheese, and those who know how to make a good article annually take the prize without any instruction being disseminated.*

*"Those who are good butter-makers are good butter-makers still, and those whose product is fit only for cart-grease continue ignoran of the means of altering the result.*

*"Is it then to be wondered at that instruction in dairying should be neglected in a country where there is not a single dairy—(I mean supported by the state)—with modern appliances that is available for farmers' sons and*

*daughter to get a lesson and see those simple labour-saving appliances, such as the Laval Cream Separator and Ramsay's patent cheese-making plant? As some of you are a ware, I have figured a little in this way myself in exhibiting dairy machinery at work at a few of our principal shows; and, I think, to the late Minister of thar purpose. And I Levien, is due the credit of giving the first State money for that purpose. And can assure the Council, from this experience, there can be a vast amount of good done in this way.*

*"We have been getting pupils every season from all parts of the the country and a good few from the other colonics, who, as a rule, take home with them fac-similes of our plant and machinery to go to work at once with our system of*

*David Wilson, continued, 18th June 1886.*

*manufacture; and, as a specimen of their success, A young lady from Kilmore, who hod been at cheesse-making under the old system for years, but could not make them to please herself, nor would, I suppose, her customers, crime to me for a month; and the next time I met her was at the Wine-growers' Exhibition, where she had entered cheese for their gold medal against very large competition, and carried it off, leaving me only with a third certificate. This, you will see, is a fair case of 'Jack beating his master,' and I was glad to see it, because it spoke volumes for our system.*

*"There is another colonial industry that is inseparably connected with dairying, that is 'salt.' And, perhaps, if I state to the Commission what steps I have taken in the matter, it might be the means of the Agricultural Department following it up to a more satisfactory conclusion, for the benefit of dairymen and the public generally.*

*"The following letter, which speaks for itself, I was requested by the Agricultural Department to hand to the Press with that object":—*

This is addressed to the Editor of the *Australasian* :—

*"Sir,—I, in common with a great many dairymen in this colony, hating lost a great deal of hotter and cheese through the effects of bad salt, resolved this season to have the different brands of salt in daily use analyzed, to which the Minister of Agriculture kindly consented; the result of which I now enclose for insertion in your paper, and from it you will see that our colonial manufactured salt takes first place, and what has hitherto been the favourite brand, namely, the 'Black Horse' salt, the last. This, I have no doubt will rather surprise the dairy public, for if there is one thing more than another that the grocer has been charged with, it is filling empty "Black Horse' bags with colonial salt, and selling it as the former, and thus furnishing an excuse to many a puzzled dairyman for the quality of bis butter; while it turns out now, if true, that he has been, doing us a service. I may add that I intend to still further test the different samples of salt, by putting down one churning with the different brands, and see which will keep longest."*

The Analyst's certificate is this :—

*"Department of Agriculture, August 30th, 1882. Sir,—I have the honour to inform you that the Government Analyst has reported as follows with reference to the samples of salt forwarded with your letter of the 10th inst:—No. 2, 'Tower of London, colonial, is the best and most free from impurity; No. 1, the worst. The others, Nos. 3, 4, 5, are about equal. As No. 2 is said to be a colonial salt, and our manufacturers are not very careful, the composition may be found variable. In a large factory of butter or cheese, it is suggested that standard tests for magnesia, lime, and sulphates be provided. I have the honour to be, Sir, your most obedient servant, D. E. Martin, Acting-Secretary for Agriculture. Mr. D.Wilson, Spring-bank, Egerton. No. 1, 'Black Horse' salt, McPhillimay, Ballarat No. 2, 'Tower, of London,' colonial, Berry. No. 3, 'Corbett's Dairy salt,' Wood and Co. No. 4, 'Corbett's do.', Priestly and Co. No. 5, 'Corbetas refined salt.' McPhillimay, Ballarat."*

I may mention to the Commission that I took some trouble in going down to town on purpose; I called at three different stores for samples of salt. Salt is a mercantile article. I took two samples of them to the Government chemist, and marked them as I sent them. You will see from that list that I gave all samples of colonial salts in daily use a fair trial, and this is your Government Analyst's answer.

1816. Which were the colonial sales and which the foreign?—The 'Tower of London,' No. 2, is a colonial salt. I think that that is my opening remarks upon this important subject, and, as I said at the beginning, if 1 have not made anything clear or plain I shall be too happy to answer any questions.

1817. You spoke of labour-saving appliances for the dairy; could you give us some information as to the relative amount of labour that

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would be involved in dealing with, say, a dairy of 100 cows under the ordinary system, and under the system that you, I believe, adopt yourself—what saving would be effected in labour?—In the dairy that I established two years ago, with a small three-horse power engine we saved fully 50 per cent.

1818. How many cows?—About a hundred cows.

1819. Do you get a better return from the cows?—I stated it the opening of that dairy that I expected to get from 10 to 12 per cent. more produce, and I am happy to say that has been fully realized, and about 15 per cent.

throughout the year better prices, and in the summer time fully 50 per cent.

1820. Do you speak of butter or cheese?—Butter, In hot weather these machines give us 50 per cent. more produce, and in cool weather, 15.

1821. How do you get that increase?—By the old system the milk has to stand in hot weather nothing less than 48 hours, and it must stand sometimes three days. By that time in hot weather the milk is sour in twelve hours, and the cream does not get out. With our magni-ficent cream separator every particle is taken off in five minutes, cold or hot.

1822. And how long after leaving the cow can you churn?—You can churn at once if you like, but we prefer to keep it a little to matare it If I get a telegram from Melbourne, and I am 150 miles by rail from Melbourne—I get a telegram at night that they want a box of butter—that they want it from the morning's milk, I can have it upon the table at four o'clock.

1823. But you would not recommend to churn from fresh cream?—For immediate use it is very good sweet palatable butter, but it does not keep so well.

1824. To keep the butter, how long would you keep the cream?—It depends upon the weather. In the present cool weather I would keep it three days to mature, not sour; then we get a butter that will keep in all seasons. In hot weather I might churn in twelve hours, if it was extremely hot.

1825. When do you separate the milk?—Every morning as it cow from the cow.

1826. You do not churn at the same time that you separate?—only in extreme cases; but I say that can be done. I can give a milker the butter in his hand before he has done milking the last cow. He is about two hours over his work.

1827. Will not the cream ripen as well after separation as before separation?—There is no difference in that; it requires a certain time to get a certain amount of acidity. It is the same in chees-making requires a certain amount of time. I have not studied chemistry, and so I cannot explain the chemical process that the cream goes through; but I speak from experience. You must use your own judgment as to the thermometer, and the time the thing takes to be ready for churing.

1828. Have you any estimate of the amount you receive from each cow per annum?—The produce or the monetary results?

1829. The monetary results?—Of course that is a big

David Wilson, *continued*, 18th June 1886.

question, and in asking questions where you are only expected to give an answer "Yes" or "No" it hampers one, so that the evidence is not very clear; but when I tell you that the value of a cow is at least £12 a season, of course you have got to average them. Some young cows will not give so much; some old cows will not give so much; some good cows will give double. I presume you want a general average?

1830, Certainly?—I do not think it is an extreme average to set down a cow at £12 a year clear profit.

1881. Are you taking into account the by product, the skimmed milk, for instance, that you would give to the pigs, or have you estimated its value as manufactured into cheese?—I set it down as clear profit in any branch. You use the milk too.

1832. Not the clear profit, but the value of the product of the cow gross, I suppose?—The whole of her product would be a great deal more for twelve months, but I allude to taking off her expenses. £12 a year is clear profit. Any fair average cow fed will give a farmer that amount per year, clear profit.

1833. Have you any views as to the kind of cows you should get?—Yea.

1834. Have you any objection to state what they are?—I found the Ayrshire cow for our climate far the best. It answered best for both butter and cheese.

1835. What grasses have you?—The natural grasses, and not first-class grass either. It is not first-class country.

1836. Do you mean the colonial grasses, or have you English grasses?—I have a few paddocks of English grasses, but the bulk is natural.

1837. How many acres does a cow require?—In our country it requires ten acres.

1838. Do you think that if the grasses were improved you could reduce it?—I would have more feed in dairying to go in for winter forage and autumn forage, either with or without irrigation or the silage in future, and I would feign have irrigation. Ten acres of irrigation to a farm would overcome all the difficulty.

1839. What is your land worth per acre here—take the ten acres per cow?—I have no idea. And as to asking my idea of the value of land, I might be a seller; it would not be a criterion. The laud adjoining mine has been sold from £3 to £7 10s.

1840. Where is it situated?—About three miles from the township of Mount Egerton.

1841. Would it let for 2s. an acre?—I would not let it for that. It would bring 4s., I should think. It is worth a greal deal more to me.

1842. Reverting to the important statement you made as to the increase of produce, you told us where the loss of produce came in under the old system, the milk going bad. Do you state that you get the whole of the cream from all of the milk in hot weather by a separator?—Yes, every particle.

David Wilson, 18th June 1886.

1843. Does not the weather affect the separation? Not at all.

1844. There is no loss at all?—No loss; it is all gain,

1845. What kind of separator do you use?—De Laval's.

1846. Are you acquainted with any other kind?—I have seen the Danish one, but it is not so well adapted, I think, for small diaria It does very well for large factories, but the Laval is so small, light, and easy, and does not get out of the level; that it is more adapted to a farm. Any woman can use it.

1847. Is the butter made by the separator better than the butter made under the old system?—We have got this year from 10 to 25 per cent. above any price we got before.

1848. Did you make butter before?—Yes, we tried every plan before we gut the separator, and if I was asked to go hack to the old system of dairying I would rather go to Pentridge.

1849. You spoke of the great difference in the samples of butter and the consequent great difference in value. Do not you think that even under this system there would still be a very great difference in the sample and value of butter?—No, I do not think so. Of course this climate is one of the most peculiar climates in the world for butter-making, for when it comes three or four hot-wind days, unless you hare a cool place to mature your cream you will not have good butter, and till that is overcome by artificial means you will always have a certain percentage of Victorian butter a drug. But one way to remedy that very easily would be a small refrigerating machine. I am in hopes we shall get it before long, a machine that would cost £30 to £50 to be worked by a little engine that you have upon the place, to cool a place say 6 feet square. It is the only want. If you could obtain that it would make dairying in Victoria altogether easier.

1850. How much space would you require to set the milk under the old system?—Three feet square would give the cream of 100 dairy con under the present system, but under the old system you would want a place 150 feet by 40 to keep the milk for three days.

1851. This cool place that you speak of is to mature the cream?—Yes; but that is another scheme. If I were in the northern parts of the colony, I should try what is called Kanas ventilating tubes, that is pipes laid about thirteen feet below the surface and carried some 300 feet to the dairy, and the end of the pipe carried up about fifteen feet into the dairy; the draught through it is always cool. They say it is a great success in America, and if that be the case I would be prepared to dairy in any portion of Victoria.

1852. Have you tried that system yourself?—On a small scale.

1853. Was it cool?—Not as cool as I would like, beacuse, instead being 300 feet in, it is only about 130 feet, and instead of being thirteen feet down, it is only three. I have not required it, because my and last season, a very hot season, was never more than 70 degrees, and some of the Commission may remember that last season we had not very perature sometimes 100 degrees in the shade; so you see I am not very hard up to get up either tubes or refrigerators myself. But the refri- gerator would overcome the difficulty of the northern

David Wilson, *continued*, 18th June 1886.

farmers. They make good butter in the winter season, as good as I have seen in the colony; but, you see, the moment the hot weather sets in there, they are dried up; they lose their cows, the cows are gone, they are of no use; but if you have some such meads as this to keep the milk or cream cool even for a night, with the silage, or ten acres of irrigation, they could dairy twelve months in the year instead of six.

1854. In the hot areas, if they had an excavation at a reasonable depth and well ventilated, would not that meet the case to settle the cream?—Yes; but I believe the refrigerator would be the simplest and cheapest, because there should be no dairy now-a-days but what should he prepared to make butter and cheese, and they ought to do that cheaply without an engine.

1855. Do you feed your cows in winter?—Yes.

1856. And in autumn a little?—Autumn is the principal feed. We give some green maize in autumn, and though I have tried ensilage on a small scale, we have up to now fed them with steam chaff.

1857. Have you tried any of the millets for feeding?—No; nothing but sorghum saccharatum, I suppose that is the nearest approach to it, cut up.

1858. Does that answer well?—Very well indeed; but our district has very sharp frosts, and you may sow a very large quantity, but the moment you get frosts you lose the lot; with a silo, you are independent. I have tried a little that way, but I suppose it is coming, I have not been perfect in that yet.

1859. You spoke of cheese-making plant suitable for a farm, as against the plant used in the factories, and you mention Ramsay's plant; is that one suitable for individual farms?—Yes, I think so; it is the cheapest and most effectual I have seen.

1860. What is the smallest number of cows that would justify the employment of those plants?—You could use them with a dairy of ten cows.

1861. What would be the cost, of that cheese-making plant complete?—For a dairy of ten cows; I believe you could get a vacuum-heater, all ready to put the milk in and take the cheese out for about £15; everything is made to the cheese-maker's hands, she could not make a mistake; it comes out ready for the press. Of course, for a dairy of 100 cows the plant would be larger and more expensive.

1862. Can you recommend any system that would regulate the supply and the price of butter?—Of our produce in the market?

1863. Yes, the butter?—That is just the anomaly of the business.

1864. I thought when you were reading that you had some sugges-tions to make to regulate the price and supply?—By making a good article, and using the machines 1 have mentioned there, that would do it; I know of no other way.

1865. Have you seen anything in the shape of a milking machine tried?—Nothing successfully.

David Wilson, 18th June 1886.

1866. You laid great stress upon that in your Paper? but I see a notice in an American paper that some-thing is coming, but whether it will be succcessful or not we cannot tell till it comes.

1867. In your experiment of ensilage, did you put any salt with it?—No.

1868. Have the cows access to lime, or is the water that they drink treated with lime?—Our country is a fresh country; there in no salt in it; but when we steam chaff we always salt it.

1869. Do you treat the water with lime at all?—No; it is too expen-aire; we cannot afford it.

1870. Do you think it would pay to export butter and cheese a England from here?—I think it would; my experience bas been both ways. Some eighteen years ago butter was a tremendous drug in the colony, and I think it was about the first year I came to Egerton; you could buy butter in the colony for 3d. a pound that year, and 23 or 25 of us resolved to try the English market with our batter at that time. I was not in charge of the dairy myself, they depended on Mrs. Wilson, who has been a dairymaid from her childhood, and we shipped a con-signment apiece, with our separate brands, to the English market. It were to copy the successful ones, but I am sorry to say the result of that consignment to England was most deplorable; the whole of the 25 dairies in my district was sold for cart-grease in London. Since then, I am happy to say, that after taking charge of the dairy myself, I make a consignment, not only of the salt, but of the fresh butter, to the Los-don market. I was so thoroughly convinced that I was in the right groove that I resolved to try it. Will the Commission allow me read the agent's letter to me from London of the result of the consignment; it will speak for itself better than I can give it. I may mention that I consigned this second consignment through McCaw, McIllwrick, and Co, of Melbourne, a very old established firm.

1871, In what year?—November, 1881 "89 Queen-street, Mel bourne, 4th June, 1882. Mr. D. Wilson, Spring Bank, Egerron. Dear Sir—We herewith enclose our London agent's report of your consign ment of fresh print butter per s.s. *Protos*, which sailed from here in December last; also find cheque in payment of our account sales-are sure you must feel much gratified at the result. We are & c. McCaw, McIllwrick, and Co." This is the London agent's report:-"London, 7th April, 1882. Messrs. McCaw, Mclllwrick, and Co. Gentlemen—We last had this pleasure the 10th February, since which the *Protos* arrived, after a very long voyage for a steamer. We found D. Wilson's, of Egerton, fresh butter in prints in excellent condition and quality, and had no trouble in selling it at 138 shillings per 100 Ibs, for which we enclose draft. This lot of butter certainly was superior to any we have seen in our twenty years' experience in the London market, and we shall he glad to receive any quantity you can send, as we are sure to find high prices for it. We had the Pleasure of showing it to Sir Henry Parkes, and he was very much pleased wish it."

1872. By what means did you get it home in the fresh

David Wilson, *continued*, 18th June 1886.

David willson. condition?—That is the point; I do not decline to show it to my pupils, but there are secrets in all trades.

1873. I think what Mr. Madden means is, was it in a refrigerating chamber in that ship?—No, it was not; and the most remarkable thing is this—I have known a great deal of butter consigned to Melbourne stand sometimes ft day in the railway shed, and a day upon the wharf, and going to Sydney, it got no chance. I went therefore to Melbourne to see about it, and I found there were 38 tous of butter in the hold shipped by one man. My cask was put upon the top, and just alongside the outside walls was a freezing chamber; there was no room for it inside at that time. I tried the temperature of the hold at the far end, and it was from 78 to 80 degrees, but I do not think it was quite so hot up against the freezing chamber, That 38 tons of butter was sold in London the same day at 8d., the day mine brought 14½d,; a remarkable difference. It ruined the man, and it showed me that I could make a fortune, if the colonials refused to take my butter.

1874, The dairies in the Kerang district are mostly cheese manufactures. You spoke about the hot winds spoiling the milk in the night time?—Yes.

1875. Will you suggest any remedy?—We have a way of preserving it by a composition of my own, a purely vegetable product; glacialine is sold for the purpose, but it is not that, I am not going to tell you what it is; I will tell you what it is not. One of the difficulties in cheese making, as Mr, Yeo remarked, is in a district where there are plenty of cows and plenty of milk. A man starts in very favorable circumstances, the milk comes in the first season very well; there come three or four hot-wind nights, and the milk comes in in the morning, and perhaps out of 1,000 gallons 20 cans have to be sent back, The man must protect his interest, the producer does not like it, and she refuses to send milk at all. This comes to them all in turn, and consequently the factory does not get the supply of milk that is wanted, and the factory has to shut up. With the proper machinery, they have not the risk of the milk going sour in transit; that is the advantage of having a factory upon the farm, where the milk is not exposed to that risk.

1876. Do you think that dairying can be carried on at the Dookie Experimental Farm, or in the northern district?—I have been to the Dookie Farm, and perhaps the first department in the farm that I saw was in my own profession. It was in a most deplorable state. I do not think the manager is responsible for that at all; but the milk that I saw there, the little milk that they had, upon my word, I would expect to have found better in the stone-breaker's tent upon the road side. In fact, from a sanitary point of view, I do not think it was right to have such a thing. Evidently a dairy had been constructed there, but for want of a lining, what little milk they bad was spoilt. It was a hot wind day, and the dust was blowing in, A reporter of the *Telegraph* was with me, and we had a difficulty in finding whether the milk standing for cream was fat, dished up with dust upon the top, or whether it was milk.

1877. I merely ask, is the district suitable for a dairy?—If by what I saw, I should say no.

1878. But it is not fair to condemn a district because the thing had been carried out in a had way?—Just so.

1879. I think you said, with a little irrigation, dairying can be carried on in any part of the colony?—Yes, if we get the refrigerating chamber; and, no doubt, even upon the Dookie Farm, with a little irrigation and a little food provided—either ensilape or green stuff for the autumn—dairying could be conducted in the district, and profitably; and I would have no hesitation in undertaking to make a dairy pay there, because, till we got the improvements I mention—either the ventilator or the re-frigerating pipes—I should make cheese instead of butter; and we are never stuck with cheese, because the morning's milk is in the press by three o'clock in the afternoon. Of course, I would never at attempt to make butter such a day as I was there; still it would not affect the profits of the dairy through the year.

*The witness withdrew*.

# George Smith examined,

Georpe Smith, 18th June 1886.

1880. What are you?—Nurseryman and seedsman.

1881. Where are you residing?—In Wendouree, near Ballarat.

1882. I believe you have prepared a written statement for the Com-mission?—I have. There were two difficulties I had to overcome. The first was, that I was appointed by the Agricultural Society in my absence, and I was somewhat surprised, as I thought there were many men better fitted from their position to give evidence; but, as they had confidence in me to do it, I could not very well decline; and the second was, that I hardly knew the form to put the evidence in. However, I have done my best.

1883. We shall be very glad to have it read?—[*The witness read as follows*]:—On behalf of the Agricultural and Pastoral Society of Ballarat I beg to make the following comments:—

*"The abundance and superior quality of the agricultural products, for which the markets of Ballarat are distinguished, are probably the fruition, and certainly the just reward, of the interest that has always been manifested by her farmer's agricultural improvement. As early as 1857 a number of gentlemen interested in agricultural pursuits met together, and established the first agricultural society in this district. This society has the proud distinction of having led the ways in its OWN particular sphere, and induced the creation of many kindred associations; prompting and stimulating improvement by holding annual exhibitions, at which five stock, implements, grain, butter, cheese, &c., were brought into The exhibitions of the society have, especially our sheep exhibition, attracted throngs of intelligent observers, practical cultivators, and stock owners front neighbouring colonies, as well as from New Zealand, and have diffused a most Salutary and beneficial influence. The shires immediately surrounding Ballarnt are four, viz.:—Ballarat shire. Creswick shire, Dungaree shire, and Grenville shire they have each their individuality in their products, and rival the best shire in any other part of the colony, both in the quality and quantity of their produvtioes*

*"Ballarat shire.—Lying to the north and west of the city, contains large tracts of volcanic soil, and also considerable areas of strong loan on clay subsoul.*

*The Learmouth, Springs, Cogbill's Creek, and Bald Hills districts are largely volcanic in their soils. For* *the first ten or fifteen years after settlement these lands were almost exclusively devoted to the production of wheat*

*Georpe Smith, continued, 18th June 1886.*

*and oat crops. Por the last ten or fifteen years mixed husbandry has prevailed, and most of the laud in Ballarat shire is now farmed partly as arable and partly as pasture land. Root crops, as potatoes, mangolda, swedes, and carrots are grown, but not extensively; but nearly all this land is eminently adapted for their culture, and the yields in some cases are very large. This shire also contains some of the finest sheep country in Victoria, we might say in Australia. The low-lying lands about Learmonth, notably Ceres, are occupied by their owners as sheep farms exclusively and the hula of Ercildoune beyond the lake, covering a large area of fine fertile country, are also devoted to sheep farming. This shire has been well timbered in early years, but has now been denuded of nearly all its indigenous timber, with the exception of Ercildoune estate. The shire council have in past years paid considerable attention to planting their shire reserves, but much remains to be done. The principal trees planted have been pinus insignia, with elm, oak, and bluegum. All the trees in the reserves planted have much rapid Egrowth, and will in a few years be valuable for both ahelter and other purposes. Live hedges have been planted extensively in most parts of this shire, the white thorn, whin, and box thorn being the principal varieties used.*

*"Crewrick Shtre—This shire contains various kinds of soil, for instance, that line of country from Spring Hill to the south, including Dean, and on the east including the Kangaroo Hills, Smeaton, and Kingston districts, are all good alluvial soils, with large areas of very rich volcanic soils. This was in its first years cultivated much on the same lines as Ballarat a hire, but recently root crops have been largely grown, and many thousands of tons of our finest potatoes, and other root crops nave been raised. Mixed farming is also prevailing of late years, as some of the most enterprising of the farmers have gone largely into resting their lands and raising sheep and horses. In many parta of this district, underground drainage has been largely used for improving the low-lying lands. Live hedges have also been extensively planted. The hills of this district, on the Ballarat side of Creswick, are, in many places, poor, and very stony; but we think many portions could be usefully planted either with acacias or other indigenous trees, as the whole of the ranges were formerly covered with heavy timber.*

*"Bungaree Shire,—This shire possesses many favorable features in its climate and general character. The chief part of the shire was formerly the heart of the great belt of forest country running parallel with the Dividing range, and is still, in some portions, very heavily timbered. The greatest portion of the soil in this shire consists of a rich volcanic ash, on a strong basalt subsoil. Its fertility has been proved by its large yields of grain, pease, and root crops; as a potato and pea district it stands pre-eminent. Nearly the whole shire abounds with permanent springs of the finest water. The Ballarat Water Reserves, that occupy a long narrow strip of country right in the heart of the shire, have been planted to some extent by the Ballarat Water Commission; but larger areas still remain unplanted and unimproved, so far as forestry is concerned. These reserves, if properly planted, would, A few years hence, be of great value, From the altitude of this area, some 1,600 feet above the sea, nearly alt the deciduous trees of the northern hemisphere grow most luxuriantly. Here also the most valuable of our indigenous timber trees would flourish, as the blue gum, stringy bark, and others. We might mention that a number of tea plants, supplied by Baron von Mueller some years since, have grown as freely as any indigenous tree or plant in the reserves.*

*"Grenville Shire.—Lying to the south and west of Ballarat, is principally of a hungry, poor, loamy soil, and is principally devoted to grazing.*

*"Dairy and Sheep Farming.—The land under cultivation in this shire is much less than in either of the former shires named, excepting the eastern portion. Between Buninyong and Cordnroy there is a long strip of strong rich land, which was formerly heavily timbered, and is now nearly all under cultivation.*

*"Grasses.—The land laid down to grass in the Ballarat district is mostly under perennial rye grass. Where mixtures hare been used, they have been principally red and white clover, timothy, and rib grass. Cocksfoot, except in the Dean and Mount Prospect, and to some slight extent in the Coghill's Creek district, has been hut little sown.*

*"I have not mentioned our resources as a fruhVproducing district, but nearly all the English fruits succeed here admirably.*

*"Cultivation.—The farms of thid district have always been to the front in seizing upon the best and latest implements, and on nearly every farm the latest and most highly improved reapers and binders, double-furrow ploughs, harrows, seed drills, and scarifiera are procured and utilized; even the Hodges Hornsby*

*Georpe Smith, continued, 18th June 1886.*

*Hedge Clipper has been introduced, and every new implement sur to be partronized that will assist in minimizing labour.*

Geoge Smith, *continued* 18th June 1886. "Through the courtesy of our market inspector, Mr. Jabez

Richards, I bave been able to analyse our returns for some years past, and I find on former years, up to the preseot date, an increase of 17 per cent. on our former yields, as show a by our market returns.

G. Smith
Ballarat,

June 17th, 1886.

Increase for the present year fully 17 per cent on any former year.

I analyzed them for some years past, and there has been a gradual increase. I might say, in addition to that, what would detract to some measure from these averages, that of late years many of the larger fanners in the Bulla rook district, since the railway has run out to Wallace and other places, and at Cogell's Creek and Clones, many farmers have put up mills of their own for chaff-cutting, and now instead of sending their produce here, they utilize those chaff-cutters, and send the whole of the hay and straw direct to Melbourne and Sydney merchants. Of course that has detracted in some measure from of returns, and yet our own market shows an increase of seventeen per cent. over any other year. There has been a gradual increase right through. I am an old member of the Agricultural Society, and have been in the habit of supplying their wants, and as I have been producing to some small extent myself, I suppose they thought I could give you some fair ideas.

1884. Has any special plant been introduced here other than the ordinary wheat, oats, barley, potatoes, and so on?—There has been nothing—speaking as a seedsman—further than we have had froto New Zealand from time to time, We have had one or two varieties of oats. Do you mean outside the ordinary cereals?

1885. Yes?—No; from our altitude it does not answer. Some of the farmers have tried—especially in connexion with dairy-farming-tried lucerne. That has been a failure in this district. It will grow, but this district is not a home for the plant; and they tried millet, sorghum, and maize. We sell on the average perhaps five or six tons of maize to the dairymen and farmers; still the quantity used in this district is very Small, and it does not increase.

1886. Has sugar beet been tried here?—It has, but not extensively.

1887. Does it grow well?—I have had favorable reports. Two or three farmers still grow a little every year, but it is not extensively grown.

1888. Has it been analyzed to ascertain the percentage of saccharine matter?—Not that I am aware of.

1889. What is used principally at the distillery here?

George Smith, *continued*, 18th June 1886.

—Grain; rye they use very largely, and barley; those are the two principal. They are large buyers of barley, and they buy all the rye they can possibly procure.

1890. Do they never distil from beetroot?—I believe never at all.

1891. You spoke of planting forest trees, and you said that in a short time they would be profitable to a man for the timber?—I mean for the timber.

1892. How many years would it take for the trees you speak of to be profitable?—If the forest reserves of which 1 speak were managed upon the same principle as the noblemen's estates upon which I worked when I was a young man at home, if they were to keep a small nursery of their own, and annually raise some thousands of trees, and have a proper system of planting, they could begin to thin them in eight or ten years profitably.

1893. What would the trees be useful for then?—For mining and all kinds of machinery. Many kinds of European woods grow rapidly, and are a perfect timber.

1894. Will you mention a few of them?—I think ash and elm grow well there.

1895. Is the pinus insignia a valuable timber?—As a pine I do not think it will be the most valuable. The deal from it, I think, will not ever come into competition with the Norway spruce; but of the Norway spruce I have had some remarkably fine specimens, and I think, if the Commission could devote a day to travel through those reserves to see the timber they did plant there some years ago, they would come to the conclusion that the Water Commission, instead of leasing those lands, would do far more for the country if they systematically used them for forest purposes. It is the natural drainage of a large area of country, and it stretches through about ten miles of the very heart of the agricultural district; and, from its altitude, I believe if a large belt of timber were conserved there it would pay all its expenses, after the first few years, from the timber taken off it, and it would form a natural shelter for the whole district.

1896. Has any red gum been planted upon it?—No.

1897. Would it grow, do you think?—I think it would.

1898. Does altitude affect the growth of redgum?—The finest foreste of redgum were at Echuca.

1899. Have you any redgum growing near Ballarat?—There may be a few, but very few. There are none indigenous that I am aware.

1900. Do they grow well?—The whitegum is the gum that is indigenous to the district.

1901. Have you seen the redgum growing well and vigorously here?—I have not. I do not think there is a single specimen.

1902. Does hickory grow?—I think hickory would. I think most of the deciduous trees of the Northern hemisphere, from its altitude and the richness of the soil, would do remarkably well.

1903. Larch, and cedar?—We are rather too warm for the larch, and for the Scotch fir: but I have seen some fine larches.

George Smith, *continued*, 18th June 1886.

1904. You said that timber would be useful in ten years. Is that from the present time?—From the time of planting. If it was undertaken you would plant thicker than you want the trees to remain permanently. When trees get to six or seven inches there is an immense demand for timber of that size for mining purposes. They could always be cut usefully, and run them out, the same as we used to do on gentlemen's estates at home.

1905. What distance do you recommend for planting them?—That depends upon the nature of the tree; I should commence at six or seven feet apart.

1906. Would you plant one variety of tree or mix them?—I should have rows of each kind, not mix them. Then, again, some of that land is very wet and swampy, and that is just the very country for redgum.

1907. Has the black or silver wattle been tried here?—Either of them would do admirably, and they would do admirably in the Story Rises and out in the Creswick district.

1908. Has the American red deal been tried here?—Only sparsely.

1909. Would it succeed well?—It would I should think.

1910. Would it be valuable timber?—Very.

1911. Is there any plant to which you think a farmer could profitably direct his attention to in this district, other than those usually grown?—Do you mean as hedge-row timber or as plantations?

1912. I do not at this moment refer to trees, say, fruit?—I believe this district, taking it as a whole, taking the volcanic soils, farmers ib planting for profit should plant all the early fruits, and on the black soils where they have strong clay subsoil, like the Beaufort side, on those ranges it would do better for English fruits, such as apple and pear; but those do not do so well upon the volcanic soils as the small fruits. In the Bullarook district all the small English fruits can be grown to any extent, and there is always a market for them at a very high price.

1913. Are there not some other vegetable products that you, in your knowledge as a scientific gardener, would recommend to be introduced into this and other parts of the colony?—There are many I would like to see introduced, but at the present time the farmers, till the last few years, have not had their attention turned to anything but the raising of the usual crops.

1914. But the object of this Commission is, if we can, to turn their attention in that direction by getting the information from experienced gentlemen like yourself?—Upon this dividing range, and with the attude that we have, almost any produce that would do in the south of England, and in the whole of the southern counties of England, ought to do here admirably.

1915. Can you mention some specially?—I should think, myself, as an improvement in farming, if they were to grow trifolium. Now, of course, they are trying mixed husbandry; but till they have either stall-fed cattle, or grow more for their stock, root farming would hardly be useful.

1916. Have any farmers tried tobacco?—No, one or two have tried it in the forest, but it bas never been a success that I am aware of.

1917. Why is that?—I suppose, in a great measure,

George Smith, *continued*, 18th June 1886.

George smith, from the want of knowledge of those who took it in 18th June 1886. hand; one or two used to grow tobacco, but they gave it up after a few years.

1918. Has chicory been grown successfully?—It has been grown; know a farmer out at Learmonth that did it, but he never proceeded with it; the demand for chicory is very limited.

1919. Does it grow very well?—Very well in this district.

1920. What number of tons to the acre, do you know?—I never saw it tried by the acre, but it grows well and gives a good return.

1921. You spoke of other products, but you had not quite finished? -I was speaking of trifolium.

1922. Would it be more convenient to you to send out a special report from that point of view, so that you can have time to think it over?—And any new plants?

1923. Tes, not only for this part of the colony, but for other parts?—I shall have great pleasure in writing to you; I will go carefully into it.

1924. Will you permit me to suggest a few headings—for instance, our Commission is to inquire what vegetable products, other than wheat and grain, the climate and soil of this district are suited for; for in_stance, in this district Mr. Wilson told us that, with a little irrigation, he could increase his profita, and make his industry much more profitable than it is now. Then, again, on the question of drainage, you say you have had some drainage done in this district; it would be very import—ant, indeed, to give us some information as to that. Then, as to fruits, we should like a very full report, not only of those that are now grown here successfully, but those that might be. Then, again, we should like to have your views, specially, with reference to timber; I see that you have given that matter special attention, and we should like very much to have your views, at length, as to the sorts of timber that might, with advantage, be introduced here, how they should be introduced, and generally your remarks upon the subject. Then as to labour—of course that is a delicate question to touch—but the last witness pointed out to us the difficulty be had to meet the point; you may have, perhaps, some suggestions to make upon that subject. Then, finally, the question of machinery; of course, that gentleman made a very important statement to us just now, that in his particular line, owing to his having introduced machinery, a saving of 50 per cent, was made; no more important statement could be made than that in reference to any industry; you may be able, upon that point, to give us also some very valuable information?—Thank you, I will consider it.

1925, You might also add to that any information you may gain from your experience as to whether any of the scent plants would flourish in this district?—Yes, I will go carefully into it, and give you every information in my power.

1926. You speak of the tea tree answering well?—Yes.

1927. What kind of soil does it grown in?—The chocolate soil. I was speaking to one or two very intelligent Chinamen about it, and they had been to the Beech worth district looking for an area for the purpose

George Smith, *continued*, 18th June 1886.

of going into the tea culture, and they had seen the tea specimens in the forest, and they said they were as fine plants as they would wish to see for commercial purpose; there are five or six varieties there, chiefly the green varieties.

1928. Is not the greatest difficulty in tea culture in this colony the question of labour; it is so costly in this colony that it would make the industry unprofitable, if you had to employ labour at its present rates?—I have no doubt you may manage, but that the tea plant may be grown here well; but as the cost of labour comes on, it may not be profitable without labour.

1929. Have you seen the plant growing at Macedón, in the Nursery there?—Yes.

1930. What height does it attain here?—Those plants are about 4 feet.

1931. How many years were they planted?—About seven or eight years.

1932. Were they raised from seed?—They were raised from seed by Dr. Mueller, and he sent up a few; I had a few and sold them, and they did equally well.

1933. How does that correspond with the height they would attain in the same time in China or India?—I told the Chinamen about it, and they went out to look at them, and from what they said they were just as good as they would be at home, and there is every sign, from the wood they make, and the leaf, and everything—

1934. Has the leaf been gathered at all?—I think not.

1935. Would not it be a nice experiment to gather a few leaves and try what the article would be like, and its results?—Yes, I should think so. Mr. Lang, who was formerly in this city for many years, was one of the most enterprising men we ever had in introducing new plants for experimental purposes; I think if there is any man in the colony we are indebted to for introducing new plants, it is he.

1936. Could he give us good evidence?—I think his experience would be very valuable to you; I have always looked to Mr. Lang as one of the most energetic and enterprising men we ever had in introducing new plants.

1937. You led us to believe that the pinus insignis was not a profitable tree, but you do not mean to say it does not grow fost?—All my doubts are as to its timber, commercially speaking, but in every other respect it would pay fairly well to grow; it is a fine shelter. Mr.ware of Yalla-y-Poora, about fourteen miles from Buangor, planted narrow belts, about two chains wide, of trees; he did this very extensively, and he told me that the sheep upon those plains gave fifty per cent, more yield since they were sheltered by the trees. They are largely composed of pinus insignis.

1938. Were they planted in from pot plants?—He used to buy them from me in seed boxes by the thousand, and keep them a year, and put them out a chain wide.

1939. By saying that the timber will not be good, you mean that it will not be first-class timber?—I think it will not be first-class timber.

1940. It might be used for boxes and packing cases?

George Smith, *continued*, 18th June 1886.

—Yes, exactly. Then at Trewalla, where Mr. Norman Wilson is now, they have planted extensive belts of acacias and gums, more than pines; but they ploughed and harrowed the land, and then sowed the seed.

1941. Is that a good plan?—It has answered very well upon some estates I have seen; the only fault is that they are liable to sow too thick; if they plant six or eight ounces to the acre for forest purposes, it is far better than sowing more. Those acacias upon the Colac line Were sowed by some one who had no idea of what he was doing; they have sowed about ten times too much seed.

1942. It is stated by a gentleman who is responsible, I believe, very largely for the thick sowing, that the object he had in view was to prevent fire; that had they been sown more thinly the grass would have grown up between them, and the trees would have been destroyed by fire, and he says that certain of those trees will take the lead, and (if the others are cut out) they will make good timber. What is your opinion?—My opinion is that they will die out, being too thick; you see them dying out even now, after being thinned; you do not get the rapidity of growth, commercially speaking—you do not get the return in bark; and all indigenous trees, if too thickly planted, die out in a few years.

1943. The gentleman responsible for that is Mr. Rees, and he is a practical man, and his opinion was and is worth careful consideration; if the trees were thinned out to 3 feet or 3 feet 6 inches apart, nearly the whole of them, do you think that at that distance apart the bark would be likely to be valuable?—They are too thick then.

1944. Even if thinned out from time to time?—Yes.

1945. And they would be much better thinner?—And they would be much better thinner, you would get a far better return in bark, and a far more rapid growth in the tree.

1946. Your opinion is that the industry is even now being neglected?—Entirely.

1947. And that there is an enormous source of wealth there for the colony if properly gone into?—Yes, and there will be a great necessity for it by-and-by; there have been great climatic changes since I came to Ballarat. When we had a great forest belt of country we could grow many things thirty years ago that we cannot grow now; for instance, the peach nsed to ripen here, and many tender trees, but now it is colder. We are upon the Dividing Range, and we have extremes of heat and cold.

*The witness withdrew*.

# Sebastian Rennie examined.

1948. What are you?—Nurseryman and seedsman.

Sebastian Rennie, 18th June 1886.

1949. Where do you reside?—I am deputed by the Horticultural Society of Ballarat, and I reside in Ballarat.

1950. Has your experience been very largely in Ballarat?—Yes, and the nurseries at Warrenheip.

Sebastian Rennie, *continued*, 18th June 1886.

1951. You have had English experience, of course?—yes.

1952. you also have prepared a paper for the Commission, I believe?—Yes. [*The witness read the same as follows*]:—

*"The climate of Ballarat is one of the coolest in Victoria, and admirably suited for the production of a great variety of fruits and vegetables as well wheat. The soils are chiefly volcanic, with here and there large patches of alluvial and sandy loams, and long stretches of the old quartzose formation composed of ranges and gullies, which are, as a rule, very poor; yet, with proper aspect and subsoil, some fruits are produced fairly well. Twenty-six years ago the climate of Ballarat was much warmer and milder than what it now is."*

At, that time Mr. Lang had a nursery at Warrenheip, and I was in his employment.

*"At that time fruits of every description were gathered into the nursery at Warrenheip and planted away, even oranges, having two objects in view—their accuracy, and if the climate and soils were suitable. Among them were a large collection of grape vines, which were the first to show that the climate was altogether too cold. We could grow vines, but we could not ripen the fruit. The same may be said of apricots and peaches, which soon gave way, and from the same cause."*

Perhaps, three or four years after the country began to be opened up, they showed signs of distress, and soon afterwards they died.

*"Apples and pears on the volcanic soil for a time promised well; but, after eight or ten years, they, too, showed signs of something wrong; and now, after 20 years, they are all but a complete failure. A few of the more bardy varieties struggle on. Of course, with apples and pears, some other cause than 'the cold' had to be accounted for,"*

as they are natives of a cold climate, and something else than cold had to be accounted for.

*"I could only reason thus. These soils are very deep—4, 6, and 8 feet. Apples and pears are inclined to root deeply, and having nothing to intercept the roots going down they got away from all influence of sun and air into a cold subsoil where the roots wasted : hence the failure. And yet these same fruits on the old quartz formation, with the clay subsoil and proper aspect, succeed well, and give off large crops of fine fruit."*

Apples upon this quartz formation, with an eastern and north-eastern aspect, away from the hot afternoon sun and with a clay subsoil, do remarkably well.

1953. Now?—Now, even though they are a failure upon the chocolate and volcanic soils. And I believe, with irrigation, all the ranges here with an eastern and north-eastern aspect would bear fine pears and armies, with a little preparation at the commencement.

*"Plums, also, on the volcanic soil, are not a success. Certainly they stand out longer than the apples; but like them, they succeed better on the quartz formation The following small fruits are a great success both on the volcanic and other deep soils:—Cherries, gooseberries, currants, raspberries, mulberries, fullbert-nuts, chest-nuts, walnuts, and such like fruits. The most of these fruits nature themselves early in the season before the very hot weather sets in, and, as a rule, give satisfactory returns. Water not being available, I have no experience as to the difference irrigation would make. No doubt, if it were available and applied judiciously at the proper time, better results would be assured. Still, too much water is sometimes an evil. The fruit becomes soft and carries badly to market and the flavour is_ destroyed; and when preserved it keeps badly. For these fruits we have alrady a market, both in Melbourne and up country, which is yearly increasing. Still my impression is that our supply and demand are about evenly balanced and were we to plant extensively now, in four or live years we should require to look for a market outside ourselves. Sydney is a good market. Hitherto the*

*Sebastian Rennie, continued, 18th June 1886.*

*Sebastian Rennie drawback has been the length of time in transit by boat, and the perishable nature of the fruit, that often on landing it was much damaged, and its value reduced. This might be got over if our Commissioners of Railways could see their way to run express trains for perishable goods at as low a tariff as possible. This district is also well suited for producing all sorts of garden and farm seeds. Sugar beet also grows to great perfection, had we only a sugar factory in our midst. There are some other seeds largely used in commerce, such as white mustard, carraway, and coriander seeds; these succeed well, and are as easy of cultivation as carrots or turnips, and a similar treatment suits them."*

Of course, a great many forest trees of all sorts succeed admirably well.

1954. You said that 26 years ago the peach flourished very well here?—Yes.

1955. How do you account for their failure lately?—The cutting away of the timber. The nursery in Mr. Lang's time was the first cultivation out there, and we were surrounded with timber on every side, so that the climate then was very different. Peaches and apricots lived there for three or four years, but as soon as the country was opened up they failed.

1956. Did they die?—They died after a few years. The fruit gave way first, then the branches began to die, and only the points were alive.

1957. Are they not planted at all?—Not for fruit. We still grow them for sale to go up and down the country. The young trees do very well.

1958. Gooseberries do well here?—Yes, they are a great success.

1959. Do you know the weight you would get per acre?—The approximate weight would be, perhaps, for a tree, 24 pounds.

1960. How many trees to the acre?—About six feet apart—1,200 trees to the acre.

1961. One thousand two hundred trees at 24 pounds each?—Yes. I have taken more, but I have taken less. I think that would be a good average of the best sorts that can be procured and under high cultivation.

1962. That would be twelve to thirteen tons to the acre?—A fraction over twelve tons to the acre. One hundred trees give nearly a ton.

1963. What is the market Value generally?—Generally, I think, about 2d. a quart. A quart is a pound and a half We sell green gooseberries in sacks, by the quart.

1964. A pound and a half for 2d.?—Yes. We got more than that last year. We got that on Ballarat last year.

1965. Have you ever had an over supply?—Sometimes there was not a very ready sale, not often. Last year there was very ready sale.

1966. Do you find a local sale for the whole you grow?—No, we send the great bulk to Melbourne.

1967. Are they used for jam or for dessert purposes?—A great many are consumed daily, and many are used for jam.

1968. At what age would a plantation of gooseberries Come into full bearing?—You get a few in four years, and a few more in five years;

Sebastian Rennie, *continued*, 18th June 1886.

but you cannot count much till six years to get much return. Meanwhile you could be cultivating some root vegetables between the rows.

1969. Have yon grown raspberries here too?—Yes; not to a great extent. They do extremely well. We never grow them for market but grow for sale, and what stand for stock bear extremely well.

1970. Are they generally grown in the district?—Yes, very largely, but not with us; and they do well.

1971. Do you know the weight of raspberries you get per acre:—I do not.

1072. Or the price?—They run 3d., 4d., and 5d. on Ballarat.

1973. You have tried oranges?—We did. They are living yet, alter 26 years, but the trees give only green fruit.

1974. Always green?—Always green.

1975. And lemons?—They grow as a shrub very well.

1976. Does the walnut tree grow rapidly here?—They do, and they fruit well.

1977. Is the walnut from which the fruit of commerce is obtained the same tree from which the timber is obtained?—Yes, the same; the common European walnut.

1978. Is that the same as the American walnut?—No. A lot ot those hickories from America, there is a great many varieties; also walnuts, though not so good for eating.

1979. What age are the oldest walnut trees in this district?—Abort, 20 years, I think, our oldest trees are. They are good large ones.

1980. What size would they be in the stem?—They are now 20feet high.

1981. And what circumference in the stem?—I could not positively say. I should guess it about 18 inches.

1982. More than 18 inches in circumference?—They are notso large in the bole.

1983. That would be only 6 inches through?—It must be more that that. It must be 9 inches at least.

Measured since, 14 inches in diameter, 18 inches above ground.

1984. Is not that very slow growth for 20 years?—They are not very rapid in growth. The walnuts in the old country are hundreds of years old.

1985. What size do they attain there?—A great size, 3 feet and 4 feet in the bole through, perhaps 3 feet above ground.

1986. Would the trees here attain the same size?—Eventually they would. They are just as healthy here as in the old country.

1987. Would it not be a very great advantage if the farmers here would combine other products with their growing of grain and grazing?—Decidedly.

1988. What product do you recommend them in this districs to grow?—grow?—The walnut, for instance, would give returns in a very short time.

1989. Generally, fruits or timber trees?—Fruits and timber trees.

1990. Would the wattle be a valuable crop?—Yes; but

Sebastian Rennie, *continued*, 18th June 1886.

on good lands I would not say "good." It is a waste of good land. Our ranges would do.

1991. On the ranges you have a quantity of poorish land that would be well suited for wattles?—Just so. Plenty of poor land all round Ballarat would grow wattles.

1992. Are you of opinion that limited irrigation here would be of great advantage to the growth of fruit trees?—Yes, limited irrigation. Fruit, when once it comes near maturity, the drier it is the better, till it is ripe.

1993. Still irrigation is good in the early stages?—Yes.

1994. You are also strongly of opinion that the timber industry is neglected here?—Decidedly.

1995. Is that one of the most desirable industries to encourage in this district?—Yes. Apart from timber altogether, we want to replant for shelter, and nothing is better for it than blue gums and pinus insignis.

1996. But apart from that, you think timber could be grown in this locality to very great commercial advantage?—Decidedly.

1997. And could be grown profitably?—Decidedly.

1998. Are sparrows and birds very troublesome?—Yes, they are becoming very troublesome, and, beyond the fruit, now they attack the vegetables—pease, for instance—as soon as they appear above the ground. In a month hence they begin to pick the green heads as they come through.

1999. Is not the nuisance so bad that something should be done?—Yes, something should be done immediately.

2000. Could they be easily poisoned. If all the people in the district were compelled to poison them, could they not?—They tried some poisoned wheat, but they are extremely crafty and will not take it.

2001. Can you give us any information in reference to the growth of flax, hemp, or any of the jute plants?—No, I have no experience in them.

2002. They have not been tried in Ballarat?—No.

2003. You mentioned carraway and coriander, have they been tried in the district extensively?—No, we only grow them for seed.

2004. They were not grown commercially?—No.

2005. You do not know whether the district is suitable for them?—Yes, it is suitable. I have here—[*producing a sample*]—some olives grown with us; of course they are out of season.

2006. Do they ripen well here?—No, they are just ripening now; but they are out of season.

2007. But they do ripen?—I could not tell you. There were only a few last year, and this is the first year they made any show. 2008. How old are the trees from which those came?—Eight or nine years old—just a nursery row standing, that were overgrown.

2009. What would you recommend as the best means of dealing with the sparrow difficulty?—I have not given it much attention. To destroy the nests would be the first thing.

Sebastian Rennie, *continued*, 18th June 1886.

2010. Do you use nets to keep them off the fruit?—No, we have never attempted that. It would never pay any one that has to grow for market.

2011. What steps do you take yourself to keep the orchard free?—We never take any steps with the sparrows. We let them eat as much as ever they can, and we find if they can get grain they will not disturb us. Parrots are most destructive.

2012. You spoke of mustard and coriander, and rape, and some other seeds. Have you grown them largely or merely experimentally?—Merely to supply bits of seed. We do not grow them for commercial purposes.

2013. Have you any idea what the yield of mustard seed would be per acre?—I could not say. The yield of the little bit that is occupied is very heavy.

2014. Do you think it would pay to grow on a large scale?—I think so, if they were commencing to grind mustard. Here is coriander grown here—[*producing a sample*]. It is an annual.

2015. How is that sown?—Just in drills.

2016. How far apart?—Two feet.

2017. And it is an annual?—It is an annual. Carraway is a biennial.

2018. Have you grown carraway here too?—Yes. It is worth about fivepence a pound.

2019. Does it seed the first year or the second?—The carraway the second year.

2020. And dies?—And dies, the same as a carrot.

2021. Has it a bulbous root?—It is very much like a carrot root.

2022. This is used very much as carraway is used, for flavouring! Yes, and used by confectioners for sweetmeats.

2023. Are there any plants specially that you think should commend themselves to the farmers as being profitable to grow other than those that are generally grown?—Filbert nuts. In this district farmers could get a lot. They grow freely here as hedges. Some plant them as hedges, and chestnuts are a valuable timber, and the fruit is always valuable in the market—that is the sweet chestnuts. They were pence a pound last year wholesale.

2024. Have you had any experience in growing scent plants, such as roses for otto, or lavender, or peppermint, for distilling?—I have no experience. They grow well enough. We grow them just to sell as plants, and they grow freely and well.

2025. Would they pay, do you think?—I have no doubt that all the scent plants would do well enough here.

*The witness withdrew*.

# Albert Bucknall examined.

Albert Bucknall, 18th June 1886.

2026. *By the Commission*.—What are you?—A grazier.

2027. Do you not pursue farming at all.?—very little; I do farm a little.

2028. You have bad experience in farming in the

Albert Bucknall, *continued*, 18th June 1886.

district?—Yes, I am deputed by the Talbot and Chines Agricultural Society.

2029. Have you prepared any papers?—No, I have not. I did not exactly understand the routine, and I thought it was usual merely to ask questions, so I did not prepare; but, as your time is very limited, it may be better for me to prepare a report. I have been here all the morning and have heard the questions that have been asked, and I can form an idea of what you require, and I can prepare it and send it in.

2030. Is the farming in your district of the ordinary character, I mean by that, do the farmers grow wheat, oats, barley, rye, and potatoes?—No potatoes, entirely wheat, and oats and barley; those are the principal crops, and a little rye. It is too dry for potatoes.

2031. Are you aware of any what I may call foreign products that would grow to advantage in your district?—No, I do not know of anything; a great many things would grow if we had irrigation, but the rainfall is comparatively little, and it is too dry for anything other than those we grow.

2032. What is your rainfall?—From 15 to 24 inches.

2033. Is the district suitable for fruit?—Yes, I should think so, judging from the public and private gardens in the districts; they always grow remarkably well.

2034. Is irrigation applied to fruit-growing?—No; there is no irrigation at all there.

2035. Fruit, then, would do without irrigation?—I think so,

2036. What kinds of fruits?—Apples, pears, plums, and apricots, and all the larger fruits.

2037. Peaches?—No; they used to grow very abundantly at one time, but of late years they have died away.

2038. Is there any viticulture?—No, only in private gardens. There are no large vineyards.

2039. Do you get good grapes?—Yes, very good. A few amateurs have grown vines, but it is only on a very small scale.

2040. If the vine grows so well, why do not some of the farmers go into vineyards?—It has never been brought before them.

2041. They want teaching it?—That is it. There was some talk at one time of a man starting a vineyard near Mary borough, but he did not. I do not know why.

2042. You said some crops would grow if you had irrigation; what crops have you in your mind?—Potatoes upon the flats and upon the rich ground, and we cannot grow any root-crops now except in very excepttional spots in the low flats. 2043. Indian corn?—Yes, and mangolds and all root crops, I think, would grow upon the better soil. They are grown to a slight extent now, but only on a few small patches of moist ground.

2044. Is the wattle cultivated in your district?—Yes, in the Majorca Government plantation. It grows exceedingly well there. 2045. How long has it grown there?—Three years.

Albert Bucknall, *continued*, 18th June 1886.

2046. What height do the trees attain?—Some twelve feet, some higher.

2047. Have you any idea of the dimensions in the stem?—About four inches—three to four inches.

2048. How many years will it be before they are fit to strip bark, do you think?—If they grow at the same rate as they have grown now, I think another four years would bring them to maturity.

2049. Have you had any experience in bark-stripping?—None whatever.

2050. You do not know what quantity per acre would be got?—I do not. The wattle then grew naturally in the bush in the old days before the trees were cut down, and there was so much stock. Twenty years ago there were many of the native wattles growing.

2051. Are English trees planted at all?—Yes, some by private people, and in the Majorca plantation.

2052. What is the elevation of Majorca above the sea, do you know?—I could not say.

2053. Lower than Ballarat?—Yes, lower than Ballarat.

2054. Is there any kind of product that you would recommend, that would live in your district, that you think it would be advantageous to cultivate different from what you are doing at the present time?—Yes, all root crops if we have irrigation; but I do not think, under present circumstances, anything more could be done.

2055. Are any oranges grown about Maryborough?—Yes, they grow very well, but the skins are remarkably thick. The trees bear fairly, I Think.

2056. But the rind being thick may show that you have the wrong sort of orange?—They say not, but I do not know myself.

2057. Are lemons cultivated at all?—I think not.

2058. Any Indian corn?—Yes, they grow it on the low parts and fiats near the creeks.

2059. Successfully?—Yes, very small patches; you can hardly call it growing.

2060. For green fodder or for grain?—For both, but mostly for the green fodder.

2061. Has ensilage been tried at all in your district?—No, not at all. In the ranges between Dunolly and Clunes and Lexton, you may say the timber grows remarkably. It is natural timber. None has been planted but that grows very fast indeed. It is always cut down as soon as it grows.

2062. You think it is well fitted for the cultivation of the more useful timbers?

—Exceedingly, because all the timber has been taken away from there. It is only saplings now.

2063. What is the formation of the soil?—Slate ranges. The timber is remarkably sound and solid, and there is a lot of ironbark timber. It is good burning wood, and the mines will always give a price for It. When the timber was being taken from there to Clunes they gave two shillings a cord for it more than for other timber.

2064. You represent the Clunes district too?—Yes.

2065. About Clunes they can grow fruit very success-

Albert Bucknall, *continued*, 18th June 1886.

fully, can they not?—Yes, round about Clunes they do.

2066. Do you know Mr. Cox, of Talbot?—Yes.

2067. There is no particular recommendation that you have to make to produce some different kind of product from what you produce at present that would be advantageous even to experiment on?—Not under present circumstances without irrigation.

2068. Is dairying carried on to any extent in your district?—No; the largest dairy that I know of is that of a man who makes about 200 lbs. a week of butter at certain times of the year, when the grass is more plentiful; but he is only one, and there are not many like that, and he does it in the ordinary method; he has no improved principles.

2069. You heard what one witness stated here to-day upon the subject?—Yes.

2070. Will you make that known in your district to the dairymen?—I shall do so. The witness withdrew.

*Theophilus Fisher examined*.

2071. By the Commission.—What are you?—Dairy

T. Fisher, 18th June 1886.

farmer.

2072. Where do you reside?—At Cardigan, near Ballarat. I have brought a sample of maize.

2073. Is that ensilage?—No; I have ensilage, but that is not ensilage. I stacked it and put a lot of poles upon the top.

2074. Is this the ordinary Indian corn?—Yes.

2075. Did you put anything into that?—Yes, salt.

2076. Do the cattle eat this?—Yes, greedily.

2077. How do you stack it?—Green from the paddock, just carted it from the paddock, stacked it, and there was a telegraph line along our road, and that was done away with, and I bought the old poles, and we put them upon the top and weighted it.

2078. What quantity have you in the stack?—I suppose it is about 12 feet by about 25 feet.

2079. Was this built upon the ground?—Yes.

2080. You grew this maize?—Yes.

2081. And after it attained a fair height you cut it?—Yes.

2082. And stacked it?—Yes.

2083. And this that you produce is the product, after how long?—About four months.

2084. Is it a fair sample?—It is a fair sample.

2085. How much did you get?—I suppose about 20 tons.

2086. What induced you to stack it?—An article that appeared in one of the papers.

2087. You stacked it up what height?—About ten feet high.

2088. And you weighted it with telegraph poles?—Yes.

2089. How many tons weight did you put upon it?—I suppose ten to twelve tons. I was surprised when it came out.

2090. Had it sunk very much?—Yes.

T. Fisher, *continued*, 18th June 1886.

2091. How much did it sink, do you think?—Fully four

2092. And what weight do you think there is in the stack now?—I think there would be fully fifteen tons.

2093. Have you fed your cattle upon it?—Yes.

2094. Have you much of it left?—Yes.

2095. What quantity do you give your cattle?—I suppose we use about five or six hundredweight per day.

2096. For horses and cattle?—For cattle only.

2097. Are they milking cattle?—Milking cattle only.

2098. Do you find it improve the milk or otherwise?—We have not tested that.

2099. Does it increase the quantity of milk?—Yes.

2100. Do the cattle eat it?—Readily. I may say that we had a heifer that would not take hand feed of any kind, would not take clean hay chaff, and we put some of this before her and she ate it at once.

2101. Do yon intend to grow more of it?—Yes.

2102. And treat it the same?—Exactly the same. I may mention that three years ago we grew some maize and preserved it in the ensilage.

2103. Did you chaff it at all?—Yes.

2104. Was this cut up—in what lengths?—In about inch lengths.

2105. Was this stacked stuff cut up?—No, stacked as it came out of the paddock.

2106. Has the outside of the stack that appearance too?—No, the outside of the stack has turned rusty and withered looking.

2107. How far in is it so—a foot?—No, about eight inches—seven or eight.

2108. Do you pull that off and throw it away?—No, they eat it all quite readily.

2109. From what area did you obtain this ten or fifteen tons?—I suppose there would be about six acres; we cut some when it was growing green, and threw it to the cattle then.

2110. And you stacked this in order to preserve it from going to waste?—Yes.
2111. And put salt with it?—Yes.
2112. Much salt?—Yes, we salted it very freely, for we found salt a benefit to the cattle.
2113. Don you know what weight of salt you put to fifteen tons—roughly?—I think about three hundredweight.
2114. In what month did you sow the maize?—Fart of this was sown in December, very late this season; but in the early part of November we like to get the crop in.
2115. This maize grew freely with you?—Yes, but of course it must be well manured,
2116. But without the artificial water, is the natural rainfall sufficient to grow it?—Yes.
2117. Are you clear in your mind that this stuff did not injure the milk in any way?—We have not tested it.
2118. Still you could tell from the results. Is the milk
T. Fisher, *continued*, 18th June 1886.
richer in any way?—I think the milk has improved.
2119. You have had no complaints about the milk?—No, but in our case the cattle only get a small quantity of this; they get other feed besides in the natural pasture.
2120. You feed them, I suppose, once a day?—We feed them twice a day. We also feed them largely on roots in the winter. It is not like a cow being stalled and fed upon this. I do not know what the effect of that would be.
2121. It is a most useful adjunct to the other food?—It is.
2122. The cattle eat it eagerly?—Yes. I was remarking that we had a heifer that we could not get to take any food, and she took that at once.
2123. What quantity of it at a time do you give to them?—An ordinary milking bucket full.
2124. If there was any other kind of food before them, chaff and bran and hay; have you ever tried your cattle with two or three kinds of food in front of them; would they take that in preference to any other?—If we put food before a cow that it will not take, we always remove that before we give her the other.
2125. But being a new food, comparatively speaking, I thought you might have tried your stock in that way. Of course, it is a good proof that the heifer took this in preference to other kinds of food; but, very often, when you place two or three kinds of food before an animal, they will take what they like best; have you tried it in that way?—No, we have not.
2126. At any rate, they eat up every portion you put before them?—Yes.
2127. Have you many cows?—We milk, at the present time, about 70.
2128. Upon what area of land do you keep them?—About 430 acres.
2129. How many acres do you estimate it requires for one cow?—I think to keep, taking a cow in good condition all the year round—where we are it is not rich land—it would take about eight acres.
2130. With the food, or without it?—Without it.
2131. With the food—how much then?—I think two acres would be ample.
2132. Have you tried any of the improved methods of dairying that one of the witnesses (Mr. Wilson) referred to this morning?—I unfortunately was not here this morning.
2133. Have you tried the cream separator?—I have not. We send our milk into Ballarat and sell it.
2134. You do not make butter or cheese to any great extent?—No.
2135. But you find it a very remunerative industry?—Yes.
2136. Is it more profitable to sell the milk than to make it into butter or cheese?—Yes.
2137. And what is the result of your ensilage?—We have not opened it this season.
2138. Have you tried it before?—Yes, about three years since.
T. Fisher, *continued*, 18th June 1886.
2139. With success?—Yes. We have a large brick tank in the ground, and we filled it with stuff cut into about inch lengths, and we had more than it would take so we stacked it upon this principle, and it is answering very well.
2140. What do you use for stacking your silo?—We have a brick tank in the ground for the silo.
2141. What do you put in?—All maize—chaffed maize.
2142. You do not use grass?—No, we have no grass or any thing, but I should not be afraid to try it.
*The witness withdrew*.

# Robert U. Nichols examined.

R. U. Nichols, 18th June 1886.
2143. *By the Commission*.—What are you?—Nursery-man and seedsman.

2144. You are not connected with farming?—In a limited manner. I have a small piece of ground. I am a seed-grower and nurseryman.

2145. You have prepared a paper, I think?—Yes.

2146. Will you read it to the Commission?—Yes, with pleasure. I have been requested by the Agricultural Society of Ballarat and that of Grenville to represent them here, and give my experience on any matter I like to choose. I have chosen the fruit-trees and fruit-growing in the Ballarat district, and for that reason I have written a few lines in this paper—[*the witness read the same, as follows*]:—

*"Fruit and fruit tree growing.—I have much pleasure in giving my 30 years' experience on the above subject in the Ballarat district. I do not claim to be the largest grower or producer here, but I have had ample opportunity of noticing many matters that I think will be of public interest.*

*"The climate of Ballarat is well adapted for the growth of all hardy trees, such as the apple, pear, plum, cherry, currant, gooseberry, raspberry, walnut, chestnut, filbert, forest trees, shrubs, &c.,; thousands of these are now annually sent to other colonies and other districts of Victoria from here, and larger quantities are being grown every year to supply orders which are regularly received.*

*"The soil is so varied that almost any sort may be found and selected. Loam, with clay and basalt subsoil; black clay, with brown marl and quartz; red or chocolate, volcanic, many feet deep; sand, with granite; all of which are more or less suitable for the growth of the many sorts of trees mentioned above.*

*"The apple, being the most useful of all fruits, does not thrive so well here as in other districts of a more temperate even nature. I attribute this partial failure to the extreme cold winds and frosts during the tender growth of the blossom and fruit, which contracts the skin—*

I brought one or two as an example, and you can easily see how it affects the fruit—*[handing in samples*].

2147. What sort is that?—That is the Northern Spy.

*—and causes a deformed and spotted fruit. The side exposed to this blast never grows after, but the other side, growing to its full size, causes the deformity. This naturally depreciates the value of the fruit when sent to market. This applies more particularly to the finest and most delicate varieties that grow so well in other parts of the colony. There are a few sorts, however, that will succeed here viz.,—Rymer, Rennette de Canada, Duchess of Oldenburg, and Northern Spy, and the Majetin."*

I have brought those as samples of Ballarat fruit. As a general rule, the Spy is free from the deformity mentioned. I am now planting nearly all those varieties.

*"Thirteen years ago I planted about fourteen acres of apple,*

*R. U. Nichols, continued, 18th June 1886.*

*pear, cherry, plum, apricot, and peach on deep volcanic soil, 16 feet apart; the apricot and peach died the following year from cold winds and gum wounds. The varieties I planted were numerous, and of the leading kinds, but only those I have mentioned have succeeded.*

*"The pear succeeds better than the apple generally; but as the demand for it is limited, it is not so largely grown. I planted several hundred trees, and after giving them a trial of ten years, they proved a failure from the same cause as destroys the apple, and I dug them all out again. The best varieties are Williams' Bonchretien, Summer Bonchretien, Gansel's Bergamot, Easter Beurre, and the Vicar of Winkfield.*

*"The plum is one of the most valuable fruits here. The trees grow well, bear well, and are not subject to any disease. The fruit is always saleable. I estimate the produce of one acre of land at five tons, and the value at £20. The best varieties are diamond, purple gage, yellow gage, Orleans, Goliath, and several kinds of damsons.*

*"The cherry is also very prolific and easily grown; its value is equal with the plum. The best sorts are Governor Wood, Elton, Biggereau de Holland, St. Margeret, and Florence.*

*"The gooseberry is also a valuable fruit here. It is grown very extensively, and sent to market in bags in the same manner as potatoes, principally in the green state. The value of the crop is equal to the plum. The best sorts are Roaring Lion, Crown Bob, Leveller, and Billey Dean.*

*"The raspberry also succeeds well here, more especially in the volcanic soil and moist laud. There is a ready sale for it for jam purposes. The demand is sure to continue, for the dry districts of Victoria and other colonies will not produce it. The best variety is the Red Antwerp. The fruit is large and of good flavour.*

*"The strawberry produces heavy crops in the warmest parts of the district around here, but l would not recommend any one to plant largely unless under very favorable circumstances, such as absence of frosts, presence of water, and very good soil.*

*"The currant is also a valuable fruit here, and succeeds well in all soils if properly cultivated. The common black and Red Versailles are the best varieties. I find considerable difficulty in getting cheap labour to gather this and other small fruits, and this is a serious drawback.*

*"The quince produces very heavy crops, and grows in almost any kind of soil. The fruit is not generally used as the other fruits I have mentioned, and therefore is not largely grown here. It thrives best near water and in low' moist soils.*

*"General Remarks.—I have not alluded to any of the fruits that require warmer districts and climates to mature their crops, such as the orange, lemon, grape, peach, &c., because they do not thrive here, except in some particular spots. I consider there is sufficient encouragement for the fruit-growers of this district to enlarge their plantations, and grow the different varieties that I have mentioned as being suitable, and open up a market for the produce either in a raw or manufactured state, as suggested in the first part of this paper. The first step towards this is to follow the advice of one of the gentlemen who has given his experience in fruitgrowing to the Commission—that you must first grow the supplies, and the demand is sure to follow. Many will say, where is the demand to come from? and to my mind this is easily answered. Other countries all find a market for their produce—why not Victoria? For example, China is celebrated for tea, India for silk, America for timber. Why not added canned fruit, jam, &c., in Australia? We are in a young country, with a limited population at present; but every day this is changing; and to provide for those changes we should produce those articles best suited to our soil and climate."*

2148. Are you of opinion that fruit-growing on the lines you have indicated in this district would be more profitable than ordinary farming?—More profitable on small areas.

2149. Would it be profitable for each farmer, or for farmers generally, to have attached to their farms a small orchard?—I think not for market purposes, because it is a business that should be attended to more particularly and closely looked after than a farmer could give his time to.

R. U. Nichols, *continued*, 18th June 1886.

2150. A man must give his whole attention to it?—Yes, if wants to be successful.

2151. Which would pay best?—I say a small farm, well farmed, will pay better than a large one badly farmed, in proportion.

2152. Supposing fruit were cultivated here to a larger extent than it is now, would it not be almost certain that canneries would be started here?—I cannot say.

2153. Is not Ballarat a very exceptionally favorable place to start the canning industry?—I think it is exceptionally well; the moist soil and volcanic land is found; it is the most beautiful land you can get in any part of the world, and the climate is suited to the varieties I have named.

2154. Are you aware of fruit being sent from here to Dunolly and Mary borough to canning factories there?—I am not aware of any.

2155. Where does most of your fruit go to?—Principally to Melbourne.

2156. Do you find a ready sale for it always?—Yes.

2157. Without any process of canning?—Yes; send it in its raw state, as I have indicated. The gooseberry carries as freely as a potato in cornsacks or gunny bags, and other fruits in cases.

2158. Do you find the fruit spot always that way with the cold winds in the early stages?—Yes.

2159. Does the codlin moth trouble you here much?—Yes, very much.

2160. Is the codlin moth very destructive?—Very destructive.

2161. Is the demand for fruit here greater than the supply?—Yes, at present. I do not mean to say the demand in this district particularly. It is not equal to the supply, or else we should not require to send our fruit to Melbourne or elsewhere if there were a local demand; but at the time when, perhaps, our cherries or other things are in full crop, they have to be sent to Melbourne, and then we have to look to longer distances for the best market.

2162. I suppose you could dispose of all your fruit here at a price?—I hardly think we could, except to a buyer to send away again, that is, a middle man.

2163. It has not been found necessary to establish any preserving works here as yet?—No, no one seems to have done that.

2164. Are there any other vegetable products than those you have spoken of that you think are suitable to the soil and climate here?—I think one is the sugar-beet; I think it would be a very profitable and suitable crop; in my opinion it is easily grown, and will produce immense crops, and, as far as the sugar is concerned, I cannot say what is in it, whether it would give a good yield of sugar; that has to he proved; but as to growing the crop itself, it is as easily grown as the ordinary mangold. I myself have tried a great many experiments in the way of growing beet and mangolds.

2165. What use would you make of it—to fed stock?—Just to feed pigs and cows.

2166. Does it pay to grow it for that purpose?—Yes;

R. U. Nichols, *continued*, 18th June 1886.

in fact, I prefer it to mangolds; it is sweeter and better.

2167. It grows more readily, and it is more nutritive?—It is more nutritive.

2168. You spoke of these apples—have you had any experience of apple-growing in any other district than Ballarat?—Only from observation.

2169. Of those samples you have handed in, one is a very nice specimen of apple, and the other very much disfigured; I think I understood you to say that you had planted various kinds and found some suitable?—Many of the more tender kinds, and the best apples, such as the pear-mains and the pippins, do not thrive here for the reasons I gave you, showing that the more delicate the apple, the more subject it is to the blast of the wind.

2170. I presume if you had been in possession of that information you would not have planted those trees?—Not at all.

2171. Yon consider that the apples you have submitted here now require to be acclimatised; that is, you require kinds suitable to the district?—Yes.

2172. Do you consider there is a deficiency of information in that respect?—Yes, generally there is; I do not think people know the sorts to plant; this is experience extending over many years; it is 30 years since I first started to plant.

2173. There are many kinds you would not plant?—Just so; it is simply loss of time.

2174. Does any other plant occur to you besides the beet?—I should think, but I do not know from practical experience, that the hop would thrive well where the beet grows so readily. It occurs to me that if the hop was tried in the volcanic soil it should thrive. I cannot say positively that the climate would suit it, but I think the soil is everything that could be desired.

2175. It has not been tried in this district?—No, only in a very limited way here and there throughout the district; but those that I have seen have done very well, and given excellent yield, and I often wonder why it has not been tried.

2176. If anything else does occur to your mind that, would interest us, would you be good enough to write a paper for our information?—I shall be most pleased to do it.

*The witness withdrew*.

# William Thompson examined.

2177. Where do you reside?—Stawell.

W. Thompson, 18th June 1886.

2178. What are you?—Nurseryman and seedsman.

2179. Apart from farming altogether?—Yes.

2180. Have you prepared a written statement for the Commission?—I have not.

2181. Has your experience been large in fruit-growing?—Seventeen years in the district of Stawell.

W. Thompson, *continued*, 18th June 1886.

2182. Have you found it profitable?—Yes, pretty well.

2183. Do you find that certain sorts thrive better in our district than others?—Yes.

2184. You heard the last witness, Mr. Nichol. Do the same sorts of apples and pears thrive with you which he indicated as being the best adapted for this district?—Yes, and much more so. We are not troubled with the cold as they are here; we have a much better district there than they have here to grow apples. Mostly the whole of the apples do well in our district.

2185. And does the peach thrive with you?—Yes.

2186. And the apricot?—Yes, they give good crops.

2187. And pears?—Yes, heavy crops.

2188. And mulberries?—I daresay you may have seen some pears exhibited in Adamson's shop in Collins-street, some time ago; they were grown at what we call the Swamp, eight miles beyond us.

2189. And the walnut?—The walnut does very well on Doctor's or Concongella Creek, three miles from us.

2190. Are any of the farmers or persons engaged in orchard culture in your district growing any other than the ordinary crops?—Oranges do very well.

2191. And the vine?—Yes.

2192. How many years' experience has there been of oranges?—Eight or nine.

2193. Are the trees in pretty good bearing?—Yes, they bear very well.

2194. Have you any idea what number of oranges a tree will bear?—Two hundred or three hundred.

2195. Is the quality good?—Very good; a little thick in the skin, but that will improve by age.

2196. Is the business of planting oranges increasing every year?—Yes.

2197. To any extent?—Not to a very large extent, but I have to order a little more every year from Sydney.

2198. Some few hundreds of trees every year are being planted?—Yes.

2199. Is the lemon grown?—Yes.

2200. Successfully?—Yes.

2201. Do you think that the district is suitable for growing oranges in large quantities?—I think so.

2202. Without irrigation?—They would be better for irrigation to a small extent. Of course the whole of the district is not suited to that, but a great portion of it is very well suited to the orange.
2203. Are the trees that have been planted irrigated?—No, in one part they are not. There are no means of irrigating them.
2204. Is the vine extensively cultivated?—Very.
2205. For fruit or for wine?—For both. There are the Great Western vineyards—I suppose you have often heard of them—and the Stawell Company has started a vineyard two years ago. I think they have 90 or 100 acres planted, and about ten acres of orchard, and, among other things, some oranges and lemons, and they

W. Thompson, *continued*, 18th June 1886.

are all doing very well. I may say that there are some thousands of acres round Stawell well adapted for the vine; it is, in fact, better adapted than the Great Western, for this reason, that we have less frost there than what they have at the Western. We stand higher, and it faces the north east. At Western it is cultivated principally for wine, and round us it is cultivated for the table.
2206. Is the fruit converted into raisins?—No; I dare say it may have been tried, but not to any great extent.
2207. Is the Zante currant, grown to any extent?—No.
2208. Have the raisins been successful?—Only on a very limited scale. It was only two or three bunches, so I cannot say much of it from a commercial point of view.
2209. Is the land suited for vines suited for wheat-growing?—Not much.
2210. Or any other kind of cereal crop?—For mangolds and other crops of that sort it is well adapted.
2211. Without manure?—With or without manure.
2212. What is the character of the land?—A finish clay.
2213. But you have a large quantity of land well suited for the growth of the vine, and not for any other industry?—The rises are suited to the vine, and the hollows between to the fruit trees.
2214. Is that similar to the soil upon which the Great Western is situated?—Yes, very similar.
2215. And better situated?—Yes.
2216. What quantity of wine is produced at the Great Western now? —I cannot say.
2217. Can you grow all sorts of nuts, such as almonds and walnuts?—Yes, almonds, walnuts, and chestnuts, and all those things; in fact, there is scarcely any fruit we cannot grow.
2218. You can grow all those fruits as well as grapes?—Yes.
2219. I was told that you could even grow bananas?—Bananas have been planted, but, of course, we cannot yet say the result. We have not had any crop.
2220. What market do you find for your fruit—where is it?—Mostly local consumption. A good deal of it is sent to Melbourne.
2221. Would a land with a sandy surface and a clay subsoil be suited for laying out in a vineyard and oranges?—Yes.
2222. You say you introduce more oranges every year. Is there any difficulty in the rearing of the plant of the orange?—They require a little attention at first, and they require the ground specially prepared for them, and a little attention for a couple of years till they take hold of the ground.
2223. If there is not much difficulty, I should think the soil would be well adapted to grow oranges?—Yes, and all fruits.
2224. The sheltered spots?—Yes.
2225. Around Stawell, between Stawell and Great Western, I have seen vineyards very successful, producing an average of 300 gallons per

W. Thompson, *continued*, 18th June 1886.

acre, and I am quite certain the land put to any other purpose would not produce anything at all; there was a clay subsoil, but pure sand upon the top, and there was apparently a large area of that land there?—Yes, we have thousands of acres of it.
2226. I suppose there is no great demand for that land, to take it up?—Not at present.
2227. Is it not locked up at present?—It is; it is a mining reserve.
2228. Do you know the piece of land that the Agricultural College hold near Stawell?—I do.
2229. What is it suited for?—To grow fruit and vegetables of every description.
2230. Is it not a fact that you have a large quantity of water at Stawell that might be used for irrigation to a limited extent that is not so used?—Quite correct.
2231. Would it not be a great advantage to use it upon the gardens round Stawell, instead of allowing it to run to waste?—It does not run to waste.
2232. Does not it run away?—That is only in winter time; in summer time the whole of it is taken in.
2233. What do you use it for?—Mining, and domestic and other purposes.
2234. Could not you get a larger quantity, if you wanted it, from the Grampians?—Yes, by laying down

another line of pipes. There is a great quantity of land upon the pipe-track reserved for the farm that could be irrigated by storing the water in tanks upon the tops of the hills.

2235. I thought you had already storage?—That is upon the pipe-track.

2236. I know, from the information given to the Water Commission, that a large quantity of water could be used at the Great Western if the Stawell people were willing to consent, and they would not consent; but I say, why not use it at Stawell, if it is better suited than the Great Western for fruits?—They have not been planting.

2237. Would it not be worth planting, and use the water for irrigation?—Yes, but if the land had been thrown open ten years ago, Stawell would have been in a very different condition to-day.

2238. Is not the land thrown open now?—No, it is all locked up; the mining board object to its being used.

2239. Does anything else occur to your mind that would be of use to us?—There has been a good deal of evidence to-day about sugar-beet; I believe myself that would just be the land for it. I believe so from the small quantities I have grown myself.

2240. Would it pay to grow it there?—I am sure it would, if there were an outlet for it.

2241. Do you think this land would be taken up and used for some purpose if it were thrown open for cultivation?—I believe it would to a great extent.

2242. Have you had any experience in growing tobacco?—I have none myself.

2243. Have you seen it grown?—Yes. The Chinamen

W. Thompson, *continued*, 18th June 1886.

have grown a good bit out there, a few miles from Stawell.

2244. Are they growing it now?—I am not sure; but I think they grow two or three acres of it.

2245. Do you know that it is profitable?—I do not know. I got some myself for fumigating purposes, and I like it very much for that purpose.

2246. Do you know anything of tobacco-growing yourself?—Not much; but there is a good deal of land there suited for that culture—light sandy soil.

2247. Some few acres, I suppose, are grown in the district every year?—Yes, in the district of Ledcourt.

2248. Does any other production occur to your mind that might be cultivated in any part of this colony with advantage that is not at present cultivated?—I may say the olive does very well with us; it has not been cultivated for commercial purposes, but it grows very well as a tree or shrub. I do not think there is anything else that I recollect at present.

*The witness withdrew*.

# James Brimmer examined.

2249. *By the Commission*.—What are you?—I am a

James Brimmer, 18th June 1886.

gardener, both a horticulturist and a gardener.

2250. In what district do you live?—In Ararat.

2251. Are these fruits that you produce grown by yourself?—All but two—*[handing in samples*].

2252. Are they grown with or without irrigation?—We had to water them.

2253. How do you irrigate?—We have not got enough to irrigate; we got the water laid on from the Ararat waterworks, and when we require a little we give it to them, but they do not get enough.

2254. Are oranges grown in your district generally?—No.

2255. How many trees arc there?—I have only got about twenty, and they are dying out for want of attention; still this shows that they would grow well with attention; the lemon is more healthy growing than the orange.

2256. What number of lemons would there be on a tree?—This tree was grown at the printing-office in Ararat, about fifteen years old, and came up from seed.

2257. What number of lemons would there be on a tree?—At the present time there are 400 of different sizes, perhaps a couple of hundred like this.

2258. How high is the tree?—About 12 feet.

2259. And healthy?—Perfectly healthy.

2260. How long have you been cultivating fruits?—Twenty-eight years I have been up there.

2261. Always at Ararat?—No, not always at Ararat, but at the Wimmera and Mount Cole. These fruits were not picked out expressly

James Brimmer, 18th June 1886.

for being better than any one else's, but, as Mr. Nichols was saying, I know it myself too, that these volcanic soils here are not good for apples.

2262. Is yours grown no volcanic soil?—No, it is like where all the gold diggings were.
2263. That is the Northern Spy, is it not?—Yes.
2264. It is a very fine one?—That is not the largest.
2265. You think all these fruits could be grown in the district?—All of them; there is not a better place in the colony.
2266. But not without irrigation?—Not with us; not on that poor gravelly ground where our garden is.
2267. Have you had any experience in the novel products, if I may so call them—flax or hemp, or rape, or mustard, or any of those?—In the beginning, in 1865 I think, when the Novel Industry Act came out, the first year I made application, and I could not get the GO acres I wanted for me and my son; it was all disposed of, so many hundred lots for one year; and the next year I was soon enough, and I got the 60 acres.
2268. What did you try to cultivate upon it?—We were to try tobacco, hops, opium, or anything else in the novel industry line. I began with tobacco, hops, and opium; but it was a failure with us, though not with every one; but it did not answer our purpose.
2269. Was it in that particular district where you now live?—No, that was at the other end of the Mount Cole Ranges; they call it Warrackeep now.
2270. You have some specimens of potatoes there?—That is to show what a little watering will do. Those were planted no the 19th December, and I dug them up for young potatoes. The large one is the Fluke Kidney, the other one is the Magnum-bonum, that had perhaps an inch and a half at three waterings.
2271. An inch and a half at each watering?—No, they would have gone rotten.
2272. At what period did you water those potatoes?—That all depended upon the heat.
2273. Did the potatoes come up of their own accord without any watering?—No, we watered the drills first. We put them in, and it was dry last December; we watered them, and then they came up, and they did not want any more till after Christinas, and they were watered twice beside. I think the last watering they had was about, the end of February; but I was going to observe the effect of water upon these things. The Magnum-bonums produced eight pounds to every root in the bed, and that is a wonderful crop, and there were very few little ones among them, and the Fluke produced six pounds.
2274. And you think you did not use more than an inch and a half of water?—I am certain of it, for we have only got a half-inch pipe put on; we are limited as to the quantity we may use.
2275. Do you find the orange and lemon grow well with you? Yes, they grow very well with attention.
2276. Is the Ararat district specially well suited for the
James Brimmer, *continued*, 18th June 1886.
growth of fruits?—Yes.
2277. All kinds of fruits?—It is equal to the Sandhurst district; they are the only two districts in the colony that are similar for the beautiful colour; I brought these apples to show the colour. I have got any amount of varieties, but these are a few of the coloured varieties.
2278. Have you had any oranges in?—I planted some 22 or 23 years ago, but the place is not in my possession now, and they are growing there now. Brierly and Wilson have got it now at Warrackeep. The orange trees there are 25 feet high.
2279. Are they bearing well?—Yes; but they cannot give them sufficient water when they want it, and the oranges are not good; they are all fuffy inside for the want of water at the proper time. That tree, of which you have the fruit before you, was as good as any of the Sydney oranges we get. I keep a fruit shop in Ararat, as well as the garden I have there. I shall be glad to write out some of my ideas for utilizing some of the waste lands round Ararat in particular.
2280. Will you mention the kinds of fruit your district is suitable for?—All kinds of fruit you can mention, except almonds, and they bloom too early. The frosts come and cut them after blossoming.
2281. Are these some of your lemons?—Yes; they are from the printing-office.
2282. And are there lemons upon the tree at all times?—Yes, there are all sorts from the blossom up to the ripened fruit.
*The witness withdrew*.

# Richard Whatmore examined.

2283. What are you?—Gardener and fruit-grower, &c.
R. Whatmore, 18th June 1886.
2284. Where do you reside?—Near Smeaton, in the parish of Bullarook.
2285. Your garden and orchard are there?—My garden and orchard are there. I represent the Smeaton Agricultural Society and also the Creswick Horticultural Society. I asked them to name something that they

would like me to bring before the Commission, and they left it entirely in my hands.

2286. You have written a paper, I believe?—Yes. I have a small piece of land, and a large family to obtain a living for, and I have to go out and do other work; so I took the management of the Creswick Shire Park, which they have at Ullina; and I have a nursery and garden and other products.

2287. The chief products of your district are wheat, oats, and potatoes?—Yes. I made the headings, and wrote a small paragraph on each of the subjects—beans, beet, maize, coriander, timber trees, walnuts, flax, and hemp. Those things I have had considerable experience in, particularly amongst fruit of all kinds. I have been now since I was ten years old (and that makes forty years) paying attention to



the growth of timber and fruit in the old country and Tasmania and this colony.

2288. And raspberry, strawberry, and general nursery stock?—Yes. I have 4 acres of nursery. I am sorry I have no more, I applied twenty years ago for a piece of land 22½ acres, ami, after doing some considerable work upon that, it was taken away from me, and handed over to large proprietors; and 4 acres were given to me.

2289. Do fruits do well in your district?—Yes, so long as they do not go into the volcanic red soil; the apples and pears do not do so well then.

2290. You say that sugar-beet can be grown as well here as in any part of Europe?—From experience, I know that sugar-beet can be grown as well here as in any part of Europe; but I might state from information received that it will not do to grow sugar-beet for sugar purposes upon the volcanic soil or any soil rich in vegetable matter, but for pigs or fowls. They prefer that which is grown upon the open plains to that grown upon rich soil.

2291. You say flax and hemp can be grown?—Yes. I have grown it myself upon the rich soils, when I first started, 3 to 5 feet high. I had many visits from experienced hands from the North of Ireland, and they said it was as good flax as they had ever seen; and a neighbour just over the fence grew, I think, 30 acres, and I helped him to harvest, but he found no sale for the raw material, and it lay in a heap and rotted. So, till mills are opened, it is no use to grow it. The expense of labour is so great that likely they could not manufacture it without machinery.

2292. It can be well grown?—Yes.

2293. From your knowledge, do you think it can be manufactured profitably here?—According to what I have ascertained from rope manufacturers and others, there is a large demand for the material, and they say they can manufacture it well if the vegetable matter is taken out. Some time since I was showing some to a North of Ireland man, and he thought it could be manufactured.

2294. Would not the rope-makers purchase the raw material?—unless it is sweated and rotted, and some of the vegetable matter knocked out. I mean by rotted that the vegetable matter is rotted, not the fibre. This was the reply received when they were written to.

2295. Do you require water for that purpose?—Yes.

2296. Have you a sufficient supply of water for that?—Yes irrigate all my land from a large spring which supplies a lot of us with water for cattle and the gardens.

2297. Do you irrigate all your crops?—I do, except the apples; but I do not irrigate them. My experience, like Mr. Nichols', is that the subsoil is too cold in our district, and the irrigation makes it colder, except on well drained land, which causes the black spot—a fungus.

2298. Does any other special product occur to your mind? carraway and coriander. For some years past I have grown carraways pretty largely, and distributed them through the district. Some time ago a notice appeared in the *Leader* asking where they could get carraway seeds, and I sent a notice saying I could supply



them, and I have sent them all over the colony, and even to Queensland.

2299. Do you grow much?—I grow a sackful in the year, only a few rods.

2300. Do you sell them?—I sold all but a small quantity.

2301. What quantity per acre do you grow?—I cannot say. My ground is very rich in vegetable matter. It was an old ti-tree swamp. The first year I grew about 4 rods, and I took off a com sackful, and those I distributed gratis all over the colony, till I had not an ounce to send. I sent to the Experimental Farm both roots and seeds.

2302. How does it grow?—About 2 feet, very like parsley; it ripens its seed the second year.

2303. Is it much like parsley in appearance?—Yes, it is much like parsley. It belongs to the same order. I have had considerable experience in forestry, and at present I am planting for the Creswick Shire Council some 30 acres of forest. I commenced it three or four years ago, and every year I add a little to it as far as their means allow me to be employed that way. I have been employed there about nine years, and I have raised timber there, and it is within two or three miles of some of the mines; and I have the opinion of some of the mining managers this year, and they said it would be very valuable for mining purposes. And

I consider that every farmer might be able to grow a large quantity of timber for his own use both for firing, fencing, and everything else on spare land; and there are thousands of acres of land throughout the colony that might be taken up by leasers at a nominal rate, and they should grow timber upon it. I took up, three years ago, a small piece, and added one acre to mine under a garden license, and I have about 300 trees upon it, and I have spent a considerable amount of money upon it, and yet I am afraid every year I shall lose it. I have a neighbour who is hungry for it. I say, give them a longer tenure of it.

*The witness withdrew*.

# Edward Cox examined.

2304. *The* Illness.—I may say that I was sent down by

Edward Cox, 18th June 1886.

the Talbot Agricultural Society to give evidence before the Commission. I have been 30 years growing fruits of different kinds, more especially the English kinds, and for twenty years I have been irrigating, and spent £300 twenty years ago to irrigate 5 acres of garden grounds, and that was the best £300 I ever spent in my life. I can assure you that I could not have possibly brought up a large family as I did bring up for ten years upon the garden after I got the irrigation dam, and I was able to do it respectably with irrigation. I am quite certain I could not have done on 5 acres of ground without. In reference to fruits, I find all fruits nearly suit us that suit temperate regions. The raspberry, the strawberry, without irrigation, were failures. With irrigation we could always ensure a crop even from the poorest land. Some years were larger than others, but a crop was always certain. With the other fruits—

Edward Cox, *Continued*, 18th June 1886.

apples—I find two or three soakings a year an immense benefit to them. I found without it one-half to two-thirds of the crop tumbled off. It was a light sandy soil with a clayey bottom; but with irrigation I found it nailed the fruit on to the trees, as I phrased it to my friends. I found that the peach and apricot, it was a great improvement to them—the peach. Of course I suffer the same as the rest—not from the denuding of the country from forest timber immediately around it, because the forest timber still exists immediately around the orchard, it being my own property; but I find that the peach dies from the root upwards, and only the top of the branch buds still. I have peach trees in my ground now 25 years old. I had cherry trees that when I started to irrigate were dying out. I then spent £160 in cutting a race from what is known as Stewart's dam, which is now the Council of Talbot's water supply for a time, and I saved those trees. The cherries were dying from the tops downwards at only ten years old. Some of those trees are still in the garden, but they are not in a flourishing state now. They are old and decrepid—one side perhaps vigorous and the other dying down. I have tried small quantities of lucern, and mangolds, and sorghum, saccharatum, and Indian corn. I find the whole of them are easily cultivated, not for grain but for cattle fodder, with irrigation. Without irrigation I found them a perfect failure. I put in a small patch almost the first year, I suppose about 28 years ago. I put it on the drill system of husbandry, and I found that lucern did very well, and found the food even without irrigation on that flat piece of land—a low flat. I got food for cattle when other food was very scarce. But it required cutting, not feeding off. When I erected the dams I tried irrigation upon it, and the effect was most marvellous, five or six crops cut in the summer time, and each crop as good as the ordinary spring crop of lucern. I thought my example would be followed by my neighbours and people round about, but I found that British people are not a copying people. I found with sowing lucern broadcast with a com crop it was a perfect failure. There was no cleaning the lucern, and in a few years the lucern died out. My experience shows me that, if you want to cultivate lucern, cultivate it in drills worked with a horse-hoe between it every year, then it is likely to last.

2305. You say you grow fruit in 5 acres?—Yes.

2306. Where do you find a market for all your produce—I have sent from January last, or rather from December last, I have sent over a ton a week to Echuca every week.

2307. You find a ready outlet for all yon can produce?—I have a place of business in Echuca, and the northern districts, of course, are the places to sell fruit; all the northern districts are bare of fruit.

2308. Are there not preserving works in your neighbourhood, a Maryborough?—Yes.

2309. Do you send any fruit there?—No, I have been unable to sell them any.

2310. For what reason?—They could not preserve the quantity that was offered.

2311. The quantity was so great?—The quantity

Edward Cox, *continued*, 18th June 1886.

was Edward Cox, so great; it was offered to them. And, at present, I was talking to their manager the day before yesterday, and he tells me the difficulty is to find a market for canned fruit.

2312. What do you attribute that to?—Being unaccustomed to canned fruits in any district like my own, everybody producing his own jams.

2313. Are there defects in the manufacture, or what?—It is very good; I am a caterer, and I put some on the Governor's table, and it was appreciated and admired at the last Talbot show. But I told him of the outlet on the northern plains and northern districts, right through from Echuca to Queensland.

2314. You have no difficulty in finding a market at present?—No, until this last four years, I have found a very ready market in the North.

2315. What are the kinds of fruits that you grow mostly?—Apples, pears, plums, peaches, apricots, gooseberries. Raspberries I have given up.

2316. You sell them all in the raw state?—No, I make a few tons of jam, but nothing to speak of; perhaps 2 or 3 tons of jam a year.

2317. This dam that you speak of, did you construct it at your own cost?—Yes.

2318. On Crown lands, I presume?—On Crown lands I started, and then I purchased the land from the Crown.

2319. And the water you get from surface drainage I suppose?—Yes.

2320. And how do you get your pressure on to your own land; is there a fall?—There is a fall from ray lowest dam of about 6 feet to any part of the garden.

2321. How often do you put the water upon the land?—It depends upon the crop. If it is fruit trees, once, twice, or three times in the year.

2322. That is all, is it?—That is all.

2323. You give it a good soaking at the time?—I soak it so that you cannot walk upon the ground.

2324. Is the water let on by channels?—Pipes to carry it into the ground and to different parts of the ground, and then the open-conduit system after that.

2325. You grow nothing but fruit at present, I suppose?—Very little else.

2526. Your experiments with mangolds and sugar-beet and other articles were upon the 5 acres?—Yes, they were upon it before the trees were any size.

2327. At the time the trees were young?—Yes; at that time I kept a few cattle, and I used those crops to feed them

2328. Are there any special products that you can recommend to this Commission as being adapted for experiment or growth in the colony?—With irrigation?

2329. Either with or without irrigation?—With irrigation I recommend every man to grow mangolds, sugar-beet, maize, and lucern.

Edward Cox, *continued*, 18th June 1886.

The lucern is a most wonderful plant; its marvels are not appreciated till you put water upon it, and then it springs like magic at the time grass is white and bare and dried up.

2330. I remember seeing some very large apples come from Talbot like a turnip; do they grew generally like that?—Certain kinds grow very large sometimes; I presume those were Bismarcks; but we reckon our district the premier district for fruit; we call Ballarat very small potatoes in apples, but we reckon you premier in growing the gooseberry or raspberry.

*The witness withdrew*.

*Adjourned*.

# Appendices.

# Appendix No. I.

# The Government Botanist on Plants, etc., Suitable for Cultivation in Victoria.—(Question 693.)

"Sir," Melbourne,

5th June, 1886.

"In reply to your last communication, I have the honour to state, for communication to the Royal Commission on Vegetable Products, that, in my opinion, those plants (cultivable under the Victorian sky) deserve preference for rural attention of which the largest import takes place into this colony.

"Taking them in the order of their monetary value as articles of import, *Tea* stands by far on the head of the list, and it is, therefore, the Chinese tea-plant (the Assam variety being too tender for most parts of Victoria) which should engage the interest of the rural population, particularly that of selectors in warm forest regions. Over and over I have urged the culture of this most important plant on a commercial scale also in this colony; and I would beg to advise that my essay on the culture of the tea shrub, and on the cheap and simplified method of preparing the leaves for the marketable article, should be reprinted and widely circulated a copy of this treatise having been communicated to your office some time ago. I would also urge anew that the most desirable test-gardens, in the mildest in the cold est, and in the driest parts of the colony, should be speedily formed, so that advantage may still be taken of this season for commencement of operations, the tea-plant to be located, tested, and multiplied in the garden of the mildest region. Perhaps seeds of the hardy Chinese varieties of the tea-shrub could be got cheaply and in quantities from the Neilgherries, or perhaps even from so near to us as Ceylon, although there the tender Assam variety is preferentially cultivated.

"Next on the list of imports into Victoria, we have the *Tobacco;* this therefore, also, should be pushed as a plant for local culture. Although in our clime we cannot successfully raise the tropical varieties for obtaining the respective valuable sort for cut tobacco and cigars, still, it appears quite hopeful to add the extra-tropic varieties to our own cultural resources here, provided that the fittest localities, regards clime and soil, are chosen for this plant. Quite as much, however, depends on the treatment of the harvested tobacco leaves as on the culture itself; but among our colonists are very many who are familiar with this plant as one of special rearing in other extra-tropical regions of the world. From such for experienced planters much detail-information might be obtained applicable to this colony. Indeed, the possibility of raising and preparing here a marketable tobacco has again and again been proved in our industrial exhibitions, and indeed, to some extent, in the trade also. Unlike the tea-bush, first alluded to on this occasion (of which seeds can only be got after some time in large quantities here from local plants, though by careful arrangements they might be brought safely across from China and Japan), the tobacco plant, as well known, can be raised with the utmost facility from easily obtainable seeds, and, what is important also, it yields to the ruralist a return at once in the season.

"*Currants* and other fruits rank next in importance here as vegetable imports. Most kinds of *Orchard Fruits* of the extra-tropic zone are long since introduced, and the colony possesses a vast number of varieties of superior value. Therefore, nothing is opposed to giving this branch of vegetable industry that vast dimension which it clearly deserves, unless it be this one difficulty, that some kinds of our leading orchard-fruits are subject to diseases, obstinate and extensive, for which remedial means are not always easy. I venture to plead again for the appointment of a specialist of long practical experience in vegetable pathology, who could lecture on this subject, visit all parts of our colony, give personally local advice, and conduct new experiments in this direction. The comparatively small expenditure for such a rational measure would yield hundredfold recompense. In my work on 'Select Plants for Industrial Culture and Naturalization,' however, many kinds of fruits for the table or for preserves are recorded, which have never yet found their wav into the gardens of our colony, or, indeed, into any part of Australia. Among these highly desirable fruits, correctly noted at p. 416 and 417 of the above-mentioned work, are several sorts of superior blackberries, huckleberries, tangle-berries, cranberries, whortleberries, blueberries, bilberries, mostly of peculiar deliciousness, but of which some would attain to perfection only in our alpine regions. It needs not my assurance to the Royal Commission that I would most willingly aid in the introduction of these plants, so that the Australian real highlands, which as yet yield hardly any revenue from cultural pursuits, may also contribute to the prosperity of the country. This would most effectually become initiated by the early placing of an experienced working gardener at some test-locality, not less than 4,000-5,000 feet high, as suggested in my former communication.

"The aggregate import of various *Fibres*, raw and manufactured, forms one of the largest of our imports, and the majority of these fibre-plants can be quite well cultivated here, even the jute plant, as shown many years ago, as far south as Port Phillip. How far we here can compete with cheap labour, in India and other tropical countries, is a theme so large that I cannot discuss it in this document. In a lecture, delivered about a dozen years ago, before the Farmers' Club in Ballarat, I entered rather extensively on our prospects here for cultivating plants of textile value, and, as in the case of my essay on the tea-plant, I would advise that the discourse on the fibre-plants be also reprinted for wide distribution, as it applies as much to the present requirements of Victoria yet as it did then.

"I have, however, pointed out already on a former occasion that only a limited number of fibre sorts will ever prove sufficiently easy obtainable on a large scale, will yield readily to the process of separation, will show a superior degree of tenacity, will cheaply submit to any pulping process, and will adapt themselves to machinery, as to enter into competition with the leading fibre-plants of the world, and thus become commercially available for the weaver's loom, for the rope factories, or for the paper mills.

One of the next kinds of imports into Victoria, as representing money value, is that of various *Oils*, mostly from plants which could be successfully reared in one or the other regions of Victoria. But here I must again allude to the necessity, that farmers reasonably expect an assurance of local oil-mills being forthcoming, if minor previous tests induce any agriculturists to devote special attention locally to any very promising oil-plant. This question is in so far also an important one, as it affects the systems of rotation of crops. Local test-gardens can also give a great help to bring the most eligible oil-yielding plants under practical notice.

"I can foresee that, sooner or later, the *Beet-plant* will also play a prominent role in our industrial culture; but I must pass this subject on this occasion, as the co-operation of ruralists and manufacturers is needed to bring the sugar-beet here to any appreciable extent into utility.

"The sum annually expended for *Cork*. imported into Victoria, is a very large one, but as the yield of good bark from the cork-oak is obtainable only after a series of years, and subsequently only at intervals, the cork-oak plantations would become lucrative here only to the next generation. Young cork-oak plants have, however, been distributed by me annually from 1859 till 1873, so that now many of the trees in different parts of our colony must be bearing their acorns, thus affording the means of providing an independent supply for raising the tree for the benefit of the next century, which is all the more desirable as our clime suits so well the cork-oak; and as the supply of good cork falls short of the demand, even now already in commerce, it seems enigmatic why maize, various grass seed? mustard, hops, tan-bark (unless sumach, scotino, and a few other select sorts)' canna arrowroot, broom corn, millet, canary seeds, pulse of some sorts, opium, starch, wicker-ware, and even some cereals, should yet be extensively imported, instead of rather forming export articles of ours. In some instances, the inadequate access to fertilizing substances may account for this, and I would venture to allude to this and to the command of extensive water supply, to which the Government devoted already such circumspect and vigorous attention, as the main factors on which the permanency of a flourishing rural industry must depend to a very large extent. Thus, it may not be out of place here for me to insist on the necessity that our rural population should not merely endeavour to extend the range of cultural plants, to be rendered subservient to them, but the agriculturists here should, by every means, endeavour to prevent the waste of manuring substances; while through deep-sea fisheries, by utilizing the gypsum deposits on the lower Murray region, and by any other new means, we should try to augment the supply of manures. Returning to the main objects of this report, it remains for me to suggest respectfully to the Royal Commission the advisability of placing a copy of the new edition (specially prepared for the Commission) of the volume on Select Plants into the library of every Mechanics' Institute of this colony, and also, it seems advisable to render it similarly accessible to the many Agricultural Societies of Victoria. I could add, in special cases and on particular interrogation, to the information contained in that work; but I believe that, for general guidance, the volume comprises most, or all, that the rural population would need to be informed on for drawing new plants into their operation. Moreover, the work is so inexpensively available, that any one might obtain a cony from the Government Printing Office, or through any of the bookselling establishments of the colony; while the many and copious indices given in the work will enable even the plainest farmer to find out what additional plants he might seek for trying to extend the variety of his cultural resources. Doubtless, the several agricultural schools, to be established in various localities, will afford valuable aid also in the selection of new rural plants; but such highly laudable institutions are more calculated to serve the coming generations, by initiating them into systems and scopes of agriculture, of which their fathers and forefathers, under different circumstances and in colder climes, could not possibly avail themselves; whereas, the immediate wants of the present tillers of Victorian soil could best be met with, so far as I can judge, by the simple and not costly three independent test-gardeus recommended repeatedly for the three different climatic zones of our colonial territory.

" I have, &c.,
"Ferd. Von Mueller.
"To John Shillinglaw, Esq., Secretary, &c."

## Appendix No. II.

## The Government Botanist on the Olive, at Dookie Farm.

Melbourne,

16th June, 1886.

"In accordance with the request of the Royal Commission, I have varieties of olives submitted to me, so far as this can be done, bearing in mind the transfer of any of the sorts of these plants to another part of the globe therefore to a more or less different soil and clime, admits not always of flxing altered varieties here, each, according to circumstances, possessing some mutability and all having sprung from one original stock. I consider what is sent (and returned) to consist of the following varieties:—

"*Picholine*.—The oil of this is regarded as generally fine and sweet the esteemed for preserves.

"*Verdale*.—A form passing into Picholine. This is, as a rule, of middling fecundity.

"*Cayone* (or *Aglandon)*.—The oil of this proves always excellent, and the yield is also good.

"*Moureau*.—A form verging towards Bouteilleau. Largely cultivated in the Provence and in Longuedoc.

*" Bouteilleau*.—Produces a good oil; the productiveness is variable, sometimes very abundant.

"The above notes are from local South-European experiences.

"I would, however, respectfully suggest that of each of these varieties here a quantity of fruit be gathered, and be pressed at the Laboratory of the Agricultural or any other department, so that the quality and quantity of yield may be ascertained of each sort separately, as that would be so much positive information as regards the district where these particular kinds of olive were grown.

"I have, &c.,
"Ferd. Von Mueller.
"John Shillinglaw, Esq., Secretary, &c"

# Appendix No. III.

# Mr. Bucknall's Additional Evidence.—(Question 2070.)

"Woorookoobanya, Rodborough,

24th June, 1886.

"In addition to the evidence I gave in Ballarat before the above Commission, I would like to add a few remarks, viz.:—

"That the larger fruits, such as apples, almonds, pears, quinces, plums, apricots, also gooseberries and mulberries, are grown in comparatively large quantities in this district, while strawberries and currants are also grown. Some of these are grown in public gardens, while a great quantity are grown by diggers in the gullies of the ranges, in patches of a few acres each.

"The Maryborough Fruit Preserving Company buy all the larger fruits that they require, and a great deal of the smaller, from these people. They used from 25 to 30 tons of fruit last season, and could have obtained a much larger quantity had they required it. They also dried a few apples and plums, and found a ready sale for them; they will go into that branch more extensively this year.

"Almonds, judging by the few that are grown, would do very well indeed here, and this is an industry that I think only requires bringing before the farmers, and showing them the results to be obtained, to induce them to take it up.

"All these fruits would grow without irrigation, though they would, of course, give more even yields with it.

"There are great facilities for irrigation by making reservoirs, in addition to which the Tullaroop Creek runs all the year round. Water has been also found under some of the plains, at from 20 to 70 feet, in large quantities.

"Lucerne is the only artificial grass that will grow without irrigation, and that only on the rich flats of the creeks. All the other artificial grasses die out after, say, three years, except in a very few low damp spots.

"Linseed has grown well some seasons, while other dry seasons it has been a total failure.

"I am, &c.,
"Albert Bucknall.
"J. J. Shillings, Esq., Secretary, &c."

# Appendix No. IV.

# Mr. Brimmer's Additional Evidence.—(Question 2282.)

"Ararat,

24th June, 1886.

"In accordance with my promise, on the occasion of the meeting held on Friday last, I have the honour to forward my experience, for the last 29 years, in horticulture, agriculture, and arboriculture.

"I have, at different periods, tried the cultivation of hops, opium, and tobacco—they all grew well—but at that time, 23 years ago, labour was both scarce and high, and, consequently, the balance was on the wrong side of the ledger.

"I then turned my attention to fruit growing, in conjunction with the market garden which I had established at Crowlands, since 1859.

"As regards fruit growing, I consider this district second to none in the colony for the cultivation of all sorts of hardy fruits, with the exception of almonds which do not crop well on account of the frosts at the time of blooming and fruiting.

"In arboriculture, I am not aware of anything having been tried, excepting olives, at the Ararat Asylum. Forty trees were planted five years ago—20 of the common olive and 20 of the Blanquette species. The common olive is very robust in growth, but has never fruited yet; the Blanquette have borne a few this season, which were ripe a month ago.

"Bluegums, I think, should be extensively grown, both by the State and private individuals. I went this day to inspect a twelve-acre paddock, which I had sown with bluegum seed eleven years ago next August. I found them splendid young trees, from 40 to 50 feet in height, as straight as a gun-barrel, with a girth of from 18 in to 2 ft. 4 in., which would have been very materially increased but that the plantation has been neglected, and, in many cases, three and four stems are growing from the same spot.

"The ground was ploughed in lands 9 feet from ridge to ridge, with the seed in patches 12 feet apart; but I can see plainly the better plan would have been to have made 8 feet the distance, and properly attended to the thinning-out.

"By this it appears that the bluegum would take from 30 to 40 years to produce good serviceable timber, without destruction by disease or insects, and I can point out to any one who takes an interest in the subject many instances of the damage done by the borers to trees of an advanced growth. Since visiting the paddock, and considering the matter over, I have no doubt it would have proved a much more profitable speculation if it had been planted with black wattles, which, I have no doubt, would have represented a value of from £20 to £30 an acre by this time for bark, besides the firewood.

"All farmers should, I think, grow enough fruit to supply their own wants. With a proper knowledge of the adaptability of their soils and situation, gum, pine, and wattle might be grown to advantage.

"As there are thousands of acres of land on the ranges and stony rises suitable only for growing wattle, the State might lease these lands, at a low rental, to any one who would undertake to grow wattle or other timber where suitable.

"I consider, also, that both shire and borough councils might, under some circumstances, cultivate the wattle with advantage, and it might increase their revenue to the advantage of the ratepayers.

"By the over-stocking of our pastures, the best of the natural grasses have been killed, and this is likely to become worse, as neither farmers nor graziers allow the herbage to renew itself by seeding. In 1859, I tried half-an-acre of lucerne as an experiment, which grew splendidly. It was sown in September, and hoed after each cutting, but it should never be grazed too closely.

"Irrigation is the great desideratum in this colony, and all farmers should endeavour to make provision for the irrigation of a few acres, thus enabling them to grow roots and green fodder for their stock. Knowing the value of water myself in the cultivation of fruit-trees, I am convinced that one acre 'irrigated will produce the equivalent of at least five acres without that assistance.

"As an instance of the value of irrigation, I planted three rows of Magnum Bonum potatoes on the 19th December; rows 4 feet apart, with 18 inches between the sets; the average yield was 8 lbs. to the root. The sets were large, from 40z. to 60z. each. The potatoes were dug in the middle of March, and retailed at 1½d. per lb.

"The cultivation of the potato in this district, without irrigation, almost invariably results in failure.

"The acacia, generally known as lightwood or blackwood, might, I think, be profitably grown. It is a quick-growing valuable timber, growing in mountsain-ous districts from the base to the summit of the ranges. Redgums might also grown on river flats and other low-lying spots, but, being of slow growth, many years would elapse without any return, although I think that any stockholder would be amply repaid for his trouble by the shade and shelter afforded stock.

"Gorse is another plant that might be advantageously grown by the farmer; it is used as green fodder, succeeds well without irrigation, and on very poor so where grass is of the scantiest. It is very extensively grown in many parts Great Britain. To cultivate, plough the ground, and work to a fine tilth; sow in drills, one foot apart and one inch deep, and roll. Sow in August, and keep clean.

"When fit, cut with mowing or reaping machine or scythe two inches above the ground. When gathered, pass through a gorse-crushing machine, This machine, when I left England some years ago, could be procured for £2 10s.; the maker was Mary Wedlake.

"I think a fair crop of gorse would cut six tons per acre, 'green' of course. I am not prepared to say how long it would stand here, but know it lasts a long time in England. Many poor people at home, in the absence of a crusher, bruise the gorse well with a mallet, when it is eaten with avidity by all sorts of stock. The Government should act in this matter by seeing that proper experiments be conducted by the agricultural colleges with this valuable fodder plant. These experiments, if they proved nearly as successful as I anticipate, would induce farmers to plant largely, and prove a safeguard in the disastrous droughts which occasionally visit us.

"As a proof of the value of irrigation, I forward you the enclosed statistics from Mr. Clarke, of the Ararat Asylum, which give the monthly yield from five acres of land for the last five years. It shows, also, the effects on wheat-growing in an experiment conducted for that purpose. In conclusion, if any information I can give would prove useful, I should feel most happy to afford the same.

" I have, &c.,
"Jas. Brimmer.
" J. J. Shillnglaw, Esq., Secretary, &c."

## "Ararat Asylum Grounds.

"Table showing the amount in lbs., grown on five acres, by irrigation; showing, also, the equalization for each month in dry season:—

"*Experiment with Wheat,* 1885-86.

"Same quantity of ground, sown with wheat in ordinary way broadcast, gave at the rate of 33 bushels per acre.

"Same quantity of ground, sown with wheat in ordinary way, in rows 2 feet apart, gave at the rate of 36 bushels per acre, less 12 lbs.

"Same quantity of land, in rows 2 feet apart, and irrigated at the rate of 115,000 gallons per acre, gave 44 bushels per acre.

"Henry Clarke,
"Ararat Asylum."

By Authority: John Ferres, Government Printer, Melbourne.

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## H.

THE ONTARIO SCHOOL SYSTEM

By Charles H. Pearson

*Minister of Education in Victoria*

Melbourne Samuel Mullen, 29 & 31 Collins St. East 1886

Price One Shilling

# The Ontario School System.

FOR some years past a strenuous attempt has been made to procure the substitution of the system of education practised in the province of Ontario for the system introduced into Victoria by the law of 1872. Mr. Andrew Harper started the discussion by a lecture, which is very full of detail, and so clearly put as to leave no doubt of what the author supposes the Ontario system to be. Mr. Robert Harper has since then brought the matter before Parliament. Unfortunately, his speech of 30th September, 1885, took up so much time in the delivery, that the Minister of Education, Mr. Gillies, could not reply to it; and this year, when Mr. Harper attempted to revive the subject, the House was counted out in about half-an-hour. The subject is too important to be disposed of in this way. Our system of education is not so perfect that we can afford to disregard the experience of other countries, and as the population of Ontario very much resembles our own in its component parts, the fact that it works a perfectly different school system, to its own satisfaction, is at least interesting, and may be in the highest degree instructive. My own study of that system has led me to dissent, in almost every particular, from the conclusions arrived at by Mr. Andrew and Mr. Robert Harper, and to believe that they have very often misunderstood its facts, from the circumstance that they seem to have worked from imperfect sources of information. Had they indeed applied the same searching criticism to official figures and statements in Canada which they very properly apply to official figures and facts in Victoria, they would, I am confident, have arrived at very different results. None the less does the community owe a debt of gratitude to them, not only for forcing this matter upon its attention, but for the great care they have evidently taken to make their case thoroughly complete from the advocate's point of view.

Mr. Robert Harper, in his speech of 1885, claimed me as a supporter in my heart of the principle of local rating. I am not afraid to say that I have always desired to see the principles of local responsibility and control more fully recognised than they used to be in our school system. In my Report of 1878, I made several suggestions for increasing the power of Boards of Advice, which have either been adopted since then, or seem likely to be so. For instance, they are now entrusted, wherever they will undertake it, with the whole working of our compulsory system; and it is proposed to give them, to some extent, the power of the purse. They have also received, at my suggestion, the power of suspending a teacher's increment under the Public Service Act, so that the Department cannot disregard any complaint that a Board of Advice may choose to make. Beyond this, I used to think, till I studied the Ontario System, that if it had been proposed, in 1872, to charge some of the expenditure for school purposes to local rating instead of to general revenue, it might have had the effect of quickening the interest of ratepayers in the attendance of their children. Again, I am not in any way a bigoted opponent of religious teaching in schools. Personally, I would never allow my own children to be taught an emasculated theology by a careless or unbelieving instructor. I do not believe in the magical efficacy of religious precepts painted up on the wall, of a single prayer gabbled over at school opening, or even of Bible lessons—though these the Ontario System does not permit—which have been so chosen as to exclude everything that is distinctive in faith. Still, if I found that the clergy of all denominations could really unite in some moderate proposal, and would reward the State for accepting it by using their whole influence in support of the National School System, I should certainly be prepared to make a small concession in exchange for a great good. Altogether, it will be seen that I have come to the study of the Ontario system with no such inveterate prejudices as might disqualify me from passing a dispassionate judgment upon it.

The results I have arrived at are, that the system has promoted religious separation in Ontario; that it only gives satisfaction to Catholics because they are unfairly favoured under it, and because they contrast it with the practice in the United States; that Protestants only accepted it as more tolerable than incessant agitation; that it does not satisfy the needs of the religious world; that it renders compulsion a mere name; that the scholars are worse taught than in Victoria; that the teachers are scandalously underpaid, and, to a great extent, less qualified than our own; that the work of inspection is worse done than in Victoria; that the Inspectors are not as independent as they should be; that the system of local rating is very unfair to poor districts; and that the Local Boards are not properly qualified for their work. No doubt, there is a great deal to be said on the other side. Ontario contrasts favourably with some of its neighbours in many respects: its Inspectors seem from their reports to be admirably trained, full of zeal, and hard workers; and the late Superintendent, Dr. Ryerson, who did his best to oppose the introduction of almost everything Mr. R. Harper admires, was a gentleman of very singular qualifications. These men have kept the Ontario school system at a fairly high level for North America. Where they have failed, it has been essentially through the operation of the law of local rating, which Mr. Robert Harper desires to introduce into this country, as a lever for lifting the clergy of every denomination into seats of honour and authority over the schoolmasters.

The history of the Ontario system is, that in 1841 the provinces which had just been united under Lord Durham's Act possed a law which empowered District Councils to levy rates for the establishment of public or mixed and of separate schools. "I think," says Dr. Ryerson, "the Legislature made a grave mistake when it inaugurated the principle of separate schools in common with that of mixed schools."

'Ryerson's reply to the attacks of Hon. George Brown, p. 23.

Elsewhere, however, he admits that the concession was partly justified by the stipulations of the Treaty of Paris, in 1763, which provided that Canada was to have the free exercise of the Roman Catholic religion, as far as the laws of Great Britain allow it. The law of 1841, which was affirmed anew for Ontario in 1843, 1846, and 1847, vested the power of establishing separate schools in the Board of Trustees of each city and town. Such as it was, it failed to satisfy a large portion of the population, and, in 1849, an Act was passed abolishing separate schools altogether, and making the mixed schools purely secular. There seems to be no doubt that this legislation was in advance of the times. Dr. Ryerson refused to administer it, and it was suspended by Order in Council, and repealed in 1850. Meanwhile, the friends of religious teaching had been exasperated and alarmed. Episcopalians and Catholics combined, and it seemed likely that a system of pure sectarianism would be introduced, if Dr. Ryerson had not arranged with the Catholic Bishop Power to amend the old law by allowing twelve heads of Roman Catholic families to demand the establishment of a separate school as a right. These tactics were completely successful, because the Catholic hierarchy was favourable to the Government of the day; and when the Episcopalians moved their amendment, relying on the Catholic co-operation which had been bargained for, not one of the Catholic Members rose up to support it, to the great amusement of the other Members of the House.

Ryerson's reply to the attacks of Hon. George Brown, pp. 24, 25.

In this proceeding, Bishop Power seems to have thrown over his allies rather cavalierly. The probability is that he had been no party to the first bargain He was a man of high character, an adherent of that wholesome Gallican school, which has always tempered churchmanship with statesmanship, and his life showed that he valued the intellectual and moral training of his people more than a sectarian triumph. So honestly did he co-operate with the State system, that the separatist schools, which at one time numbered nearly fifty, had dwindled down to 20 in 1850, and to 18 in 1852

Ryerson's Letters in reply to Foreign Ecclesiastics, pp. 9, 10. Ryerson's reply to the attacks of the Hon. George Brown, p. 10. Kohl says, in his Travels in Canada, vol. ii. p. 207, that in 1851 there were only 16 Roman Catholic separate schools in Ontario; but I have preferred to abide by Ryerson's statements.

. This is the real period of religious peace in Ontario, and it belongs to a time when the recognition of separate schools was so trifling, that in an instance quoted by Bishop Charbonnel, the Catholic School of Chatham, with forty-six scholars, only received £4 10s. out of the Government grant and was offered as little out of about £300 taxes raised for the payment of teachers.

Bishop Charbonnel's Letter of March 7, 1852, given in Ryerson's Letters in reply to Foreign Ecclesiastics, p. 2.

Unhappily, the peace-loving Bishop Power was succeeded about 1851 by Bishop Charbonnel, who was probably less tolerant himself, and who is supposed to have fallen under the influence of violent advisers. Bishop Charbonnel and his clergy found plenty to say against the public school system. There was the solid grievance, that the separate Catholic schools, though treated impartially like the separate Protestant, which were then rather more numerous, were not as liberally subsidised as the public schools, but only assisted by trifling grants. In addition to this, it was discovered that Goldsmith's "History of England," used as a text-book, was anti-Catholic; that White's "Universal History "was little better; that a text-book on botany spoke of superstitions in the Romish Church; and that a book of reference in a normal school contained a problem about nuns, who were supposed to violate their vows.

Ryerson's Letters in reply to Foreign Ecclesiastics, pp. 2, 80, 81

No one will defend the use of partisan school-books, but it will probably seem to most of us that the only necessary reform was to render the text-books in public schools colourless.

This, however, would not have contented the Catholic agitators In 1854 the three Roman Catholic Bishops of Ontario circulated a draft Bill. Clause II. of this enacted that any number of dissentients might establish a separate school, and elect trustees at a public meeting, convened by three heads of families. Clause VI. proposed that "the said trustees shall be entitled to receive from their special superintendent, on a report such as required by him, such sums out of the Government grant out of all the taxes for school and library purposes, and out of any provincial and municipal school funds as proportionate to the population they represent, according to the last official census, provided that those sums shall be expended for school purposes." The memorial enclosing the draft Bill ended with these words:—"We, the undersigned, hereby declare that nothing short of the above will satisfy the conscientious convictions of the Catholics of this province. Patrick Phelan,. Bishop of Carrhoe; Armandus, Fr. Ma., Bishop of Toronto; Jos. Eugene, Bishop of Bytown."

Copies of correspondence on the subject of Separate Schools. Printed by order of the Legislative Assembly. P. 37.

That is, nothing would satisfy the conscientious convictions of Catholics, but that the Protestants, who might be, and habitually were, the more numerous and wealthy part of the population, should pay whatever a Catholic superintendent demanded, on the basis of population alone, for the support of separatist schools, though they were already taxed for public schools, which Bishop Power had supported and approved. This is surely a much stronger claim than that of the Victorian Protestants, that Catholics shall contribute to the support, not of separatist and Protestant schools, but of national schools, which two-thirds of our Catholic children have no difficulty in using.

Bishop Charbonnel did not get all he fought for, but he got a great deal. In 1855 it was agreed that the municipalities must levy the taxes for separate schools on the demand of five freeholders or householders; and the power of Township-Councils to assign boundaries of their own, was replaced by a provision that separate school sections should be the same as common school sections. At first this was a concession to-Catholics exclusively. Protestants apprehended that the national school system would be ruined altogether if families sending their children to a private school might club together and call it a separate school, and demand exemption from rates.

Ryerson s reply to the attacks of the Hon. George Brown, pp. 38, 39.

However, it is always difficult to resist the claims of analogy, and, in 1859, an Act was passed, giving Protestants the right to be separately rated to denominational schools, though with limitations that were unequal, and that have had the fortunate effect of making the concession valueless.

The student of Church history will learn without surprise that the surrender of 1855 did not satisfy Catholics for more than a time. In 1857 their schools had increased from the 18 of 1852, to 100; but the natural limits of expansion seem presently to have been reached, and then the agitation began again. In 1860, 1861, and 1862, the Catholics were moving ineffectually in Parliament for an alteration of the law, and in 1863, by an agreement between Dr. Ryerson and the Catholic prelates, a fresh Bill was drafted by a Catholic barrister, Mr. Scott. It was not very important, but it gave the trustees and electors of separate school sections a power to amalgamate if they liked, which seems harmless and equitable, and it allowed a Catholic residing within three miles of a separate school to claim exemption from common school rates, though he was not in a separate school section and did not pay rates to it, which seems inequitable and mischievous. It is obvious that by this clause, intended apparently to save Catholics from the offence to conscience of having to contribute to the National School system, many men would escape contributing to school purposes at all. Nevertheless, in 1864, the Toronto *Freeman*, a Catholic organ, declared that "a more cruel hoax, a more transparent deception, under the show of a measure of justice, of conferring benefits, never has been practised by a Government in any community" than Scott's Separate School Bill of 1863. James O'Reilly, a Catholic lawyer of Kingston, said at a public meeting, "This much-vaunted Separate School Act is nothing but a sham and a fraud." Dr. Ryerson answered this agitation by pointing out that only two important demands ever formulated by Catholics had not been admitted. The first of these was the proposal in the draft Bill of 1854 to levy a rate on Protestants for the support of Catholic schools. The second, which he says was also in the first draft of the Separatist Bill was that Catholics should be excluded by law from common schools, the State being thus set to discharge the functions of a Church police. There were, however, two rival demands. One, formulated by Mr. O'Reilly, was that the property of Irish absentees should never be rated to common school purposes. The other and only specious one was that as the State subsidised separate school teachers, it should also contribute to the expense of separate school buildings.

The materials of this paragraph, except the last sentence, will be found in Ryerson's Remarks on the new Separate School Agitation. As regards the last claim, Dr. Ryerson says, in a letter of 26th August, 1854, that it was made in error. "The whole of the Legislative School grant in Upper Canada must be expended in paying the salaries of teachers. There is, therefore, no school 'building fund' in Upper Canada, and, therefore, none for common, any more than for separate schools.

So far as I can discover, these last demands have not been generally taken up by the Catholic Church in Ontario, which has remained contented, as it well may, with its position of political privilege. Being the Church of the minority, it has several advantages over the majority. (I) It has far greater facilities for establishing separate schools, requiring only five heads of families to start one, while Protestants require twelve. Again, Protestants can only start one where the head of the public school is Catholic, not where he is a free-thinker, a

Jew, or a Socinian;

Protestant and coloured Separate School Act, clauses 1 and 6.

neither, again, can any one Protestant body, however large, establish a separate school for itself. Further, as I read the law, Protestant separatists may find their school shut up in a year, because the obnoxious head-teacher has been replaced by a Protestant.

By the Common School Act of 1880, it was "provided, fourthly, that no Protestant separate school should be allowed in any school division, except when the teacher of the common school is a Roman Catholic, nor shall any Roman Catholic separate school be allowed, except when the teacher of the common school is a Protestant." Dr. Ryerson says, in his Report for 1852, When once established, each school can be continued as long as the party establishing it shall comply with the requirements of the law." Since this was written, however, the law has been changed. The Roman Catholic Separate School Acts of 1855 and 1863, dispense with the condition of 1850. The Protestant and Coloured Separate School Act of 1859 re-enacts the provision for Protestants and coloured people. Evidently these are in a position of ineriority to Catholics, and I apprehend that not only are they now hampered in starting the school, but that they cannot continue it if the common school gets a Protestant head teacher.

This accounts for the fact that there are no Protestant separate schools. Catholics have no difficulty of this kind. (2) Catholics cannot be compelled to attend any school unless they reside in a separate school section.

School Act of 1871, section 3.

(3) Congregationist lady teachers are dispensed from passing an examination to show their capacity.

I quote M. Buisson's words, as there may be a difference of opinion about their meaning. In Canada, he says, and the context shows that he is referring to Ontario, 'on accorde seulement la dispense du brevet aux congreganistes femmes et quelque tolerance dans les details administratifs."—Buisson's Rapport sur l'lnstruction Primaire," p. 461.

The one advantage which the National Schools have appears to be that a school building and its land cannot be foreclosed on for debt.

"The School Law," by J. G. Hodgins, LL.D.; p. 131.

Mr. Andrew Harper has persuaded himself that Catholics in Ontario are satisfied to avail themselves moderately of the separate schools, and, as a rule, loyally acquiesce in the Public School system. "Between 1868 and 1876," says Mr. Andrew Harper, "the number of separate Catholic schools increased only from 162 to 167." We must set against this, that between 1852, when the population of Ontario was just under a million, and 1884, when it had about doubled, the Catholic separatist schools had increased from 18 to 205, or eleven-fold. In 1884 11 schools and twenty-seven teachers were added to the separate system.

Report of James F. White, Esq., R. C. Inspector. Printed in the report of the Minister of Education for 1885, p. 158.

This, however, only shows a part of the case. The Catholic population of school age in Ontario being about 85,000 in 1882, the Catholic school Inspector, White, estimated that it was thus distributed—24,767 in separate primary schools, 2000 in denominational schools and colleges of a higher order (together 31.4) 30,000 in common schools as distinctively Catholic as separate schools, 35.2, 1670 truant, and 26,563, or 31#2 per cent., in State-schools.

Report of James F. White, Esq., R. C. Inspector. Printed in the report of the Minister of Education for 1883.

Let us contrast this with the results in Victoria. The Catholic children of school age were 49,979 by the census of 1881, and must have been about 50,980 in 1883,

These figures have been kindly supplied to me by Mr. Hay ter.

when it was reported officially to the Royal Commission that 21,554, or 42#2 per cent., were attending Catholic schools and colleges. It will be seen that the distinctly separate schools get a larger proportion of the population in Victoria than in Ontario, but in Ontario the Catholics under the local system have succeeded, as Mr. White, with natural pride, boasts, in gaining practical possession of a great many schools intended to be public. Neither is it quite certain that the Catholics even now regard the Ontario system as just. The Catholic Inspector, Donovan, says, in his report of 1884, that the separate system "was founded under difficulties that would have prevented the existence of many others; and it has been maintained among trials that would have caused others to perish." If this kind of language is held in an official report, what are we to suppose is the secret feeling of religious circles throughout the country?

It may be said that we are not now concerned with the question whether the Ontario system began in sectarian animosities, and implies unequal concessions to one denomination, as the Protestant agitation against it, which was tolerably strong down to 1872, has now died out. The broad issue is, whether it works well, for if it achieves better results than our own, it may deserve to be imitated on that ground alone, and we may, perhaps, devise a means of making it airer to Protestants than it is in Ontario. Mr. Robert Harper is very emphatic on the fact that compulsion is better worked in Ontario than in Victoria. He takes the official

Canadian statement, that the total absentees of school age in Ontario were only 6230 in 1883, and he denies the official Victorian statement that 17,976 children of school age, who do not attend school, are mainly accounted for by the 27,648 children who have passed the standard examination in the last three years. My own information, derived from Mr. Hayter, is that our habitual absentees are 5387 to 202,379 children of school age; and the Ontario returns for 1884 show 7266 children between 7 and 13 out of a total population of that age of 261,162. The compiler of the Ontario returns has inadvertently compared the absentees of the age during which attendance is supposed to be compulsory, 7—13 with the population of school age, so called, that is, the age during which attendance is allowed and encouraged—5-16. When this mistake is corrected, it will be seen that Ontario and Victoria stand pretty much on the same level for truancy.

Habitual truants, however, are not really so important to an Educational Administrator as lax attenders. The legal minimum of attendance in Ontario is only no days, 10 days less than in Victoria. In 1884, 88,432 children, or 33.8 per cent., out of 261,162 between the ages of 7 and 13 did not comply with this miserable requirement. To put it in another shape, 9 per cent, of the pupils attended less than 20 days, 17 from 20 to 50, 25 from 51 to 100, and 22 from 101 to 150. It will soften the damnatory character of these last statistics if we assume, as perhaps we may, that they include the children of all ages; but under any circumstances the number of those who fail to comply with requirements more moderate than our own, cannot be put at less than 33.8 per cent. It may seem as if we were not much better off in Victoria, even when allowance has been made for the ten days' extra attendance, which the law here enjoins. In the worst quarter of 1884, 32 46 of the children did not attend the proper 30 days. If, however, we deduct from these those who were not within the school age, as is professedly done in Ontario for the 88,432, we shall reduce the number of defaulters to 26.9; and if we add those who lived beyond the prescribed distance, or who had completed their school course, we find the missing proportion reduced to 21.4. On the whole, I think we may put 21.4 per cent, for deficient attendances against 33.8 per cent, in Ontario; and it must be borne in mind that many of our children undoubtedly make up for their absences in one quarter by fuller attendance in the remaining months of the year.

Perhaps, however, a few reports of the Ontario Inspectors will be more convincing on this subject than mere figures. Inspector Fotheringham reported in 1879: "Those who enter schools do not average one day there out of two; and only one in 17 attends nearly full time. . . Compulsory clauses are a dead letter at least in North York." Inspector Mackintosh says that in his district "the average attendance was 40 per cent, of the number enrolled." These reports may be excepted to as antiquated. In 1882 Inspector Curry said, for Haliburton County, that a great many children between 7 and 12 either did not attend school at all, or attended for less than four months in the year. In the same year, Inspector Fotheringham said that more than a million was lost through defective attendances in Ontario alone. Inspector Kyrle said, for Carleton County: "Compulsory education does not seem to have accomplished anything as yet in the County of Carleton." In 1884, Inspector Kelly says, for County Brant: "The compulsory clause of the School Act has not been put in force, so far as I have learned, anywhere in the county." Inspector Fotheringham says, for County York: "The percentage of attendance, though advanced by nearly 25, is still below one-half of those enrolled." Inspector Mitchell says, for Lanark County: "The compulsory clause is inoperative." Is it possible to resist evidence of this kind? No doubt, districts differ from one another, and a bad season affects attendances. Thus, in County York the attendance in the first half of 1879 decreased by 30,000, while it gained 14,000 over the last year in the second six months, after a good harvest. This, however, tends to show that the Local Boards do not dare to enforce the compulsory clauses. It must be added, that under the Canadian system the Local Boards have an interest in stuffing the rolls, and the Inspectors, who are set to guard against this, and who seem to do their duty faithfully, like high-minded gentlemen, are liable to dismissal in a moment, without cause assigned.

Of course, no teaching can be thoroughly satisfactory where the attendances are so deplorably bad as in Ontario. It is contended, however, that the excellence of the teachers and the superior organisation of the inspectoral staff place Ontario, in two important respects, above Victoria. Let us see how the Ontario teachers stand. In 1884 there were 6911.

First-class, County or Provincial, 394 decrease, 68 Corresponding Second-class, 2238 53 to our Certificated. 2632 121 Third-class, 3426 decrease, 45 Corresponding to our Licensed. Corresponding to I nterim, 603 increase, 194 our partially Various, such as permits 250 increase, 26 Classified

In Victoria, for the same year, the number stood thus:—

Two important facts may be noted: (1) That, in Victoria, teachers of the higher class are increasing in proportion to the total number, while in Ontario they are decreasing. (2) That in Ontario the less qualified teachers are more than four-sevenths of the whole number, while in Victoria they are barely over a half, 51.3. Mr. R. Harper quotes an opinion that a Canadian teacher, having a first-class certificate, is superior to the graduate of an English University, and to a Victorian teacher who has passed into the highest class in this Colony. If by the first statement is meant that the Canadian holder of a first certificate is superior to an average Oxford pass-man, I can easily believe it, though the fact of a pass-man failing to get the Canadian certificate would prove little, as the Englishman has been trained in Latin and Greek, and the Canadian mainly on mathematics and a little science. If, on the other hand, it is implied that a first-class teacher in Ontario is better than a first-class Oxford or Cambridge honour man, I will grant it when I see a Canadian stripping the English Universities of scholarships and fellowships. The comparison with Victoria is a little more easy. After carefully going into the matter with the Secretary and Assistant Inspector-General of the Education Department, I believe the first Canadian certificate corresponds pretty well to our certificate in first and second honours, and the second Canadian certificate to our ordinary certificate. The third Canadian certificate is as good as our license, but, apparently, not quite so good as the work now exacted from our first-class pupil teachers. The Canadian system takes in rather more subjects; but the Victorian system balances this by making the knowledge of a dead language compulsory. All depends, therefore, on the way in which the examinations are conducted; and since March, 1880, the Ontario Education Department has transferred the examination for certificates to a central Board of Examiners. The subjects being very much the same, the examinations in Ontario appear to be more easily conducted than in Victoria. On an average of three years (1882-1884) less than 36 per cent, of our candidates obtained a certificate of competency. During a similar period, the latest of which I can find record, in Ontario (1878-1880) 95 per cent, of the Ontario teachers passed. Altogether, we are at least justified in assuming that our certificated and licensed teachers are equal to the three certificated classes of their Canadian rivals, and we have scarcely any so wanting in qualification as the 853 who are classed in the Ontario Reports as "interim" and "various, such as permits."

Mr. A. Harper has stated that "the teachers are required to possess proper certificates of qualification from Government;"and the Minister of Education in Ontario has written to Mr. R. Harper that "every grade of teachers is required to take a special course of training. "Required can only mean "expected theoretically." Even the low standard which some of the local Boards of Examiners fix, and which, in the case of third.class certificates, went down to 40 per cent, for grammar and arithmetic, and 20 per cent, for all other subjects in Lanark County, in 1880, is very far from being always attained. "The supply of teachers holding regular certificates is still much less than the demand," writes Inspector Mackintosh, in 1879; "and the Inspector is driven to grant special certificates" (or permits) "to persons possessed of very meagre qualifications for the positions to which they aspire." Inspector R. G. Scott speaks of Renfrew County as being so poor "that the refusal to incur the increased expense of paying the salaries of qualified teachers could only be looked upon as perfectly justifiable." "Many of the trained teachers," says Inspector Knight, "show that they have made but little use of their time but he still thinks that they are better than the untrained. Let us pass to a later date. In 1884, Inspector Smith regrets to have to report that so many teachers are holders of permits and temporary certificates, but cannot see how there can be any change—(first) because of "the scarcity of qualified teachers and (secondly) because the school rates are already as high as can be borne. Inspector Mitchell follows suit, with the remark that "our schools are mere stepping-stones, and must continue to be such, until *teachers* are placed in charge of our schools—not mere school-girls and medical and other students, who intend to make a stepping-stone of the occupation to something better." Inspector Curry says—"The scarcity of professional trained teachers continues to be felt." There are several Inspectors who say, year by year, in the Ontario reports, that their districts are improving; but there is barely one who gives as good a report of the qualifications of his teachers as any Victorian Inspector could give. Very significant, too, is the fact noted by Mr. Fotheringham, in 1884, "nearly half of the schools change teachers every year" Evidently, either the school cannot get suited, or the teacher is inadequately paid.

There can be little doubt that the latter is the more frequent reason why the teacher shifts a residence or abandons the profession. Although the Ontario system economises teaching power, so as to allow only one teacher to 63.4 children, while the Victorian system allows one to 50, the salaries of the great mass of teachers in Ontario are lamentably low. The Report for 1884 puts them thus:—

- County, £24...£160 Average for Males, £78 16s. Females, £50 8s.
- City, 55...240 Average for Males, 15216s. Females, 528s.
- Town, 40...200 Average for Males, 121 os. Females, 55 8s.
- Average in the Province: Males, £84 8s.; Females., £54 8s.

Inspector Smith, from Carleton County, reports that trustees often sign a requisition for an unqualified teacher, in order to get him cheap, for instance, at *£40* a year; and it has been ruled in the Ontario Courts that townships are not exempted from the obligation to provide a teacher by offering this sum, and then pleading that they cannot obtain one. It must be noted, also, that salaries are not only low, but precarious. In 1879, Inspector Bigg reports for Leeds County that "salaries, on an average, are about 15 per cent, less than were paid four years ago, in consequence of hard times, though they are still 20 per cent, higher than were paid prior to 1871." When has a Victorian teacher been subjected to fluctuations of 35 per cent, within ten years? What comparison is possible, as regards the comfort and well-being of the teachers, between our own system, in which the men rise from;£1oo to £480 a year, and the ladies from £80 to £300, and the Ontario tariff, in which a lady may get as low as £24, and a man only £40, while the general average for man and woman is below the minimum for either among ourselves?

Mr. Robert Harper has a comfortable theory that the teachers in Canada are, as a class, as well remunerated as any portion of the community doing similar work. As my own recollections of Canada, in two visits that I have paid it, are that prices were much what they are in Victoria, I have taken great pains to ascertain whether the Ontario Inspectors are all wrong in saying that the teachers suffer from insufficient stipends. There is no doubt, I think, that Canada is a rather poorer country than Victoria, and that high functionaries such as judges, ministers, and departmental heads get rather beggarly stipends, ranging from *£6oo* to £18oo a year. Schoolmasters, however, are very far below this position in Ontario, and I find it difficult to compare them with any class, for they are worse paid than the commonest labourers.

"Mr. Summerly, Inspector for Prescott and Russell, uses this exact comparison in 1881: "Labourers and domestic servants are paid higher wages than many of our teachers."

For instance, the Immigration Agent at Ottawa reports in 1883 that he lias placed out farm labourers (new chums, and, therefore, the least valuable of workmen,) at *£2* 16s. to £4 a month, with board. Common labourers were then getting 6s. a day; carpenters, 6s. and 7s.; masons and bricklayers, 10s. In Hamilton district, farm labourers were commanding £40 a year, with board and lodging. Looking at prices for the same year, the expense seems to be much the same as in Victoria. Bread, 6d. the 4lb. loaf; beef, 4d. to 6d. a pound; mutton, 3½d. to 6d.; and tea, Is. 8d. to 2s. Firewood is from 18s. to 24s. the cord, and the prices of dress seem not excessive; but it must be borne in mind that the rigours of a Canadian winter certainly demand a larger expenditure on these two items than is required in this country. On the whole, while I admit that the teachers in the towns of Ontario are reasonably well paid, and perhaps gain by the lower scale of expense usual in society, I should certainly recommend a young man, in whom I was interested, to try his fortunes as a farm labourer in Ontario if he could not hope for more than the average salary of a country teacher. I am convinced that, if our service were thrown open to certificated teachers of Ontario of the first and second class, to-morrow, there would be a general exodus of nearly the whole class from the Dominion. Now, the fault of these insufficient salaries is undoubtedly in the system. Inspector upon inspector says that his district pays all it can afford; but struggling farmers in the backwoods cannot support a burden4 of national dimensions. Gippsland and the Wimmera would be as badly off as Ontario if they had to pay for their schools by local rates.

With inferior attendance of the pupils, more pupils to each teacher, and in many cases less qualified teachers, it cannot be supposed that the Ontario system can equal our own in efficiency. We are not left to conjecture on this subject. We know what is taught in the six classes of the Ontario schools. The first four correspond almost exactly to our own, except that the arithmetic in Ontario is a little higher in the fourth class. In the fifth and sixth classes, though there is still of course some parallelism, the Ontario teaching takes a much wider range. So far, the balance seems to incline to Ontario. On further examination, however, we find (I,) that 20 per cent, of our own children are in the fifth and sixth classes (13.97 in class 5; 4.64 in class 6,) while in 1884 only 2 per cent, were in the fifth class in Ontario, and 19/100 in the sixth class; (2,) that the 16,677 children who are in the fifth and sixth classes in Ontario appear very nearly to correspond in number with the 17,912 pupils who range from 17 years of age to 21 and above. The Ontario Inspectors do not encourage the formation of classes above the fourth. "As a general rule," says Inspector Bigg, "a fifth class means neglected first, second and third classes, the chief labour being bestowed on the crack pupils of the fourth and nominal fifth classes in order to prepare them for the High School Entrance Examination." Accordingly, the percentage of fifth and sixth class pupils has declined steadily in Ontario, having been 343/100 in 1879, against *2 19/100* in 1884, while the percentage in Victoria has risen year by year.

Mr. Robert Harper instituted a comparison, in his speech of 1885, between the inspection of schools in Ontario and Victoria, to the great advantage of the former. His main argument was, that in Victoria there were 99 schools to 1 Inspector; in Ontario, where they do not examine for results, only 66. Mr. R. Harper a little overstated the case against this country. Our Inspectors, in 1884, were 21 to 1773 schools, or 1 to less than 85 schools, and it is proposed to increase their number and to give them rather fewer pupils to examine. Still, anyone looking at present facts, and computing that a Canadian Inspector has only to examine 6100 children, while a Victorian averages *nearly* 9000, may naturally infer that the Canadian system is stronger in an important point. This impression will, I think, be dissipated when he finds how many and what onerous duties are imposed upon the Ontario Inspector. He is, in fact, charged with a great deal of the finance of his district, and has, for instance, to assist in equalising the assessment of whole school sections, and to give out or refuse cheques to teachers, and act as referee in the audit of school section accounts, and determine, with the other inspectors, how the sums to be paid from the School Fund of each township shall be apportioned. He may be called upon to attend arbitrations, and he is referee if there is any dispute about the proceedings of an annual or special school meeting. He, therefore, does much of the work which in Victoria is done by clerks in the Education Department, and, as a consequence, has less time than a Victorian Inspector for the supervision of schools. In 1881 the Government of Ontario instructed Inspector McLellan to report, after a visit to America, on any improvements that could be introduced into the schools of Ontario. One of his recommendations was, that they should introduce "one thorough inspection a-year, as better than two hurried ones.' We, in Victoria, thanks to our much-abused system of results, have succeeded in getting the one thorough inspection a-year, in addition to another, which is not necessarily a hurried one. However, it may be well to let the Ontario Inspectors speak for themselves. Mr. Fotheringham says, in 1879: "An Inspector, with, say, 8000 children, 100 teachers, 80 Boards of Trustees, teachers' examinations, intermediate and entrance examinations, annual reports, half-yearly returns, apportionments, cheques, orders, 800 or 1000 communications, 150 or 200 calls on his hands, cannot possibly do the work as thoroughly as he would wish." Mr. Morgan says, in the same year: "The annual reports sent in by the Trustees are, in many cases, painfully inaccurate, sometimes culpably inaccurate. It is no uncommon thing for an Inspector to have to correct portions of fully half the reports, from data in his possession, before copying them on the township report." Mr. Smith says, in 1884: "I endeavour, in all cases where the school demands it, to devote half a day to the examination of the classes. I am of opinion, however, that one whole-day visit in the year would be preferable to the half-day system." In Victoria, it is no uncommon thing for an Inspector to spend from two to six days over a single school; but then, the Victorian Inspector is not burdened with the duties of a cashier and an auditor.

There is another important point to notice. Inspectors in Ontario are appointed by the very bodies they are supposed to check—county councils, or city or town Boards of Public School Trustees, and may be dismissed at pleasure. The only check upon the elective bodies is that they are bound to appoint someone who possesses a legal certificate of qualification for the office. Beyond this, the system of payment adopted wrould not generally be regarded as a pleasant one. The Inspector gets no more than five dollars from the State, and not less than five dollars from the County Council for every school he visits; the number in his charge being bound not to be less than 50, or more than 120. The Inspector's fixed salary, therefore, may be as low as;£1oo, and cannot easily be more than £300.

In 1880 the average salary of an Inspector was £228 12s., the highest salary £362, and the lowest £81.

His fluctuating salary is derived from fees for examinations and arbitrations. The impression left upon the mind of an outsider is that an Inspector's position in Ontario is very precarious, and that the really admirable work these gentlemen do is not adequately remunerated. Looking at the intrepid frankness of their reports, I cannot suppose that this generation of men, trained by Dr. Ryerson, is influenced by fear or favour; but it is surely permissible to ask whether a system under which the men who watch and report upon School Boards may be dismissed by those very Boards at a moment's notice, without reason assigned, is altogether a wise one, or compatible with the self-respect of the profession. Under the title "Hampered Inspection," Mr. Fotheringham raises this important question in his Report for 1884, and defines the School Boards as "a popular body in no way specially qualified to judge of the merit of the services rendered, and held more strictly to account for economy than efficiency in such services."

The fact is, the Ontario system, in its present shape, appears to be localism run mad. "The Boards," says Mr. Fotheringham, "change too rapidly; they are unremunerated, and cannot be held to the duties of their office as paid officers could be; neither can it be supposed that ten to twenty efficient Boards can as easily be provided for the schools of a township as one competent Board for the whole, though even larger." Mr. R. Harper will, perhaps, say that the natural remedy is to make school districts larger. The attempt has been made, and has miscarried. Mr. Bigg writes about it in 1879, "hen the Department did all in its power to substitute Township for Sectional Boards, and says that he is not sanguine of seeing the reform carried out, as the law required a two-thirds majority for the change, and all the rich sections were certain to vote against it. Mr. Bigg gives us an instance of the inequalities under the present system—that the school-tax may be two mills in the dollar, or even less, while it is over a cent (or more than five times as much) in the adjoining section. Of course, this unfairness tells in two ways. The poor district has the heavier burden to sustain in the first instance, and it gets a smaller share of the Government and municipal grants. Can we wonder if Mr. Smith reports, in 1884, that the statistics which the trustees furnish are unreliable, and that they often apply for unqualified teachers, in the desire to keep down rates in the poorer portions of the country? Can we wonder if correcting the trustees' reports was declared by Mr. Morgan, in 1879, be one of his most arduous duties? Does any educational expert really think it desirable that a board of men, who have never made school work their special study, should have the power, which the Ontario Boards possess, of "allowing options in the course of studies, and deciding what shall and what shall not be taught of the programme?"

It is surely allowable to believe that the Messrs. Harper would never have been fascinated by the Ontario System, if they had not conceived that it permitted the introduction of something like religious teaching. What does this amount to? "Of the 5252 schools reported," says the Report for 1884, "the Scriptures only were read in 334; prayers only, in 1864. Both Scriptures and prayers, in 2772; and Scriptures with prayers by both teachers and pupils, in 906." The prayers in question consist of two collects from the English Prayer Book, the

Lord's Prayer, from St. Matthew, in King James's version, and the Benediction. In addition, the Ten Commandments are taught, under a Conscience Clause, to all the pupils, and are repeated at least once a week. Beyond this, the Ontario schools are in no way more favourable to religious teaching than the Victorian. The right of the clergyman to give religious instruction is limited to "at least once a week after the hour of four o'clock in the afternoon." Since 1868 the Irish National reading books have been discarded.

Canadian Educational Directory for 1876, p. 223, note.

So far as I can perceive, the Ontario system is called "godless" and other bad names as freely as our own by members of the religious world. "One county Inspector writes," says Dr. Ryerson, in 1872, "that one R. C. priest, in a separate school which the Inspector visited, said, 'Your schools are atheistic. You don't acknowledge God.'"

Ryerson's defence against the attacks of the Hon. George Brown, p. 76.

Dr. Ryerson tells us that he had long cherished, and at last sought to realise, the grand idea of giving "all needful religious teaching to pupils at schools without infringing upon any denominational peculiarity. One discordant note has interrupted the harmony." The context shows that he refers not to the separation of Catholics, but to opposition among Protestants, the only Christians whom he supposed it possible to unite. At any rate, his words are conclusive evidence that he regarded the so-called religious element in the Ontario system as a delusion. In the same strain writes Mr. Marling, the chief clerk in the Education Department of Ontario.

Canadian Educational Directory for 1876, p. 223.

He tells us that only in two out of a hundred and fifty cities, towns, and villages, and in one of these in only one or two out of fifteen schools, have the clergy applied for leave to give religious instruction before four o'clock. He says that there is "an active propaganda of the new gospel of unbelief," and blames the clergy for not taking advantage of the school law to combat it. "Can we say," he asks, "that the children of this country, however much their wits may be sharpened, are highly educated, while this is undone?"

The one fact Mr. R. Harper has succeeded in bringing to light is, that the Ontario system is cheaper than the Victorian. Where, however, does the economy come in? Not in 'restricting the school age, for Ontario in that respect sins even worse than ourselves, and counts 17,912 children over 17 years of age in her schools, while we have less than 3000 over 16. Not in the expenses of administration, for our own only amount to about £ 17,000, and if two-thirds of that were economised under the local system, the saving would not be 2 per cent, on our total expenditure. The real difference undoubtedly lies in the salaries of the inspectors and teachers, and if Mr. R. Harper now attempts to evade this conclusion by saying that you must add 40 per cent to Ontario salaries, if you adapt them to Victorian needs, a great portion of his economies will disappear. He has alluded to me in one place as having once proposed reductions. If he will do me the honour to examine my scheme of 1878, again, he will find, I think, that it rested mainly on the suggestion that the number of teachers should be reduced, first, by forcing children to attend so that they might complete their school course by the age of 12 or 13, and next, by assigning 55 instead of 50 scholars to every teacher. Of this second proposal I will only say now, that as a teacher, I would sooner have 55 children attending regularly, than 50 attendances made up as they may be at present of 80 scholars dropping in at uncertain times. Beyond this I proposed what has since been carried out, that inspectorships should be reserved as prizes for energetic teachers, and what may perhaps be carried out some day, that high schools should be established for the head-masterships of which teachers might qualify. I do not think the profession would have lost

Under my scheme, fifth-class head teachers would have averaged as much as under the Public Service Act, and their incomes would have been less precarious, the amount dependent on results being smaller. The fourth class in my plan was more broken up than it is now, and the lower members would have begun at nearly the same salaries as under the Public Service Act, while the higher members would have been better paid. Junior assistants, male and female, would have gained, as a class, very decidedly.

if my proposals had been carried out, though I believe the country would have gained, and I tried to make provision against hardship in individual cases. Just now it is often necessary for me to oppose increases that are not unwarrantable in themselves, because even a rich country like our own can only carry out a great work gradually. Not unfrequently I am bound to be firm against giving relief in an exceptionally hard case, because the precedent would entail a yearly expense of many thousand pounds if it was carried out to its logical conclusion. Even so, I am thankful to think that the worst paid of our teachers, the ladies who are junior assistants or head teachers of fifth class schools, get more than governesses or teachers in fashionable schools, and begin by getting half as much again as the average lady teacher of every grade in Ontario.

The lowest salary of a junior assistant lady teacher in our schools is *£64* fixed and results, which are a possible £32, and which average £26 8s. 9d., altogether, £90 8s. 9d. The average salary of the Ontario lady teacher is, as we have seen., £54 4s.

I am convinced that if it were necessary to face extra taxation for the sake of saving our teachers from the privations and unrest of the Ontario system, from a position worse than that of day labourers and household servants, the country would willingly face a new burden rather than let the educators of our children be sacrificed.

I should be sorry to have it thought that I undervalue the great educational work which has been done in Ontario. I am filled with admiration for the men who, in a poorer country than our own, miserably paid, terribly overworked, and fighting a much more arduous fight against sectarian bigotry, have, nevertheless, succeeded in scattering schools broadcast over the country, and in giving every child the opportunity of acquiring the elements of knowledge. I am convinced that, sooner or later, Ontario will abandon the two worst blemishes in her system, will again make Inspectors departmental officers, and will subsidise the poorer districts with special grants from the State Treasury so as to secure a reasonable stipend to every teacher. She has already centralised the training for teachers with what appear to be good results, though for the time the supply of qualified instructors is falling off. Perhaps it is not too much to say that she may learn some lessons with advantage from ourselves, just as we may learn from her, to supplement our primary school system, by high schools almost equally accessible to every one. Had the Messrs. Harper singled out this feature in the Canadian system for imitation among ourselves, I could only have acquiesced and welcomed them as allies. What they have done has been to praise the education of Ontario for characteristics which all its most thoughtful officers acknowledge to be blemishes, and to represent it as better than our own in the very matters where our own is demonstrably superior. Let any dispassionate man ask himself, after reading what separation is in Ontario, whether he wishes to give a position of privilege to one religious denomination, and whether the formal repetition of collects and moral precepts with which Protestant bodies have to content themselves in Ontario is of any appreciable value whatever as a religious influence. To myself it seems as if the real lessons taught us by the Ontario system are that only under a centralised system can teachers be properly appointed and adequately paid, and that there is no half-way house between secular and denominational education. Ontario pays for religious teaching to Catholics, and denies it to Episcopalians and Independents; Victoria, with more equity, opens her schools on even conditions to all, and refuses to let the Italian priest tithe and toll in her dominions.

NOTE 1.—Since this pamphlet was in the press, Mr. Robert Harper has published his speech in full; and it seems necessary to state, that I have never from the first purposed answering anything except his statements about the Ontario System. On that particular subject it is probably correct to say, that nothing hitherto has been generally known in Victoria, except through Mr. A. Harper's lectures and Mr. R. Harper's speeches. It seemed important to show the other side of the question. As for the general policy of our Education Act and the administration of our schools, they are matters very generally understood, and that can be discussed without the smallest difficulty in Parliament.

NOTE 2.—It has been stated, since the advance sheets of this pamphlet were printed, that Protestants have now been raised to the level of Catholics in Ontario, so far as that five Protestant heads of families can constitute a separatist school. I cannot absolutely deny this, but I can find no trace of it in laws or school manuals. The change must certainly have been made since 1872. It has also been objected that though a Catholic cannot send his children to a separatist school, and need not send them to a public school, he is bound to educate them! How, if he is illiterate or overworked? Is a ploughman to keep a governess or a private tutor?

Fergusson and Moore, Printers 48 Flinders Lane East, Melbourne

Front Cover

# 1885-6. The Art-Union of Glasgow.

*Dunedin, N.Z.*

*In the Spring of 1885, there was exhibited at the Royal Academy in London a painting by Sir James D. Linton, P.R.I., representing*

*"The Marriage of the Duke of Albany,"*

*which excited a wonderful amount of attention and interest. It was generally difficult to get near the picture, owing to the pressure of the crowds around it. The Committee of Management of the Art-Union if Glasgow secured the copyright of this important painting, and commissioned Mr. Leopold Lowenstam to make an Etching front it, the who/e being done under the special sanction of Her Gracious Majesty the Queen.*

*"Mr. Lowenstam has executed his work in such a successful manner as to call forth the unqualified approbation of the distinguished artist, Sir James Linton, who has expressed himself as ""highly gratified with the Etching."*

*This will from the Presentation Work for the current season and the committee of Management hope that its singular excellence will justify the unusual lapse of time that has taken place since the last distribution of prizes*.

John Hercus, HON. SECY.

# Press Criticisms.

*"The great attraction of the tenth Room is Mr. J. D. Linton's*

*Mr. Linton was subsequently knighted, mainly in consequence of the excellence of this picture*

*picture of the Marriage of the late Duke of Albany (1,028). Royal marriages always interest a vast number of people, especially when portrayed by so skilful an artist as the President of the Institute; and the recent death of the lamented young Prince lends special importance to this picture, Mr, Linton has chosen the Moment when the bride and bridegroom are turning to leave the attar; on the Prince's left stands the Queen, surrounded by the Royal Family of England, while the bride's relatives and her tow bridesmaids are grouped opposite, Everybody will easily identify the various dramatis personae. It is enough to say that on the while the likenesses have been well caught, though the painter has hardly done justice to the Princess of Wales, or to the grave yet genial features of the late Archbishop Tail, The painting shows Mr, Linton's well-known qualities, especially in the creamy dresses of the bridesmaids, and in the dexterous rendering of the bride's white satin and late; and if we take account of the great difficulties of a subject in which portraiture has to be considered first, and artistic composition second, the picture may be pronounced a success,"* LONDON TIMES, 25th May. 1885.

*"The picture of the Marriage of H.R.H the Duke of Albany, painted for the Queen by Mr. J. D. Linton, is as satisfactory as any work of an official or ceremonial kind that has been produced in modern time, and in some qualities better. Mr. Linton has depicted the scene precisely as it appeared, and at the same time with great artistic ski11. The prevailing colour is agreeable, and the workmanship throughout of the finest kind. Every head is not only a faithful likeness, but modelled with extraordinary completeness. As it contains portraits of all the members of the Royal Family, of some foreign primes, and of several ecclesiastical and other dignitaries, the picture has historical value apart from its merits as a work of act*."

*—THE GRAPHIC, 23rd May, 1885.[over.*

# 1885-6.

# The Art-Union of Glasgow.

# *Instituted, 1841. Incorporated by Royal Charter, 1861*.

## Patron—His Royal Highness the Prince of Wales

## Presidents.

- His Grace the Duke of Argyll, K.T.
- The most Noble the Marquess of Bute.
- Sir Arch Orr Ewing, BART., of Ballikinrain, M.P.
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- THE HON. William M'onie, LORD PROVOST OF GLASGOW, *Chairman.*
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THE object of the Art-Union of Glasgow is to aid in exteding a knowledge of the Fine Arts, by distributing among its Members Meritorious Works of Art.

A Subscription of One Guinea constitutes Membership for One Year. The whole Subscription, after deducting the necessary working expenses, are devoted to the purchase of PAINTINGS, DRAWINGS, SUCULPTURES, ENGRAVINGS, and other works of Art; each Member being entitled to the presentation work for the year of Subscription, and a share in the Annual Ballot of Prizes.

Any Member having paid his ordinary Subscription for the current year, and wishing additional shares in the Ballot for Prizes—*but without another Copy of the Presentation Work*—may have one additional share for every Half-Guinea subscribed, for which a separate printed Receipt will be given.

The Presentation Work for this year consists of a very charming Etching, by Leopold Lowenstam, of London, after the Painting representing

## *"The Marriage of the Duke of Albany,"*

by SIR JAMES D, LINTON, P.R.I. Size of etched surface, 21 by 14 inches,

## The Prizes Will Consist of—

- FIRST.—Sums set apart for the purchase of Paintings or Sculpture, each Prize holder having the right to select the Work of Art to form his Prize from any Public Exhibition; and
- SECOND.—Paintings, Engravings, and other Works of Art, as Minor Prizes, selected by the Committee.

## The Distribution of Prizes will take place in January, 1887.

## *A Subscriber for more than One Share has the Following Privileges:—*

- FOR Two Guineas—Two shares in the Ballot for Prizes; and, in his option, Two Copies of the Etching, or copies of the Etching, or one proof impression on India paper.
- FOR Three Guineas.—Three Shares in the Ballot for Prizes; and, in his option, five copies of the Etching, or One Proof Impression *before letters on India Paper*.
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- FOR Seven Guineas.—Seven shares in the for Prizes; and, in his option, seven Copies of the Etching, or, a singed "Remarque" Artist's Proof Impression on Japanese Vellum.

*Note-The "Remarque" and Artist's Profs being necessarily limited in number, can be guaranteed only to the first Applicants*.

Subscriptions will be received at the office of the Society, 22 RENFIELD STREET, GLASGOW; and by

John Hercus, Hon. Secy.,

Estate Agent, Exchange Court, Dunedin, N.Z.

Mr. John Hercus, Hon. Secy.,

Art-Union of Glasgow, Estate Agent, Exchange Court, Dunedin, N.Z.

# [*unclear:* To be Ardea to the Honorary Secretary.]

# Art-Union of Glasgow.

# 1885-6,

MR. JOHN HERCUS, HON. SECY., ART-UNION OF GLASGOW.
SIR,

Please insert my name in the List of Subscribers to the ART-UNION OF GLASGOW, for the present year, for ... Share of One Guinea each.

I am,
Yours, &c.,
*Name*,__________
*Address*,__________
*Date*,__________

Report of the Committee of Management of the Art-Union of Glasgow
For the Year 1883-4.
With an Account of the Proceedings of the Thirty-Sixth General Meeting of the Society, and LIST OF SUBSCRIBERS.
Office of the Art-Union of Glasgow 22 Renfield Street.

# Patron.

- His Royal Highness the Prince of Wales.

# Presidents.

- HIS GRACE THE Duke of Argyll, K.T.
- THE MOST NOBLE THE MARQUESS OF BUTE.
- Archibald Orr Ewing, Esq., OF BALLIKINRAIN, M.P.
- SIR Peter Coats, of AUCHENDRANE.
- D. C. R. C. Buchanan, ESQ., OF DRUMPLLIER.
- John Graham, ESQ., SKELEMORLIE CASTLE.
- Jas. Alex. Campbell, ESQ., OF STRACATHRO, LL.D., M.P.
- James Campbell, ESQ., OF TULLICHEWAN.
- LOUIS LEISLER, ESQ.

- SIR Charles Tennant, BART., OF THE GLEN, M.P.

# Committee of Management.

- THE HON. William M'onie, LORD PROVOST OF GLASGOW, CHAIRMANY.
- David S. Cargill, ESQ., VICE-CHAIRMAN.
- SIR James Watson.
- James Salmon, ESQ., F.R.I.B.A., I.A.
- James C. Bunten, ESQ.
- Alex. Moore, ESQ., C.A.
- JAMES REID, ESQ.
- Robert Miller, ESQ.
- David Ritchie, ESQ.
- James Sellars, JUN., ESQ., I.A.
- G. W. Clark, ESQ.
- D. E. Outram, ESQ.
- A. G. Macdonald, ESQ.
- Richard G. Ross, ESQ.
- Maclean Brodie, ACTING SECRETARY.

# Annual General Meeting.

THE ANNUAL GENERAL MEETING of the Members of the ART-UNION OF GLASGOW was Held in the Fine Arts Institute, Sauchiehall Street, on Friday, 10th April, 1885,

The Hon. WILLIAM M'ONIE, Lord Provost, presiding.

Mr. MACLEAN BRODIE, Secretary, read the Report of the Committee of Management for the year 1883-4, and Abstract Statement of the Cash Account,

The LORD PROVOST regretted that the Report was not of such a satisfactory character as could have been expected The income had, on account of dull trade and other causes, fallen about §600 under that of last year, but he hoped that the coming your would he a more prosperous one for the society. He moved the adoption of the Report.

Mr. DAVID S. CARGILL, in seconding the adoption of the Report regretted that the past year's operations had been so unsuccessful compared with former years. The extreme depression in all branches of business had operated against the society, but it had also suffered seriously through what might be called tho opposition of another Art-Union instituted in connection with the Fine-Art Galleries. Probably the promoters of the new Art-Union did not intend that such should be the case, but it was the fact that, owing to the similarity between the names, subscriptions intended fur the old Glasgow Art-Union had gone to the newly founded society. In the circular issued by the new society it was stated that the subscriptions received would he entirely spent in the purchase of pictures from the galleries of the Institute of the Fine Arts. The Glasgow Art-Union had over and over again brought under the notice of the public that it had always managed, through its prize-winning subscribers, to spend a very large percentage of its funds in the purchase of pictures from these galleries. It was found that out of nine drawings for prizes §4557 had been spent In these rooms out of a total of §4633. (Applause.) Many subscribers, on getting a prize, spent more upon a picture than the amount allocated to them by the society, so that the galleries benefited by its operations more than was actually known. Last year, for instance, there was §100 spent more than the amount gained as prizes. He regretted that the society bad only §160 to spend this year on prizes, but he hoped that with improved time? they would have an extended subscription list.

The Report was unanimously adopted.

SIR JAMES WATSON referred to the good work the institution had done in the past in forwarding the cause of art, as it had, during the 40 years of its existence, spent §117,000 in prizes and presentation engravings, All the plates issued by the society had been of a high class, and were to he found distributed all over the land. It was to be regretted that the society had fallen behind in the way of obtaining the support it deserved, but it was to be hoped that it would still be enabled to continue its work of refining and encouraging the artistic tastes of the public. (Applause.)

Mr. JAMES SALMON moved that Mr. JAMES SELLARS, jun., I.A., Mr. G. W. CLARK, Mr, D. E. OUTRAM, Mr. A. G. MACDONALD, and Mr. R. G. Ross he re-elected members of the Committee of Management.

Mr. WALTER E. WINGATE seconded the motion, which was adopted

Thereafter the Secretary read a certificate of the accuracy of the tickets placed in the balloting wheels, representing the tickets of the Subscribers, and the prizes to be balloted for, and also a statement of the mode in which the drawing was to take place, when two ladies from the body of the nice ting were requested to draw the tickets from the wheels. The result will be found at pages 10, 11. The proceedings terminated with a vote of thanks to the Lord Provost and the ladies who had given their services at the ballot-boxes.

Maclean Brodie, *Secretary*.

# Report,

In presenting their thirty-sixth Report of the proceedings of this Association, the Committee of Management are sorry to state that the accounts for the past season show a considerable falling-off from those of the preceding one, This result is perhaps not to be wondered at, considering the extreme depression which has prevailed in agriculture and in business generally, but it is nevertheless very much to be regretted.

The subscriptions amount to the sum of §1364, 9s 6d, and, after deduction of the cost of the presentation work and necessary expenses, there is a free surplus available for prizes of §100, which the Committee propose to allocate as follows:—

And they have added from their reserve stock 30 artists' proof engravings and etchings as minor prizes, Although these have not been charged in the accounts they are worth five guineas each, so that the actual value of prizes now to be distributed exceeds §300.

The presentation work for the past season consisted of a mezzo-tinto engraving after Sir Edwin Land seer's celebrated painting of "The Sutherland Family," and the Committee can only regret that from a variety of unfavourable causes it has not met with the success which its beauty, attractiveness, and high quality deserved.

The Committee of Management are happy to announce that they have provided for the subscribers next year such a presentation work as, they feel persuaded, will be acceptable to all classes, both from the nature of the work and the interest of the subject. Amongst the chief paintings expected at the forthcoming Exhibition of the Royal Academy is one by Mr. J. D. Linton representing the marriage of the late Duke of Albany in presence of the Queen, the Prince and Princess of Wales, and a crowd of other distinguished persons. The composition of the picture is very artistic, and the likenesses are strikingly good. This great picture is now to be reproduced as an etching, under the special sanction of Her Majesty, and Mr. Leopold Lowenstam has been engaged for the purpose. The Committee have arranged with him and the artist for the acquisition of the plate and the copyright of the picture, and from the oeneral excellence of Mr. Lowenstam's work they anticipate with pleasure being able to place before the many friends of the Art-Union of Glasgow next season a work of art of no ordinary merit and interest.

The members of Committee who retire by rotation at this time are—Mr. James Sellars, Jun., LA., Mr. G. W. Clark, Mr. D. E. Outram, Mr. A. G. Macdonald, and Mr. R. G. Ross, who are all eligible for re-election.

# Abstract Statement of Account.—The Art-Union of Glasgow.

# For the Drawing of 1883-4, as at 30th September, 1885.

§ s. d. 1355 11 0 8 18 6 § 8. d. Dr, To 1291 Subscriptions at 21s. each 17, 10s. 6d. " Cr. By Amount allotted and paid for Objects of Art Distributed viz.:—Presentation Work, including Specimen Copies to Honorary Secretaries and Local Agents . . . . 480 8 5 Sum allocated for Prizes to be selected by the Prizeholders 160 0 0 30 India Proofs (§5, 5s. copies) taken from the Reserve, and not charged . . . . . . . . 0 0 0 § s. d. 640 8 5, Amount paid for Prospectuses, Agency in obtaining Subscriptions, and Distributing Works of Art, viz.:—Agents' Commission and Changes . . . . . 87 5 4 Carriage . ........ 18 2 4 Packing-cases, &c. ........ 900 Printing Prospectuses. 46 1 6 Sundry Expenses:—694571140328110481201121237l6Printing and Stationery .... Rent, Taxes, and Insurance Salaries and Secretary's Commission Advertising ...... Postage and Receipt Stamps Charges on Remittances .... Travelling Expenses, General Charges, and Auditors' Fee 533 11 11 §1364

9 6 §1364 9 6 the year Glasgow, 31st October, 1885.—We have examined the foregoing statement of the Accounts of the Art-Union of Glasgow, for the drawing of ear 1883-1, have compared it with the relative vouchers, and have found it correct. REID & MAIR, C.A., Auditors.

# List of Prizes.

# List of Paintings, &c., Selected by Prizehrolder. of 1882—3

Amount OKSELECTED.PRIZE.David Ritchie—§5000"Study of Head for Chiistian Martyr"A. J. Fraser2000" Cockle Gathering, Fairlie Sands" -A. Jeff -2000" Bressay Sound and Lighthouse, ShetlandDavid Wilson -2000"Stirling Rock"John Naismith,2000"Something Funny " -John Neil son -1500"A Quiet Kook on the Lyon, Perthshire "William G. Belford -1500" Rest by the Way" -G. Buchan1500"Little Fishers"Hugh Mackintosh 1500 "Across the Snow, the Sun's red glow shone out awhile, thou faded " John M'Milhuj, jun. 1500"Fishing Smacks " ....T. W. Dobson -1000"Specimen Grayling"K. G. Burt10()0"St. Paul's, from the BoroughRev. E. B. Savage -1000"The Little Rambler"J. S. Macarthur1000"Autumn Evening—Loch Ard" "Scene on the Coquet"C. F. Shotton -1000Robert Brodie -500"Among the Roods Loch Lomond" -Hugh M'Ruer -500"Goring Church "Dr. Alex. Hogg500"A Coast Study at Kildalton, Islay"Mrs. Tom Curry500"The Dead Rabbit"- -C. Jarrett500"Bullfinches, Autumn "James Strang -500"Cliffs of Moher, County Clare"Andrew Todd -500"Its only Dress"J. Carfrae Alston500"Street in Lavenham, Suffolk"John Miller500"Left in Charge " -Z. Henry Heys500"Evening Late Autumn "Robert Watt500"In the Orchard "F. M. Fisher500"Startled—at Aberfoyle" -John Anderson -500"Pastoral " -Edward Snowball500"A Man of Letters" - -A. P. Dodds500"A Sea-side Study"-By Exhibition. Catalogue Value. James Archer, U.S.A. -Glasgow Institute of Fine Arts§52100J. D. TaylorDo.3500J. H. OswaldDo.2500J. L. C. DochartyDo.31100A. DavidsonDo.3500D. CameronDo.7000Pollok S. Nisbct -Do.2000Middleton Jameson -Do.3000Alfred East -Do.2650Clara Montalba -Do.8000G. T. Targott -International Fisheries Exhib.10 100C. J. LauderGlasgow Institute of Fine Arts1200H. W. Foster -Walker Art Gallery, Liverpool10100A. A. Dalglish -Glasgow Institute of Fine Arts15150.Miller PennycookFine Art Exhib.,Newcastle on T.1000G. P. Lyon -Glasgow Institute of Fine Arts1000R. Phene Spiers -Do.770Thomas Alison Do.660J. E. ChristieDo.660Kate GriffithThe Royal Academy550K. Curtis -Glasgow Institute of Fine Arts1000Jeanie Dickson -Do.r? 700A. K. BrownScot.Soc.of W.C. Painters, Glas. 770C. J. LewisGlasgow Institute of Fine Arts2050Louis B. HurtDo.10100Madame F. RohlDo.880C. M 'EwenGlasgow Art Club -1000E. A. WaltonScot.Soc.of W.C. Painters, Glas.3500R. E. Morrison -Glasgow Institute of Fine Arts 12 120 Robert Jobbling -Gateshead F. A. & Indus, Exhib.10100

# List of Paintings, &C., Selected by the Prizeholders of 1883-4.

PRIZBUOLDER.AMOUNT OF PRIZE.SELECTED. By EXHIBITION.CATALOGUE VAI.UK. Alexander Cullen 30 00"The Broken Doll" Alexander Davidson -Glasgow Institute of Fine Arts§6500William Lindsay2000(Not Yet Selected)William Farnie1000" Arran from Portincross"James MacculIochGlasgow Institute of Fine Arts15150Joseph C. Mitchell 1000"The Lledr Bridge" James PeelAlbert Palace1600Cyril T. C. Tafcham 1000" Gathering Fuel " B. D. Sigmund -Scot.Soc.of W.C. Painters,Glas.1500T. D. Brodie, W. S.1000"Wizard of the Glen—Glenfeshie" -W. Beattie Brown, R. S. A.Royal Scot. Academy (W. C.)2100If. B. Noble -500(Not Yet Selected)Archibald Thomson500" Low Tide " D. MackinlayGlasgow Institute of Fine Arts10100Simeon Cohen -500"Hydrangea"Miss Jane NisbetDo.10100George Imrie -500"Autumn" W. F. HulkDo.1000A. Shand500"Cockburnspath Harbour"John CairneyDo.10100James Brown -500"Spring, Uddingston"Robert BrinkleyDo.880W. M. Robinson500(Not Yet Selected)Right Hon. Lord Blantyre500" A Cumberland Stream " -Mrs. Paul J. Naftel -Glasgow Institute of Fine Arts880William Thomson500"Granny" Miss Alice Gair -Do. 44 0R. M'G. Smith500" Granite Stairs Kelvingrove Park "P. M'G. WilsonScot.Soc. of W.C. Painters,Glas.12 120William Arrol -500"Winter" Thomas Munro Glasgow Institute of Fine Arts10100Sir Peter Coats500(Not Yet Selected)Alexander Moffat500"And they lived happy ever afterwards"Miss MacRitchieRoyal Scottish Academy-13130David S. Cargill500" Kilchurn Castle—Loch Awe" James

# Names of Members of the Art-Union of Glasgow,

# For the Year 1883—4.

- Adams, G., London
- Adams, John, Hanley
- Adamson, R. W., Rangoon
- Aitken, James, Glasgow. 2 shares
- Aitken & Waddell, Glasgow
- Aitken, James, Invercargill N.Z.
- Alexander, Thomas, Chippenham
- Alexander, William, Arbroath
- Alexander, William, Kilmarnock
- Allan, Miss Edith M., Glasgow
- Allan, F. W., Glasgow. 3 shares
- Allen, Leopold, Glasgow
- Almour, A. B., Montreal
- Alston, Thomas, Melbourne. Victoria
- Anderson, Alexander, Glasgow
- Anderson, A. W., Partick
- Anderson, J. W., London
- Anderson, Robert, Glasgow
- Anderson, Thomas, Glasgow
- Anderson. William, Dundee
- Anderson, William, Glasgow
- Anderson, William, Pollokshields
- Andrew, D. H., Glasgow
- Andrews, Nathaniel, Tipperary
- Annan, T. & R., Glasgow
- Arnott, John, Grey mouth, N.Z., *H.S. 2 sh.*
- Arrol, W. A., Glasgow
- Arrol, Walter, Glasgow
- Arrol, William, Glasgow
- Auchinvole, Christina, Crossbill
- Austen, Henry, Reigate
- Austin, James (Lee), London
- Baber, H., Croydon, Surrey
- Backhouse, Win. A., Durham
- Badger, Frank, Grey mouth, N.Z.
- Bailey, Janies, Glasgow
- Baillie, Hugh, Glasgow
- Baird, A. J., Dudley
- Baldiston, F., Croydon, Surrey
- Balie, T., Westport, N.Z.
- Ball, A. S., Woodstock, Ontario
- Ball, A. T., Port Dover, Ontario
- Bankier, P. M., Hamilton, Ontario
- Barkley, W. B., Grey mouth, N.Z.
- Barnard, John, Epsom. 2 shares
- Barnsley, John, North Shields
- Barr, James, Dunedin, N.Z., *L.A.*

- Barr, Wm" Bellshill
- Barry, J. W. C., Nenagh
- Barry, James S., Partiek
- Bartholomew, James, Chertsey, Surrey
- Bartlet, George, Windsor, Ontario
- Bateman, E., & Coy., London
- Baxter, H. A., London, Ontario
- Baxton, Frank II., Godshill, Isle of Wight
- Beattie, A., St. Marys, Ontario. 2 shares
- Beith, Gilbert, Glasgow
- Bell, A. C., Glasgow
- Bell, George, Runcorn
- Benjamin, R., Wanganui, N.Z.
- Bennington, C. H., London
- Bennington, W. F., London
- Beuce, M. R., London
- Bevir, II., Wootton
- Bassett Bisset, James II., Aberdeen
- Black, Mrs., Glasgow
- Black, Mrs. M. A., Tipperary
- Black, William, Glasgow. 5 shares
- Blackie, Dr. W. G., Glasgow
- Blackiston, F. C., Reigate
- Blacklock, D., Glasgow
- Blackwood, James, jun., Glasgow
- Blair, Adam, Greymouth, N.Z.
- Blair, Robert, Inversnaid
- Blantyre, The Right Hon. Lord, Erskine
- Blyth, Robert, Glasgow
- Bogie, J. R., Spilsby
- Booker. Henry. Boston
- Booth, Mrs., Kyneton, Victoria
- Bottomley, Jonas. Keighley
- Bouglas, Henry. Carluke
- Bowden, Alfred. South Shields, *L.A.* 2 shares
- Bowie, James, Ibrox
- Boyd, George V., Glasgow
- Boyd, Richard. Glasgow
- Boyle, Hugh, Strathbungo
- Bradbury, W. J., Addlestone, Surrey
- Brass, Lot., London
- Brims, James, Thurso
- Brinkworth, W. H., Chippenham
- Broadhurst, Henry, Mansfield. 3 shares
- Brodie, Robert. Glasgow. 2 shares
- Brodie, T. D., W.S., Edinburgh
- Brogan, A. D., Glasgow. 2 shares
- Brooke, Thomas, Doncaster
- Brooking, George E., Santa Rita. 5 sh.
- Brown, A. J. Dennistoun, Balloch. 2 sh.
- Brown, Edward, Barnstaple
- Brown, J., South Shields
- Brown, James, Carluke
- Brown, James, Glasgow
- Brown. James H., Ellon
- Brown, James R., Galashiels
- Brown, Mrs. Eleanor, South Shields
- Brown, T. G., Croydon, Surrey

- Brown, Thomas, Glasgow
- Brown, William, Glasgow
- Brown, William, Glasgow
- Brownlie, Archibald, of Monkcastle
- Brownlie, Janies. Barrhead
- Brownlie, Rev. W.f Glasgow
- Brownlie, Win., Glasgow
- Bruce, A., Douglas, Isle of Man
- Bryden, Thomas, Glasgow
- Buchan, G., Glasgow
- Buchanan, A. W. G., Glasgow
- Buchanan, Francis, Falkirk
- Buchanan, William, Motherwell
- Buckley, Samuel, Woodley, near Stockport
- Bulloch, Matthew, Glasgow
- Bunny, H. J., Melbourne, Victoria
- Burnand, E. J., Wallington, Surrey
- Burnside, W. G., London
- Bushell, .John B., South Shields
- Butchart, James S., Aberdeen
- Butler, Thomas. Dunkeld
- Cain, W. J., Douglas, Isle of Man
- Calder. John, Hamilton. Ontario
- Cameron, Daniel, Partick
- Cameron, H. D., Hamilton, Ontario
- Cameron, Nicol, Glasgow
- Cameron, Thomas, Dalmally
- Campbell, Alexander, Glasgow
- Campbell, Colin, Glasgow. 2 shares
- Campbell, G. H., Dunedin, N.Z.
- Campbell, J. A.. LL.D., M.P., of Stracathro
- Campbell, James, of Tullichewan. 2 sh.
- Campbell, W. M., M.D., Adelaide, S.A.
- Carey, Thomas, Warrenpoint
- Cargill, David S., Glasgow, and 8 halfguinea shares
- Carmichael, A., South Shields
- Carnegie, J. D., Bray, Co. Wicklow
- Caw, David, Glasgow
- Caxton, W., Melbourne. Victoria
- Chadwick, S. B., Higher Runcorn
- Challender, C. M., Douglas, Isle of Man
- Chalmers, Thomas W., Hillhead
- Chandler, Thomas, Croydon, Surrey
- Chapel, David, Arbroath
- Chapman, Charles. Loudon, Ontario
- Charles, John, Inverurie
- Chartick, H., Adelaide, S.A.
- Cheverton, R. B., Newport, Isle of Wight
- Chirney. Joseph, Morpeth
- Chisholm. Thomas, Glasgow
- Chown, E. H., Melbourne, Victoria
- Christie, George, Glasgow
- Christie, John M., Walsall
- Christie, Robert, Crossbill
- Christie, William, Walsall
- Chrystal, John W. M., Hillhead
- Claque, Dr., Castletown, Isle of Man
- Clark, G. W., Glasgow. 2 shares, and 2 half-guinea shares

- Clark, George, Preston pans
- Clark, John, Glasgow
- Clark, R. M., Paisley
- Clark, Robert, Melbourne, Victoria
- Clark, Stewart. M.P. Paisley
- Clark, William, Dalrymple
- Clarke, Henry, Caterham, Surrey
- Clarke, J. A. P., Addlestone, Surrey
- Clarke, James, Glasgow
- Clarke, R., Reddish, near Stockport
- Clelland, John, Glasgow
- Clement, Henry, Swansea
- Clinch, J. W., Douglas, Isle of Man
- Closs, Dr., Invercargill, N.Z.
- Clucas, J. T., M.H.K., Ramsey, Isle of Man
- Coats, James, Paisley
- Coats, Sir Peter, Auchendrane. 2 shares
- Coats, Thomas, Glen, Paisley
- Coblyer, Francis, jun., Coventry
- Cockburn, M., North Shields
- Coglin, P. P., Adelaide, S.A.
- Cohen, Simeon, Melbourne, Victoria
- Coldwells, T. M., Croydon, Surrey
- Collins, Sir William, Glasgow
- Colquhoun, A., Alexandria, N.B.
- Comber, Charles F., Jazpampa. Peru
- Compson, J. W. H., Barnstaple
- Connell, T. R., Kumara, N.Z.
- Connell, William, Hamilton
- Cooley, Thomas, Spalding
- Copland, William, Shawlands
- Coulson, T., South Shields
- Cowan, A. B., Troon
- Cowan, D. J., London, Ontario
- Cowan, Henry, Hillhead
- Cowan, W. B., Glasgow
- Cowell, Mrs., Douglas, Isle of Man
- Cowie, James, Stonehaven
- Cowle, James, Douglas, Isle of Man
- Cox, C. F., London, Ontario
- Cox, T. H., Dundee
- Crabtree, J., Lincoln
- Craig, Alexander T., Glasgow
- Cree, J. S., Glasgow
- Crewdson, A. W., Chertsey, Surrey
- Croll, John, Glasgow
- Crosby, John, Glasgow
- Cross, A., Bishop-Anckland
- Crosthwaite, R. F., South Shields
- Cruickshank, Edward, Glasgow
- Cullen, Alexander, Wishaw
- Culley, G. D., Adelaide, S.A.
- Cumming, J. S., M.D., Glasgow
- Cunningham, W. G., Runcorn, Cheshire
- Currie, John, Glasgow
- Currie, Thomas A., Dumfries
- Cuthbert, Alexander A., Glasgow
- Cutlibertson, Thomas, Glasgow

- Cuthbertson, W. B., Ayr
- Cutter, Henry John, Manchester
- Dale, W. J., Hornton Heath, Surrey
- Dalton, J. E., Cashel
- Dalziel, W., South Shields
- Daniel, T. D., Aberavon
- Danter, G. W., Manor Park, Essex
- Darling, James, Strathbungo. 3 shares
- Darling, Victor, Colombo, Ceylon
- Darly, G., Gosport
- Davidson, Charles, M.D., Coventry
- Davidson, James, Aberdeen. 3 shares
- Davidson, James, Montrose
- Davidson, W., South Shields
- Davidson, W. J., Edinburgh. 3 shares
- Davidson, William, Glasgow
- Davie, William, jun., Alexandria, N.B.
- Davis, David, J. P., Swansea
- Davis, Theodore, Caterham, Surrey
- Davis, William, Louth. Lincolnshire
- Davy, William, North Shields
- Dawson, Capt., Wellington, N.Z.
- Dawson, John, Iquique, Peru, *H. S.* 4 sh
- Dawson, John M., Glasgow
- De Qurizoz, T. R., Rio
- De Salis, Colonel, London
- De Silva, George, Colombo, Ceylon
- Devlin, John, Pollokshields
- Dewar, Alexander, Glasgow
- Dewar, Robert, Ayr
- Dick, Janies, North Shields
- Dickson, Arthur, Montrose
- Dickson, D. Ritchie, Rio
- Dickson, James, jun., Warrnambool, Victoria
- Dickson, John, Glasgow
- Dickson, Miss. Warrnambool, Victoria
- Dix, Thomas, Weybridge, Surrey
- Dixon, W. F., Melbourne, Victoria
- Dobie, William, Keighley
- Dobson, T. W., Croydon, Surrey
- Dodds, A. P., Newcastle-upon-Tyne
- Dodds, E. F., Whitley
- Doig & M'Kechnie, Edinburgh. 5 shares
- Dougal, H., Virginia Water, Surrey
- Douglas, A. S., Durham
- Douglas, T., Durham
- Douglas, William, Bellahouston. 2 shares
- Dow, J. R., London
- Dow, Samuel, Bellahouston
- Downie, James, jun., Glasgow
- Downie, John, Kirkintilloch
- Dowson, Miss E., Weybridge. Surrey
- Doyle, M., Douglas, Isle of Man
- Driver, Henry, Dunedin, N.Z.
- Driver, Miss, Chertsey. Surrey
- Dron, James, Coupar-Angus
- Drummond, John, Glasgow
- Drummond, Neil, Glasgow

- Drummond, Thomas, Paisley
- Dryden, R., South Shields
- Drysdale, James, Bridge of Allan
- Duckett, W., Partick
- Duffield, James, London. Ontario
- Dulfer, Jacob, Suva, Fiji
- Dunbar, Dr., Blackburn
- Duncan, J. W., Dunedin, N.Z.
- Duncan, Matthew, Rothesay
- Duncan, Walter, Glasgow. 3 shares
- Dunn, Robert, South Shields
- Eadie, James, Rutherglen
- Eakins, W. H., Woodstock, Ontario
- Easton, John, Glasgow
- Eastwood, E., Chesterfield
- Edmonds. John, Dunedin, N.Z.
- Edridge, F. T., Croydon, Surrey
- Edwards. C. M., Crawley Down, N. Sussex
- Edwards, E. J., London
- Eissenhardt, John A., Greymouth, N.Z.
- Ekman, J. J., Gothenburg
- Elder, John, Langside
- Ellis, George, Hanley
- Ellison, T. P., Douglas, Isle of Man
- Eurch, John, London. 3 shares
- Eve, John Bowmar, Louth, Lincolnshire
- Ewing, A. Orr, M. P., Glasgow
- Ewing, H. M., Glasgow
- Ewing, William, Glasgow
- Eyre, David, Glasgow
- Farnie, William, Invercargill, N.Z.
- Farrall, William, Runcorn
- Ferguson, Alexander, Millport
- Ferguson, F., Glasgow
- Ferguson, James, Glasgow. 2 shares
- Ferguson, Robert, Glasgow
- Ferguson, Robert, Sandy ford
- Fergusson, Alexander A., Glasgow
- Fergusson, T. M., Glasgow
- Fergusson & Mitchell, Melbourne, *L.A.*
- Ferric, Richard, Glasgow
- Ferry, Henry, Glasgow
- Finn, S., South Shields
- Fisher, F. M., Tuam, Ireland
- Fisher, Thomas R., Dunedin, N.Z.
- Fishwick, F., London
- Fitzsimons, F., Glasgow
- Fleming, D., Adelaide, S.A.
- Fleming, M. Tarbett, Rangoon
- Fletcher, Charles. Dunkeld
- Fletcher, Dr., Wellington Quay
- Fletcher. William, Ottershan, Surrey
- Fookes, W. J., Melbourne, Victoria
- Forrest, Peter, Shotts
- Forshan, Edward, Hanley
- Foster, Harry S., C.A., London. 2 sh.
- Foulds, Alexander, Glasgow
- Foulds, Andrew, Paisley

- Fountain, Henry, Bradford, Yorks.
- Fowler, M., Durham
- Frame, D. G., Glasgow
- Frankenburg, Julius, Glasgow
- Franklin, H., Croydon, Surrey
- Fraser, A. S., Glasgow
- Fraser, John, Nairn
- Frew, James, Langside
- Frew, John, Helensburgh
- Fry, W. H., Gosport
- Fuge, James H., Blantyre
- Fyfe, Dr., Melbourne, Victoria. 2 shares
- Galbraith, Win., Glasgow
- Gale, James, Glasgow
- Galloway, John R., Manchester
- Galloway, Michael, Hillhead
- Gamble, David, jun., Eccleston, Lancashire
- Gardner, John, Glasgow
- Garriock, L. F. M., Dundee
- Gelling, R., Douglas, Isle of Man
- Gemmell, Bessie A., Keighley
- Geminell, Thomas, Glasgow. 5 shares
- Geneys, Count Des, Gosport
- Gibb, W. E., Sheerwater Court, Surrey. 3 shares
- Gibb, William, Douglas, Isle of Man
- Gibbens, H., London, Ontario
- Gibson, Mrs., Glasgow
- Gibson, R., Hexham
- Gilkison, William, Linlithgow
- Gillespie, Thomas, Glasgow
- Gillies, David, Hamilton, Ontario
- Gilliland, James, Glasgow
- Gilmour, David, Busby
- Glass, James, Glasgow
- Glen, John, Glasgow
- Glen, Mrs., Barrhead. 5 shares
- Goldie, Thomas, Airdrie
- Goodwillie, George, Invercargill, N.Z.
- Gott, William, Glasgow
- Graham, J. D., Glasgow
- Graham, James, Glasgow
- Graham, John, Glasgow
- Graham, Robert, Blackburn
- Graham, Robert, Glasgow
- Grainger, Mrs. Janet, Falkirk
- Grant, Mrs., Warrnambool, Victoria
- Grant, Provost. Fortrose
- Graves & Co., Henry, London. 6 shares
- Gray, Thomas, Glasgow
- Green, C. R., South Shields
- Green, James A., Dunedin, N.Z.
- Gregor, Joseph, Swansea
- Gregory, Henry, London
- Grieves, James, South Shields
- Griffith, Mrs. G., Dolgelly
- Griffiths, J. H., London, Ontario
- Grimond, A. D., Dundee
- Grindle, Rev. H. A. L., M.A., Devizes

- Groves, James, Keighley
- Guild, J. Wyllie, C.A., Glasgow
- Guinness, A. R., M.H.R., Greymouth, N.Z.
- Haggitt, D. A., Dunedin, N.Z.
- Hall, Charles, Peterboro, Ontario
- Hall, G. T., Croydon, Surrey, 2 shares
- Hall. T. M., South Shields
- Hall, T. W., Kyneton, Victoria
- Hamilton, Gavin J., Aberdeen
- Hamilton, James, Glasgow
- Hamilton, Patrick, Glasgow
- Hamilton, Robert, Glasgow. 2 shares
- Hamilton, William, Glasgow
- Hammond, R. M., Croydon, Surrey
- Hannay, A., Glasgow
- Harley, J. X., Paisley
- Harris, W. C., Adelaide, S.A.
- Haufe, J. H., South Shields
- Hay, Alexander, Invercargill, N.Z.
- Hay, Robert, Newcastle-on-Tyne
- Heaton, William, Wigan
- Helgar, Henry, Haverfordwest
- Henderson, W., Melbourne, Victoria
- Henderson, William, Glasgow
- Houston, J. A., Tipperary
- Heron, Mrs. Elizabeth, Frodsham, Cheshire
- Heymann, H., Nottingham. 2 shares
- Heys, Z. Henry. Barrhead. 5 shares
- Hey worth, Eli, Blackburn
- Hick, J., Sulby, Isle of Man
- Hiddleston. Mrs., Stromness
- Hill, Mrs. Rowley, Bishop's Court, Isle of Man
- Hobson, J. M" M.D., Croydon, Surrey. 2 shares
- Hodder, R. E., leading
- Hodgkinson, John, Bakewell
- Hogg, Mrs. E., Douglas, Isle of Man
- Hogg, R. Martin, Glasgow. 2 shares
- Holms Kerr, R. K., Glasgow
- Hooker, James, Croydon, Surrey
- Hooley, S. J., Tunstall
- Hopkinson, .J. C., Chapeltown, near Leeds
- Horn, H. H., Wanganui, N.Z.
- Horn, Miss Annie, Louth, Lincolnshire
- Hornby, H., London
- Horne. Z. C., Westport, N.Z.
- Horrocks, John, Croydon, Surrey
- Howat, D. G., Glasgow
- Howat, William, Airdrie
- Howe, G., Wanganui, N.Z.
- Hoyle, John, Bury, Lancashire. 2 shares
- Hughes, J., Westport, N.Z.
- Hughes, James, Glasgow
- Humble, Mansfield
- Hungerford, R. B., London, Ontario
- Hunt, E., Glasgow
- Hunt, Henry, Grevmouth, N.Z.
- Hunt, R. J., Chertsey, Surrey
- Hunt, W. R., Adelaide, S. A.

- Hunter, George, Glasgow
- Hunter, Hugh S., Invercargill, N.Z.
- Hunter, James, Glasgow. 2 shares
- Hurst, Mrs., Dublin
- Hussey, C., Croydon, Surrey. 2 shares
- Hutchison, Henry, Glasgow
- Huxtable, James, Torrington
- Imrie, George, Glasgow
- Ingham, Samuel, Oldham
- Inglis, G. M., Iquique, Peru
- Innes, Robert, Peterboro, Ontario
- Irving, Dr., Blackburn
- Isdale, illiam, Douglas, Isle of Man, H.S. 3 shares
- Jack, Andrew, Melbourne, Victoria
- Jackson, P. R., Wanganui, N.Z.
- Jackson, Joseph, Sunderland
- Jackson, W. H., Hanley
- Jamieson, A., C.E., F.R.S.E., Glasgow
- Jamieson, W. A., Glasgow. 3 shares
- Jardine, Robert, M.P., Lockerbie
- Jarrett, C., Croydon, Surrey. 3 shares
- Jefferson, Thomas, South Shields
- Jeffery, R. K., Iquique, Peru
- Jenkins, Alexander, Glasgow
- Jenkins, J. W., Aberavon
- Jenkins, R., Aberavon
- Jerrard, S. J., Lewisham, Kent
- Jessop, L. A., Adelaide, S.A.
- Jewell, M., Iquique, Peru
- Jobling, Mrs. Joseph, Morpeth
- Johnson, George, South Shields
- Johnston, B., Croydon, Surrey
- Johnston, Charles, Glasgow
- Johnston, J., Glasgow
- Johnston, John, Liverpool. 3 shares
- Johnstone. D., London
- Johnstone, Ninian, Glasgow
- Jones, B., Swansea
- Jones, James. Grey mouth, N.Z.
- Jones, John, Epsom
- Jones, Mrs. D. R., Corwen, Norili Wales
- Jordan, William, Colombo, Ceylon
- Joske, A lick B. Suva, Fiji
- Jukster, L., South Shields
- Karran, James, Douglas, Isle of Man
- Kay, Cathcart, Glasgow. 2 shares
- Kean, Michael, Glasgow
- Keen, W. V., Croydon, Surrey
- Keighley, William Henry,
- Keighley Kemp son, Augustus, Northampton
- Kennedy, W., Wanganui, N.Z.
- Kennedy, William, Partick
- Kermode, R. K., Castletown, Isle of Man
- Kermode, W. K., Douglas, Isle of Man
- Kerr, C., Woodstock, Ontario
- Kerr, J. H., Greymouth, N.Z.
- Kidston, Richard, Edinburgh
- Kidston, Richard, Helensburgh

- Killey, Miss, Douglas, Isle of Man
- King, Charles M., Glasgow
- King, James, Glasgow
- King, Robert, Glasgow
- Kinnaird, George, Glasgow
- Kinnear, P. T., Bearsden
- Kirkham, Thomas, Runcorn, Cheshire
- Kirkland, James, Lenzie
- Kirkpatrick, A. J., Glasgow
- Kitchen, John A., Melbourne, Victoria
- Kneen, Thomas, Douglas, Isle of
- Kyle, William, Uddingston
- Laidlaw, William, Hawick
- Laing, David T., Glasgow
- Laird, William, Glasgow
- Lake, Henry, Croydon, Surrey
- Lambert, A. J., Croydon, Surrey
- Lambie, George, Glasgow
- Lambie, J., Melbourne, Victoria
- Lancaster, Melbourne, Victoria
- Lang, Matthew, Melbourne, Victoria
- Langlands, C. J., Kpsoin
- Langlands, E. W., Glasgow
- Lasbam, B., Croydon, Surrey
- Lavender, Sarab Jacques, London, 3 shares
- Law, R., Wanganui, N.Z.
- Lawrence, R., Adelaide, S. A.
- Lawrie, Thomas, & Son, Glasgow
- Laws, C. L., North Shields
- Lawson, James, Glasgow
- Lawson, R. A., Dunedin, N.Z.
- Lazarus, T. L. Suva, Fiji
- Leach, Howard R., Diss, Norfolk
- Ledgar, Edward, Barnsley
- Leech, Captain, Westport, N.Z. Legg, H., Croydon, Surrey
- Lenuox, A. B., Glasgow
- Lester, Thomas, Dudley
- Letts, —, Thornhill
- Leys, James, Wanganui, N.Z., *H.S.* 2 sahres
- Lilburn, James, Glasgow, 3 shares
- Lillico, W., Croydon, Surrey
- Limnbrey, Thomas, M.R.C.S., Newport, Monmouth .
- Liminer, E., London
- Lindsay, Alexander D., Airdrie
- Lindsay, William, Glasgow
- Linton. H., Croydon, Surrey. 3 shares
- Lister, John, Settle
- Little. S. II., Dunedin, N.Z.
- Lock, A. H., Dorchester
- Lock. T., Dorchester
- Logan, William, Glasgow
- Lomax, F. G., Iquique, Peru
- Lomax, J., Wanganui, N.Z.
- Lomax, Samuel, Douglas, Isle of Man
- Long, Henry, Croydon. Surrey
- Longdon, George, Aberavon
- Longstaff. Henry, Bishop-Auckland
- Lorimcr, Hon. J., Melbourne, Victoria

- Lovell, John D., Linlithgow
- Lovell, Mrs., Chertsey, Surrey
- Low, Captain T., Wanganui, N.Z.
- Low, James, Glasgow
- Lucas, Alfred, Acton
- Lunt, Joseph, Manchester
- Lush, J. M., Dorchester
- Maddever, W. C. W., Rothesay
- Madeley, E. T., Chertsey, Surrey
- Mair, Robert A., C.A., Glasgow
- Maitland, D., Union Mills, Isle of Man
- Maidand, W. H., Glasgow. 2 shares
- Mallet, H. L., Torrington
- Marks, S., Exeter Marr, Thomas, Glasgow
- Marr, Thomas H., Glasgow
- Marriage, W., Croydon, Surrey
- Marsden, G. W., London
- Marshall, J. C. R., Glasgow
- Marshall, James, M.C.C., Greymouth, N.Z.
- Marshall, John, London, Ontario
- Marshall, Martin, Dunedin, N.Z.
- Marshall, W., South Shields
- Mart, William, Leeds
- Martin, Alexander, Glasgow
- Martin, H., Croydon, Surrey
- Martin, James, North Shields
- Martin, Mrs. Jane, Pollokshields
- Martin, S., Clifton. Bristol
- Mason, Robert, Greenock. 2 shares
- Mason, Thomas, Glasgow
- Masterman, George, Asbtead. Surrey
- Masterman, Mrs. J., Wakefield
- Mather, John, Haddington, and 2 halfguinea shares
- Matheson, George N., Sarnia, Ontario
- Mathias, E. P., London
- Mathieson, William, Crossbill
- Meiklam, Ralph, Glasgow
- Menteath, A. A. S., M.H.R. Greymouth, N.Z.
- Menzies, James, Glasgow, 3 shares
- Menzies, Robert, Whitburn
- Miekleborougb, J., Sr. Thomas, Ontario
- Milburn, John, Workington
- Millar, Alex., jun., Glasgow
- Miller, J. S., Glasgow
- Miller, Robert, Glasgow, 2 shares
- Miller, Robert, Glasgow
- Miller, Robert, Glasgow
- Miller, Miss, Glasgow
- Milligan, John, London
- Milne. George, Glasgow
- Milroy, William, Glasgow
- Mitchell. Alexander, Glasgow
- Mitchell, David, Glasgow
- Mitchell, John, Dunedin, N.Z.
- Mitchell, John, Greymouth. N.Z.
- Mitchell. Joseph C., London
- Mitchell, Robert M., Glasgow
- Mitchell, William T., Falkirk

- Moffat, Alexander, Glasgow. 2 shares
- Moffatt, William. Crosshill
- Moir, James, M.A., Aberdeen
- Moir, Peter, Glasgow
- Mollisou, W. M., Glasgow
- Moodie, John, Halifax
- Moore, A. E., Melbourne, Victoria
- Moore, Alex., C.A., Glasgow. 2 shares
- Moore, Francis, Newry
- Moore, John, South Shields
- Moralee, T., South Shields
- Morewood, A., Hanley
- Morgan, S., Llanidloes
- Morison, Patrick G., Edinburgh. 2 sh.
- Morison, W., Lanark
- Morison, William, Glasgow. 2 shares
- Morrice, Alexander, Pollokshields. 2 sh.
- Morris, J. H., Greymouth, N.Z.
- Moston, W. K., Hanley
- Motherwell, G. B., Airdrie
- Moultrie, John, Glasgow
- Mudie, William, jun., Glasgow
- Muir, A. Craig, Glasgow
- Munn, Samuel. London, Ontario
- Munro, G., Westport, N.Z.
- Munro, J. C., Glasgow
- Munro, J., Westport, N.Z.
- Munro, John, Hanley
- Murdoch, William, Glasgow
- Murdock, J., Westport, N.Z.
- Murgatroyd, J. H., Halifax
- Murray, John, Glasgow
- Murray, John S., Galashiels
- Murray, Robert, Glasgow
- Murray, Thomas, Douglas, Isle of Man
- Murray, William, Hamilton, Ontario
- Murray, William, Manchester
- Murray, William, Workington
- Myers, A. B., Exeter
- Mylehreest, Thomas, Douglas, Isle of Man
- M'Adam, John, Rutlerglen
- M'Alister, Kbenezer, Strathblane
- M'Arly, D., Glasgow
- M'Avoy, Patrick, Glasgow
- M'Bain, Captain, Aberdeen
- M'Cabe, James, Lewisham, Kent
- M'Call, James, Hillhead
- M'Callum, D., sen., Glasgow
- MacCartney, W. N., Glasgow
- McClelland, A. S., Glasgow
- M'Cormick, A., Addlestone, Surrey
- M'Creadie, D., Glasgow
- M'CulIoeh, James, Glasgow
- M'Diarinid, Archibald, Glasgow. 2 shares
- Macdonald, A. G., Glasgow. 2 shares
- Macdonald, Alexander, Glasgow
- McDonald, Allan, Glasgow
- M'Donald, D. P., Fort-William. 2 shares

- Macdonald, J. G., Glasgow
- Macdonald, James. Glasgow
- M'Donald, Mrs. Janet, Falkirk
- Macdougall, D., Partick. 2 shares
- M'Ewan, Peter, Glasgow
- M'Ewan, Walter, Woodstock, Ontario
- Macfarlane, Walter, Glasgow
- M'Gibbon, John, Pollokshields
- M'Gregor, John, Glasgow
- M'Gregor, Peter. Kirkintilloch
- M'Gregor, Thomas, Glasgow
- M'Guffie, Alexander, Glasgow
- M'Intosh, Alexander, Crosshill
- MacIntyre, A. C., Glasgow
- M'lntyre, Andrew, Strathbungo
- Mackay, Alexander, Thurso
- Mackay, William, Glasgow
- M'Kechnie, W., M.C.C., Greymouth, N.Z.
- M'Kendrick, J. G., M.D., LL. D., Glasgow. 2 shares
- Mackenzie, J. Bussell, Aberdeen. 3 sh
- M'Kill, John, Glasgow
- Mackinnon, A., Glasgow
- McKinnon, John, Alexandria
- Mackinnon, John, Glasgow
- Mackinnon, William, Glasgow
- Mackintosh, Hugh, Nairn
- M'Kissock, Peter, Glasgow. 2 shares
- M'Laren, Captain J., Wanganui, N.Z.
- M'Laren, John, Dunfermline
- M'Laren, T., Glasgow
- M'Lean, Archibald, Glasgow
- M'Lean, John R., Glasgow
- Mac Lean, Walter, Glasgow
- Mac Lean, William, jun., Glasgow
- M'Lennan, Alexander, Glasgow
- M'Lennan, James. Pollokshields
- MacLeod, Rev. Peter, Neilston, 2 shares
- M'Millan, John, jun., Dunbarton
- M'Nab, George, London, Ontario
- M'Naughton, John, Dunkeld
- M'Neil, Alexander, Glasgow
- M'Noil, Peter, Glasgow
- M'Onie, The Hon. William. Lord Provost of Glasgow. 2 shares
- Macpherson, H. S., Glasgow
- Macpherson, Mrs., Crosshill
- Macpherson, William, Glasgow
- M'Queen, Captain, Douglas, Isle of Man
- M'Queen, F. C., London, 5 shares
- M'Queen, F. C., & Son, London. 4 sh.
- M'Queen, J. H., London. 5 shares
- M'Qucen, J. H. & F. C., London. 13 sh.
- M'Qucen, Miss. London. 2 shares
- M'Qucen, Mrs., London. 2 shares
- M'Viear, Donald, Glasgow
- Mac Whirter, James, Woodstock, Ontario, *L.A.* 2 shares
- Naismith, John, Glasgow. 3 shares
- Neale, John, Lynn, Norfolk
- Neilson, John, Bothwell

- Neilson, John, Glasgow
- Nicholls, J. Mayne, Iquique, Peru, 3 sh.
- Nichols, J. G., London
- Nicholson, William, Kumara. N.Z.
- Nicolson, N. S., Dunedin, N.Z.
- Niven, Gcorge, London
- Noble, H. B., Douglas, Isle of Man
- Okell. W. H., Donglas, Isle of Man
- O'May, Daniel, Falkirk
- Organ, William. Invercargill, N. Z.
- Orr, John. Glasgow
- Orr, Wiliiam, Glasgow
- Oswald, J. H., Edinburgh
- Oughton, R. H, Darlington
- Outram, Augustus Frederick, Tenterden
- Outram, D. E., Glasgow. 5 shares
- Owen, Wm., Haverfordwest
- Pain, H, Westport, N.Z.
- Paine, H. E., Chertsey, Surrey
- Park, Jamea, Glasgow
- Park, John H, Hamilton, Ontario
- Parker, T. H, Woodstock, Ontario
- Pascall, F. C., Croydon, Surrey
- Paterson, Dugald, Glasgow
- Paterson, E. B., Glasgow
- Paterson, James, Glasgow
- Paterson, John, Glasgow
- Paterson, Robert, C.A., Glasgow
- Patou, R. B., Birmingham
- Paton, Thoma, Glasgow
- Patullo, A., Woodstock, Ontario
- Paul, William, Aberdeen
- Paxton, M., Langside
- Payne, S. J., Melbourne, Victoria
- Peacock, H., South Shields
- Peake, J. F., Dunedin, N.Z. and 1 half-guinea share
- Pearce, R., South Shields
- Pearse, W., South Shields
- Pearson, W. J., Campbeltown
- Peat, John, Inverurie
- Pededa, John D., Colombo, Ceylon
- Pelton, John, Shirley, Surrey, 3 shares
- Penney, E., Mexico, and 1 half-guinea sh.
- Pennycuick, Alexander, Rangoon
- Perks, P. B., Hanley
- Perrins, J. B., Melbourne, Victoria
- Perry, C. E., Woodstock, Ontario
- Peter, Thurstan C. Redruth
- Pettle, Richard, Torrington
- Phipps, Pickering, M.P., Collingtree
- Pickersgill, J. W., Wellington, N.Z.
- Piercy, M., Stoke-on-Trent
- Pittar, W. P., Douglas, Isle of Man
- Podmore, H. R. B., Croydon, Surrey, 3 shares
- Polastie, A. V., Iquique, Peru
- Pomphrey, William, Wishaw
- Porteous, Christina, Erskine, Glasgow
- Porteous, James, London

- Porteous, William, Glasgow
- Porter, Mrs. Wm., Londonderry
- Potter, C., Croydon, Surrey
- Potter, H, Croydon, Surrey
- Potter, J. T. Oldham
- Powell, Miss, Croydon, Surrey
- Power, W. H., Glasgow
- Poynter, John E., Glasgow
- Pratt, George C., Glasgow. 2 shares
- Price, W. H., Leeds
- Pugh, James Rees, Whitby
- Purden, John, Lambhill
- Purvis, Adam, Glasgow
- Puttock, G. C., Gosport
- Quinlan. A. W., Glasgow
- Quirm, John J., Newry
- Railton, E. B., South Shields
- Ramsay, John, Musselburgh
- Ramsey, Robert, Glasgow
- Rankine, David, Glasgow
- Reekie, John, Manchester
- Reeve, B. A., London
- Reid, E. T. S., Glasgow
- Reid, Hugh, Glasgow
- Reid, James, Glasgow. 2 shares
- Reid, Miss, Glasgow
- Reid, Robert, C.A., Glasgow
- Reid, Robert. London, Ontario
- Reid, Thomas, Kilmardinny
- Rendell, W., Dorchester
- Renwick, -, Melbourne, Victoria
- Richards, Mrs., London
- Richards, S. More, London
- Richardson, D., Iquique, Peru
- Riddell, James, East Kilbride
- Ridge, B., Croydon, Surrey
- Ridllington, J. E., Boston
- Risk, John. Glasgow
- Ritchie, David, Glasgow. 4 shares
- Ritchie, Thomas, Belleville. Ontario
- Robb, James, Stafford
- Robertson, George, Coopar-Angus
- Robertson, James, Dunbarton
- Robertson, James, Glasgow
- Robertson, John, Glasgow
- Robertson, Dr. Murray, Durham
- Robertson, Wm., Johnstone
- Robey, William, London. 3 shares, and 2 half-guinea shares
- Robinson, J, R., Tynemouth
- Robinson, John, Ashton-under-Lyne
- Robinson, John, South Shields
- Robinson, W., South Shields
- Robinson, W. M., Croydon, Surrey. 5 sh.
- Robson, Adam, South Shields
- Robson, John, South Shields
- Rocke, Fred., Swansea
- Rodger, George, Barrow-in-Furness
- Rodman, W., Belfast

- Roger, J. H., Glasgow
- Rogers, J. C., Glasgow
- Rollo, William, Arbroath
- Rose, Alexander, Billhead
- Ross. Alexander, Hillhead
- Rosa, David, Dunedin, N.Z.
- Ross, James, Glasgow
- Ross, James A., Sunbury-on-Thames. 2 shares
- Ross, Murdo, Dunedin, N.Z.
- Ross, Richard, Rutherford. 2 shares
- Ross Richard G., Glasgow. 2 shares
- Routh, J. T., Hamilton, Ontario
- Rowland, F. S., Iquique. Peru
- Rowland, W. H., Croydon, Surrey
- Russell, E., Troon
- Russell, F. A., Galashiels
- Russell, J. W., Croydon, Surrey
- Russell, Lewis, Glasgow
- Ryley, James, Bolton
- Secker, E., Kenley, Surrey
- Salmon, James, Glasgow
- Samuels, R. D., Glasgow
- Sandeman, R., Glasgow
- Sandford. A. L., Glasgow
- Sandy, W. H., Croydon, Surrey, *L.A.* 4 shares
- Sangster, Robert, Aberdeen
- Savage, Rev. E., Douglas, We of Man
- Sawers, George B., Glasgow
- Scott, J, S., Adelaide, S.A.
- Scott, James P., Glasgow
- Scott, T. C., South Shields
- Seale, H., Croydon, Surrey
- Seddou, R. J., M.M.R., Kumara, N.Z.
- Sellars, James, jun., Glasgow
- Semple, J., South Shields
- Sewell, J. S., Workington
- Shand, A., Blackburn
- Shanks, James, Arbroath
- Shanks, Mrs. Mary, South Shields
- Sharp, George, Glasgow
- Sharp, John G., Glasgow
- Shaw, Henry, Huddersfield
- Shearer. W., Newmains
- Shepherd, J., Chertsey, Surrey, *H.S.* 2 shares
- Sheriff, John, Glasgow
- Sherrard, W. O., Glasgow
- Sherriff, George, Glasgow
- Sherwood, George, Ash by-do la-Zouch
- Shotton, C. F., South Shields
- Sidebutham, John, Stockport
- Sillars, John A., Glasgow
- Simpson, Hugh, Birmingham
- Simpson, Mrs., Edinburgh, and 1 half-guinea share
- Sinclair, James, Bluff, N.Z.
- Skinner, A., Croydon, Surrey
- Skipworth, W. G., Dublin
- Slack, Thomas, Diss, Norfolk
- Slessor, A, L., Glasgow

- Slimmon, J. B., Glasgow
- Slyman, H. J., London
- Small, John, Glasgow
- Small, John, Glasgow
- Smellie, A., South Shields
- Smith, Miss A. J., Lanark
- Smith, Andrew, Lanark
- Smith, Charles, Langside
- Smith, D. R., Glasgow
- Smith, Duncan, Glasgow
- Smith, E. Johnson, Hungerford
- Smith, J. B., Dunedin, N.Z.
- Smith. J. S., Croydon, Surrey. 5 shares
- Smith, Rev. James F., Glenduce
- Smith, James, Glasgow
- Smith, John, Glasgow
- Smith, R. M'G., Uddingston
- Smith, Thomax, Dundee
- Smith, William, Glasgow
- Smitton, Mary, Auehterarder
- Smyth, S., Coventry
- Snowball, E., Glasgow
- Soul, Jos. S., London
- Spence, J. W., Glasgow
- Spence, Janies. Harrington
- Spence, James, Workington
- Spencer, G. F., Chertsey, Surrey
- Stables, James. Kirkintilloch
- Stafford, K., South Shields
- Stainsby, W. P., Neweastle-on-Tyne
- Stausfield, G. H., North Shields
- Steedman. Thomas, Kinross
- Steel, E., Hanley
- Steele, A. J., Douglas, Isle of Man
- Stephenson, John, North Shields
- Stevenson, Cecilia J. M., Kirkintilloch
- Stevenson, D. M., Glasgow
- Stevenson, George, Suva, Fiji
- Stevenson, W., Croydon, Surrey
- Stevenson, William, Glasgow
- Stewart. Andrew, Glasgow. 2 shares
- Stewart, Gilbert, Kumara, N.Z.
- Stewart. James, Glasgow
- Stewart. John (Rcntield Street), Glasgow
- Stewart, John (Wilson Street), Glasgow
- Stewart, John, Partick
- Stewart, Thomas, Glasgow
- Still, H Croydon, Surrey
- Still, H., South Norwood, Surrey
- Stobbs, William, North Shields
- Stoddart, Matthew, Glasgow
- Stoker, R., South Shields
- Stokes. H., South Shields
- Stone, J. B., London
- Stops, S., London
- Storrar, A., Stranraer
- Stout, Robert. M.H.R., Dunedin, N.Z.
- Strachan, W., Melbourne, Victoria

- Strang, James, Glasgow. 5 shares
- Strang, Samuel H., Glasgow, 5 shares
- Struthers, Alexander F., Glasgow
- Stuart, A. P., Wellington, N.Z.
- Sumpter, W., South Shields
- Sutherland, Angus, Golspie
- Sutherland, C. J., South Shields
- Swan, Miss, Glasgow
- Swan, William, Falkirk
- Swift, Mrs., Mansfield
- Sword, John, Hexham
- Tancock, W., Croydon. Surrey
- Tate, R. M., North Shields
- Tatham, Cyril T. C., Weybridge, Surrey
- Taylor, E., South Shields
- Taylor, Edward, South Shields
- Taylor. J. M., Newtown, Montgomery-shire
- Taylor, James, Melbourne, Victoria
- Taylor, James, jun., Glasgow
- Taylor, W. G., Glasgow
- Tealby, A. J., London
- Tees, David T., Montreal. 2 shares
- Templeton, James, Glasgow. 2 shares
- Tennant, Sir Charles, Bart, of the Glen, M.P. 2 shares
- Terris, James, jun., Dallomuir
- Thomas-Peter, Capt., Paignton, S. Devon
- Thompson. W. E., Iquique, Pern
- Thomson, Archibald, Glasgow
- Thomson, John, Aberdeen
- Thomson. John, Glasgow. 2 shares
- Thomson, John, Glasgow
- Thomson. M. C., Glasgow. 3 shares
- Thomson. Thomas, Glasgow
- Thomson. W. B., Dunbarton
- Thomson, W. K., Melbourne, Victoria
- Thomson. William. Glasgow
- Thomson, William, Glasgow
- Thomson, William H., Glasgow
- Thornton, P., South Shields
- Thrale, R. A., Croydon. Surrey
- Thrale. Ralph. Croydon, Surrey
- Thrift, J., Croydon, Surrey
- Thurston, G. H., Addlestone, Surrey
- Tindle, J. G., North Shields
- Todd, Andrew, Glasgow
- Todd, J. B., Glasgow
- Tominson, Thomas, Dunedin, N.Z.
- Tonga, W. A., Alderly Edge, Cheshire
- Toomer, R., Reading
- Triggs, B., Reigate
- Trumper, F. R., Hay, Brecon
- Tudor, T., South Shields
- Tulloch. Lawrence. Swansea
- Tulloch, William, jun., Glasgow
- Turnbull, T., Wellington, N.Z.
- Turner, Dr., Melbourne, Victoria
- Turner, S., Mansfield
- Tuxford, S. A., Sibsey. Lincolnshire

- Tweed. John, Glasgow
- Ure, George, Bonnybridire, 3 shares
- Ure, George R., Bonnybridge. 3 shares
- Urton, William, Chesterfield
- Valentine. J. C., Workington
- Vannan, Mrs. Robert. Glasgow
- Vasey, Thomas, South Shields
- Waddell, George, Glasgow
- Waddell, Robert, Glasgow. 5 shares
- Wade, J. L., Glasgow
- Wado, T. N., Kyneton, Victoria
- Walker, Georgy, Petcrboro, Ontario
- Walker, T., Colombo, Ceylon
- Walker, W., South Shield's
- Wall, Charles, Wigan
- Wallace, John, Maryville
- Wallace, William, Glasgow
- Warren, R., Westport, N.Z.
- Warrillon, A., Hanley
- Warrnambool Museum, per Mr. Cockmun.
- Warrnambool, Victoria
- Wass, William R., Runcorn
- Waters, Alfred. Croydon, Surrey. 2 sh
- Waters, William, Croydon, Surrey
- Watkins, Jonah, Llandovery
- Watson, A. C., Glasgow
- Watson, Miss Belle, Barrhead
- Watson, Duncan, Barrhead
- Watson, Miss Elise, Barrhead
- Watson, James Partick
- Watson, Sir James, Glasgow. 2 shares
- Watson, Joseph, Barrhead. 2 shares
- Watt, Robert, Airdrie
- Watt, Thomas, Cowlairs
- Waugh, A. Lees, Manchester
- Waugh, John, Thornhill
- Waun, C., South Shields
- Weatherall, James, North Shields
- Webster, James B., Arbroath
- Welford, Dr. A. B., Woodstock, Ontario
- Welsh, George, Newport-on-Tay
- Wenham, W. P., Croydon, Surrcy
- White, George, Epsom
- White, H. G., Whitley
- White, James, Woodstock, Ontario
- White, John, North Shields
- White, John, Woodstock, Ontario
- Whitley, John, Halifax
- Whitney, Miss, Huddersfield
- Whyte, Robert, Glasgow
- Whyto, Thomas. Glasgow
- Williams, E Wynn, Dunedin, N.Z.
- Williamson, A., London
- Williamson, Thomas, Glasgow
- Williamson, Wm. T., London
- Wilson, David, Pollokshields
- Wilson, E. L., Bannockburn
- Wilson, James, Glasgow. 3 shares

- Wilson, James, Glasgow
- Wilson, John, Glasgow
- Wilson, Robert (Bond Street), Dunedin. N.Z.
- Wilson, Robert (Princes Street), Dunedin, N.Z.
- Wilson, T. W., Greymouth, N.Z.
- Wilson, W. N., Douglas, Isle of Man
- Wilson. Walter, Glasgow
- Wingate, J. B., Glasgow
- Wingate, W. E., Glasgow. 2 shares
- Wood, R. A., Newcastle-on-Tyne
- Wood, William. Ewell
- Woodrow, John, Keighley
- Wright, John, Glasgow
- Wright, John T., Dunedin. N.Z.
- Wright, R. D'Aubney, Manchester
- Wright, R. F., North Shields
- Wright. W. H. Colombo, Ceylon
- Wright. William, Glasgow
- Wyatt. E. G., Rio
- Wylie, William, Langside
- Wylie, Alexander, Dalqnhurn, Ronton. 5 shareg
- Young, Charles, Epsom
- Young, E. C., Wanganui, N.Z.
- Voung, John, New Kilpatrick
- Young, Robert, Hamilton, Ontario
- Young, Thomas, Iquique, Peru
- Young, William, Aheravon
- Younger, George, Glasgow

Glasgow: W.G. Blackie and co., Printers, villafield.

# Instituted, 1841. Incorporated by Royal Charter. 1881. 1885-86.

# The Art-Union of Glasgow, Office. 22 Renfield Street, Glasgow.

(For Office-bearers, see page 3 of Report.)

*The object of the Art-Union of Glasgow* is to aid in extending a knowledge of the *Fine Arts*, by distributing among its Members *Meritorious Works of Art*.

A Subscription of One Guinea constitutes Membership for One Tear. The whole Subscriptions, after deducting the necessary working expenses, are devoted to the Purchase of PAINTINGS, DRAWINGS, SCULPTURES, ENGRAVINGS, and other Works of Art; each Member being entitled to the Presentation Work for the year of Subscription, and a Share in the Annual Ballot of Prizes.

Any Member having paid his ordinary Subscription for the current year, and wishing additional Shares in the Ballot for Prizes—*but without another Copy of the Presentation Work*—may have one additional Share for every HALF-GUINEA subscribed, for which a separate printed Receipt will be given.

The Presentation Work for tills season is now in course of preparation. By the special permission of Her Majesty the Queen, MR. LEOPOLD LOWENSTAM, of London, has been commissioned to make an Etching of SIR J. D. LINTON'S Great Picture of

## "The Marriage of the Duke of Albany,"

which was exhibited a few months ago in the Royal Academy. The likenesses are admirable, and the composition of the Picture remarkably good. Size of Etched surface, 21 by 14 inches.

The Prizes will consist of—

- FIRST.—Sums set apart for the Purchase of Paintings or Sculpture, each Prize-holder haring the right to itoloot the Work of Art to form his Prize from any Public Exhibition; and
- SECOND.—Paintings, Engravings, and other Works of Art, as Minor Prizes, selected by the Committee.

## *The Distribution of Prizes will take plact early in 1886*.

Subscribers for more than One Share have the following Privileges:—

- FOR Two Guineas.—*Two Shares* in the Ballot for Prizes; and, in his option, Two Copies of the Etching, or One Proof Impression India Paper.
- FOR Three Guineas.—*Thrrt Shares* in the Ballot for Prizes; ami, in his option. Three Copies of the Etching, or One Proof Impredion *before Letters* on India paper
- FOR Five Guineas,—*Five shares* in the Ballot for Prizes; and in his option, Five Copies of the Etching, ora signed Artist's Proof Impression on Japans Velhem,
- FOR Seven Guineas,—*Seven Shares* in the ballot for Prizes; and, in his option, Seven copies of the Etching, or a signed "Remarque"Artist's Proof Impression on JappanessVellum;

NOTE.—*The " Remarque" and Artist's Proof being necessarily limited in number, can be guranted only to the first Applieants*.

Subscriptions will be received at the Office of the Society, 22 RENFFELD STREET, GLASGOW; and by the Honorary Secretaries and Local Agents of the Society in other towns.

Maclean Brodie,
*Acting Secretary for the Art-Union of Glasgow*.

Front Cover

Queensland Branch of the Geographical Society of Australasia. Report of the Second Ordinary Meeting,

Held in the
Museum Library, Brisbane,
March, 1886.

EDITED BY J. P. Thomson, M.A, C.E., Hon. Secretary and Treasurer.

The Authors of Papers are alone responsible for the opinions expressed therein,

Brisbane: Printed and Published by Alex. Muir & Morcom, Creek Street. 1886

# Report of the Second Ordinary Meeting,

The second ordinary monthly meeting of the Queensland Branch of the Geographical Society of Australasia was held in the Museum Library, Brisbane, on Tuesday evening. 7th March, 1886, Mr. W. A. Tully, B.A;. F.R.G S., occupied the chair; and there was a good attendance of ladies and gentlemen.

The hon. Secretary read the minutes of the previous meeting, which were confirmed, and announced the receipt of a valuable map of Tasmania, presented to the Society by Mr. C. P. Sprent. Deputy Commissioner of Crown Lands through the instrumentality of Mr. T. B. Moore.

The Rev. G. Woolnough desired to know whether the Society intended subscribing towards the Forbes exploration fund.

The Chairman said that a Subscription list had been opened by the Royal Society of Queensland with a view to assist Mr. Forbes in his exploration in New Guinea, and thought that the Queensland Branch of the Society might subscribe.

Mr. W. H. Miskin said that he considered Mr. Forbes was to some extent the servant of the Geographical Society of Australasia, inasmuch as he was subsidised by the New South Wales branch of the Society and was under formal agreement with them, and he was not aware that Mr. Forbes had solicited assistance from the Royal Society of Queensland.

The Chairman said it was, he thought, the act of the Secretary of the Royal Society rather than of the Society itself.

Mr. Miskin thought that the subject of assisting with subscriptions would be a matter for the consideration of the Geographical Society of Australasia generally.

Mr. Thomson said that the Secretary of the Royal Society had communicated with him regarding the subscription list opened on behalf of Mr. Forbes, but the communication being informal had precluded its presentation to the Council, and from communications he had seen between Mr. Forbes and Sir Edward Strickland he thought that, some misunderstanding existed between the former gentleman and the Society, and quite agreed with the last speaker, that any assistance should be a matter for the consideration of the Geographical Society of Australasia collectively.

Mr H. H. Romilly, on the invitation of the Chairman, said he had no doubt that Mr. Forbes required assistance, and what Mr. Thomson had said in reference to a misunderstanding between Mr. Forbes and the Society was perfectly true, as he had conversed with Mr. Forbes on the subject.

No action being taken in the matter, the subject dropped.

The following paper was then read by the author:—

# New Guinea.

# By Mr. H. H. Romilly,

Special Commissioner of British New Guinea.

I do not propose to bore you with a dry list of names of coast and inland districts, names of tribes, etc., but to describe as well as I can some of the principal features of the country, the peculiarities of its inhabitants, and the possible future of the Protectorate.

There is but little that I can tell you of the work which has been done by the different exploring parties which have bean organized by this society, and by private enterprise, which you do not already know. Though a considerable amount of information has been gained by them, they have been on the whole disappointing. D'Albertis added considerably to the list of known birds and fishes, but he discovered no geoghaphical facts of any importance, and the rough map he made of the course of the Fly River has since been proved to be very incorrect. The collection, too, which he made was allowed to go out of the country, though his expenses had been defrayed almost entirely by New South Wales.

In his book he hardly mentions, if he does so at all, haying passed the mouth of the river ascended recently by Captain Everill. One of the members of his expedition told me some years ago that there was much discussion at the time as to which stream they should ascend. Most of them were in favour of going up the Strickland, but D'Albertis decided on the other stream. I think he must have exaggerated the number of miles he ascended, as he was not an accomplished navigator. I have found, myself, while, ascending rivers, that one is very apt to exaggerate the distance travelled. Perhaps the greatest results were obtained by an expedition of miners in 1877. Very little was said or known of them at the time, but they penetrated some forty miles into the interior from Port Moresby, in a north-easterly direction, till they were stopped by the enormous Owen Stanley Range. Forty miles sounds very little, but a great part of that distance was cut through the dense jungle at the rate of about a mile a day. Many of them died, and they returned disheartened to the coast, having failed in the principal object of their expedition, but having succeeded in holding friendly intercourse with some of the natives of the interior, and having ascertained that there was inland a splendidly watered, rich country.

The explorer from whom I anticipate the best results is Mr. Forbes. He is, as you know, partly supported by the Royal Geographical Society. He is a man as he has shown, of immense resource and pluck, and he is always cheerful under misfortune. He has a most comfortable camp now at a place called Sogere, situated about forty-five miles northeast of Port Moresby. It is about 1500 feet above the sen level, and is on one of the spurs of the Owen Stanley Range. From it he can explore in every direction. It was where I left the country within ten miles of the furthermost point reached. it is supposed that the natives from the north coast occasionally visit Sogere, and if this is the case the day must be near at hand when we can shake hands across the boundary with our neighbours the Germans. Mr. Forbes originally intended to be quite independent of the natives of the country, and accordingly he engaged the services of a number of Malays to accompany him and to act as carriers, but he soon found that they were a source of trouble to him as the inland natives refused to hold friendly intercourse with them. The principal reason assigned for this was that the Malays refused to eat the pork which was offered them on their arrival as a mark of high respect. He has now got rid of nearly all of them, and intends to carry on his work with the assistance of the natives of the country. It had been my intention to ask Mr, Forbes to accompany me in the expedition which was organised in November of last year for the purpose of ascending the Mai Cassa and Aird rivers, but the melancholy death of Sir Peter Scratchley necessitated a complete change of plans. These two rivers, more especially the Aird, we know very little of. Mr. Chester, at present police-magistrate at Cairns, and Mr. M'Farlane were the first to ascend the Mai Cassa. Mr. Chester has described it to me as a salt water creek and not a river. It is probably connected with the Fly by swamps. It has been ascended nearly a hundred miles, till the shallowness of the water prevented any further progress. On its banks many varieties of fine timber are to be found, and at the present moment some enterprising timber-getters are getting cedar there. The extensive swamps which extend from this part of the coast many miles into the interior make the country very unhealthy and very difficult to work in. On the other hand, the banks of the Mai Cassa are very thinly inhabited, and the white men have nothing to fear from depredations or attacks by natives. Of the Aird River I may say that we know absolutely nothing. For eight or nine months of the year the south-east trade is blowing, and the numerous sandbanks and bars, with heavy breakers on them, close this river even to whaleboats. But in the north-west season it is supposed to be possible to enter it. There can be no doubt that it is a river well worth the attempt, and my disappointment at having to give up all thought of it last year was very great. We have a few native accounts of it, and through them it would appear to be a very rapid clear river, magnificently timbered on the borders. We know, also, that the banks are densely populated with powerful and savage tribes.

Our knowledge of the country west of the Mai Cassa is very slight; in fact, with the exception of a few pearl shellers, it is unvisited by anyone.

The natives of this part of the coast are probably the true aboriginals of the country. They have little of the Malay type about them, while both east and west of them their neighbours grow fairer skinned and smaller in stature. Their language, too, differs greatly from those of the eastern and western tribes. Their nature is fierce and treacherous, and they are, on the whole, very awkward people to deal with.

Following the coast to the eastward from the great Papuan gulf, we find a succession of fine rivers, harbours, and roadsteads, which is unequalled, I should imagine, by any country in the world. Every few miles a river discharges its waters into the sea. Many of them would be called fine rivers in Australia.

On the banks of these rivers, after passing the inevitable belt of mangroves, are plains densely covered with the tough cane grass which grows only on rich soil, With the exception of the country round about Port Moresby, the whole of the south coast appears to be entirely fertile, and at South Cape, where the Government have acquired a large tract of territory, the richness of vegetation cannot be surpassed.

It may be interesting to compare the country comprised within the limits of the British Protectorate with the German territory. While on the south harbours and rivers abound, on the north they are not nearly so plentiful. In fact, Finsch Haven, on the north, is the only good harbour they possess. The rivers are small and not very numerous. The mountain ranges which run parallel with the coast are so short a distance inland that it would be impossible for any very large river to exist. The country from Mitre Rock—the point of departure of our boundary line—to Astrolabe Bay, appears to be rocky barren soil, and it is evidently but thinly inhabited by natives. It changes in appearance very much, however, below Astrolabe and Humboldt bays. I visited that part of the coast some five years ago, and made short excursions inland at several points, and I was much struck with the magniflcence of the country and the friendly character of the natives. I had at that time just left the Admiralty and New Britain groups, where the natives are as savage as in the Pacific, and the contrast between them, and the Papuans of Astrolabe Bay was very great. In fact, the Russian explorer Maclay named the islands in Astrolabe Bay the " Archipelago of Contented Men." He lived with them for two years, and though they treated him rather badly : first, eventually they got on very well together. As not much is known of the natives of the northern coast it maybe interesting if I read an extract of a journal, kept at the time, of my impressions of them five years ago. I was at that time visiting all the various groups of islands south of the line. Commodore Wilson had kindly placed H.M.S. " Beagle," Captain Matusin, at my disposal. New Guinea at that time was inclosed in the Western Pacific district. We coasted from a spot about one hundred miles north-west of Astrolabe Bay, as far as Dampier Straits, when we were turned back by heavy southerly gales and adverse currents.

## EXTRACT FROM JOURNAL.

"June 11th, 1881.

"Up to Saturday night we had almost dead calms, only making about twenty miles a day. We got a rain squall on Thursday night, however, in which we made another fifteen miles.

"When it cleared up we Found land all round us. However, till next day Matusin could not determine his position. On Friday we found that they were Lottin, Crown, Long, and Dampier islands; we could also see the New Britain coast, and straight ahead of us rose the coast of New-Guinea, at that particular spot some 12,000 feet high. This morning we were close up to it, and it was certainly a most magnificent sight to see this land rising straight out of the sea to such an enormous height. In the afternoon, about two o'clock, we came to an anchor in a tiny little cove with only just room to swing in, but very deep water. Maclay had called it Port Constantine, and it was his headquarters while he was staying in Astrolabe Bay.

"We saw a few canoes putting off to us, but they seemed rather shy at first till I shouted out the magical name of " Maclay," when they came up as fast as they could. They had all got very powerful bows and enormous canoes. By the help of the few words Maclay had written down for me I was able to inform them that he would come hack to them soon, that I was his brother, and that I wanted to see their towns. They at once became extremely friendly and kept on telling each other that I was Maclay's brother. I then asked for the principal men of the villages by name, and they promised that they should come off next day and would then take me to their towns. In the evening Matusin and I went ashore to look for water. I took my gun in the hope of shooting some birds, but though I heard plenty the bush was so thick I could not see one. We looked about for some time and found a little creek with good water, but we did not explore it very far as it looked a most likely place for alligators.

"In the morning a crowd of canoes came out to us to trade. They seemed to have nothing but bows and arrows and spears of rather a rough description.

"A few of them asked for tobacco, but they evidently did not care much about it Knives and beads were in great demand, but they had so few things of any interest that their trading was not carried on with very great vigour. Matusin and I had settled to visit Gorendu, which is the biggest village here, after divisions in the morning. As soon as they were over a native told me that "Sa-ul," the chief I had asked for, was coming off in a canoe, so we determined to wait for him. When he came alongside we lowered the boarding netting for him, and he came on board after some persuasion, as he was evidently in a great fright. We took him down to the cabin, where we showed him anything we thought likely to take his fancy. Oddly enough he seemed much more pleased with the masks and spears, etc., which we had brought from the other islands than with anything else. The poor old man then attempted a feat manifestly beyond him, though he had evidently tried it before—namely, smoking a day pipe filled with trade tobacco. After a few draws he dashed up the steps of the cabin and was violently sick. When he came back he roared with laughter for some time. The Steward gave him a piece of bread and jam, which he gravely licked with his vermilion tongue, and then handed it to the other members of his staff, who all did the same. No one, however, thought of eating the bread till it came to a small boy who made the attempt. He was not, however, allowed to swallow it as the elder members of his family, when they saw it was good to eat, made him disgorge it, after which it was handed round from tongue to tongue in the most convivial manner. We then made Sa-ul some small presents, which seemed to delight him hugely, and proposed that we should go to Gorendu. Before he left the cabin, however, he was destined to suffer a severe shock to his nerves. He was pulling everything about in a great state of astonishment, and finally came to a seltzogene, the handle of which he pressed. Of course it at once discharged a stream of soda water into his face, and poor Sa-ul tumbled down as if he had been shot.

"After this we got him into the boat and started. . We began our walk to the town from a point about a mile along the bay from where we were anchored. There was a capital path leading us through two walls of bush into which we could not see a yard and which came together about twenty feet oyer our heads. Along the skies of it were any number of ferns and crotons, and there were innumerable festoons of orchids hanging down all round us.

"It was a luxuriance of vegetation I had never seen before and had not imagined possible. I had been in hopes of shooting some birds, but such a thing was quite impossible.

"The orchids I had not seen before anywhere, and there were several Borts of crotons quite new to me. Unfortunately there was no room on board the ship to carry cuttings. After walking some time we heard shrieks and the sound of people running, and then we came to a clearing in the bush, with a few wretched bamboo huts in the centre of it. This village, the name of which I have forgotten, was entirely deserted. evidently on account of our arrival. "We could hear the people talking, no doubt discussing us, quite close in the bush, but we could not see one. As there were no points of interest in the external appearance of this village, and as in the absence of the owners I could not enter any house, we started off again. After walking some time we came to another large clearing and a larger number of huts, which, Sa-ul informed us with a proud air of proprietorship, was Gorendu. We heard the same shrieks there and retreating footsteps, but this town was not absolutely deserted.

"An aged lady, totally devoid of clothing, no doubt owing to her extreme anxiety to get away, as it is not the habit of the women to go naked, was discovered sitting on the ground, in the middle of the town, and one by one they began to come in. Only one woman, however, made her appearance, perhaps, owing to the fact that she possessed a garment of grass which came down to her knees. After the people had come in there was a great deal of patting and pinching to be endured which could have been dispensed with, as they had all got skin diseases. I went into Sa-ul's house, but he seemed to have hardly any property in it. There were some very rough earthenware cooking pots and a few spears and bows, but nothing else. Sa-ul was perfectly civil to us all the time we were on shore; but it is rather remarkable that though I gave him a good many things, he never offered me anything in return. In the Admiralties, where they looked infinitely more savage than they do here, the chief insisted on making me presents in return for mine to him.

"After walking about for some time round about Gorendu wo turned back to the boat with a crowd at our heels, and got back to the ship about two o'clock. At all the places we called at before going to New Guinea I made inquiries about an interpreter for Astrolabe Bay, but at no place could I hear of anyone who had been there. I made out that two ships had been at Port Constantine, both English, but how long ago I could not find out. I believe the only foreigner of any country who has stayed with them and can speak their language is Maclay. I could see no sign of European implements, beads, or cloth, which there probably would have been had they mixed with foreigners."

Maclay says every yard of land is owned by someone and every fruit bearing tree has its owner. There may, no doubt, be scented woods on the mountain ranges, but we saw no signs of them, Tobacco, I should say, there certainly was not, as we not only saw no signs of it in the towns, where it most probably would have been planted, but the natives did not at all seem to care about ours, though some of them did know the use of it. As far as the appearance of the people goes, I imagine Wallace must be wrong when he says that the Astrolabe natives are not true Papuans, but a colony from another place. They are utterly unlike the New Britain, New Ireland, or Admiralty islanders, and where else they could have come from I do not know. They are copper-coloured instead of black, and have Jewish features. There is none of the flat-nosed, thick-lipped type about them, and their heads are better shaped than those of any of the natives round about. If they did not all suffer from skin diseases they would be a very fine looking people. It is possible they were more civil to me than they would have been to anyone else, owing to the fact of my acquaintance with Maclay, which I made the most of. They seem to fight very little among themselves. None of them were scarred like the Solomon Islanders, and the bows they sold us had evidently been out of use for a long time, and had all new cane strings. There seemed to be very few weapons of any sort in any of the houses I went into.

No doubt there must be very fine land up the rivers. Indeed, up the valley of the Gabina Hiver we could see plains stretching for some twenty miles or more.

The natives of New Guinea vary very much in appearance and language. It may be roughly said that in the east and west they are fair skinned small men; and that in the centre they are powerfully made black men, probably the true aboriginals; while their neighbours are colonists from other places. They are always fighting amongst themselves, and as a rule the black men have the best of it, as their weapons are superior and they keep themselves in constant practice

I have found, also, that the black men are more to be trusted than their fair skinned neighbours, in spite of their being cannibals, which the others, as a rule, are not.

The population of the country has been estimated at between three and five millions, Some parts of the interior are densely populated by wandering tribes, so that it is difficult to form anything like a correct estimate. Mr. Chalmers, who should know more about the country than anyone else, believes the population to be about three millions. In conclusion, I must apologise for the rambling nature of this paper, and thank you once more for the honour you have done me in asking me to read it.

The Chairman referred to the lucidity of Mr. Romilly's paper and the pleasure it had given the members in listening to its reading.

Mr. Thomson said that after the reading of a paper it was usual to invite discussion, and thought it was very desirable to do so, as it made the subject more [*unclear:* interii-üno] to the members and more satisfactory to the author. Referring to that part of the paper which described the native of New Guinea. he had travelled over a great portion of the South Sea Islands, many places frequented by the author himself, and had associated much with the natives, and being a keen observer of human nature generally, he had taken great interest in studying the habits of the natives, and considered that while they could be trained to make excellent servant when away from the influence of their own tribes they are naturally inclined to be treacherous when influence [*unclear:* ane] by a close association with their own people and could not be trusted like a European

In the absence of the author, the hon. Secretary read a paper entitled

# Western Tasmania.

BY MR. T. B. MOORE, New Norfolk.

Although Tasmania ranks as the second settled colony in Australia, yet it is only within the last few years, owing to mining enterprise, that the western portion of the island has become permanently populated and partially explored. I avail myself of the opportunity, this evening, to give a sketch obtained by personal observation of the physical features, resources, etc., of this comparatively unknown region.

In 1876, Mr. C. P, Sprent, Deputy Commissioner of Crown Lands, then district surveyor, on behalf of the Government, led the first expedition to Mount Heemskirk, from the north coast, *viâ* Mount Bischoff and the

Parsons Hood, the extreme southernmost termination of the Meredith Range. Mr. Sprent made many interesting discoveries, and reported favourably upon the mineralogy of the country, which naturally excited the minds of the enterprising spirits, and in the following summer three expeditions were formed to explore the *terra incognita* Two of the parties proceeded by small sailing crafts, and landed their effects at the Pieman River and Macquarie Harbour, where they commenced their explorations, the vicinity of Mount Heemskirk being the centre of attraction. The third one, under my leadership, had the honour of first crossing the island from the south, *via* Lake St. Clair, the Eldon Range, and Mount Dundaas. Along this route, endowed by nature's most lovely charms, discoveries were made of numerous small picturesque lakes, dashing torrents, and high rugged mountains. Minerals were discovered and land selected by each party, the result of these finds being an influx of population and the permanent settlement of the coast generally.

Western Tasmania is divided from the other portions of the island by continuous chains of high mountain ranges, commencing in the north in the granite peaks of the Meredith Range, followed by the eon glomerate-capped Silurian heights of the West Coast and Elliot ranges, and terminating in the white cliffs of the Willmot, Franklin, and Archer ranges. These insurmountable barriers attain heights of between three to four thousand feet above the sea level, and run parallel within fifteen to twenty tuiles of the coast line.

Owing to the inaccessible nature of these massive piles of rock only three practicable routes for overland communication have been discovered. One in the northern part taps the important gold deposits of the Pieman district, and has a commencement at Mount Bisehoff, *viâ* the north end of the Meredith Range. A central track leading from the vicinity of Lake St. Clair I had the honour to discover in the summer of 1883, when exploring for the Government. This passes between Mount Lyell and Mount Sedgwick, through the only accessible saddle in the West Coast Ranges, and, after following a dividing spur situated along the auriferous zone of the King River goldfields. terminates at the Macquarie Harbour.

The most southerly one to Port Davey starts from the township of Victoria, and. after following the course of the Huon River for a considerable distance, passes through a splendid opening between the Franklin and Arthur ranges.

As yet horse traffic has only been attempted on the Pieman route, the Other proposed lines of communication being merely used by explorers, no roads or horse track having as yet been constructed, but an expenditure of public money ¡a voted for opening out the central thoroughfare during the coming summer.

By examining the map other ranges may be observed to be charted within a short distance of the coast. The first of these, north of the Pieman River, are the quartzite and conglomerate rocks of the Norfolk Range; south of that stream the granite slopes of Mount Heemskirk; and between Macquarie Head and Port Davey the slate, schist, and quartzite formations of the D'Aquilar, Junction, and De Witt ranges.

## Rivers.

This densely timbered and mountainous tract of country it intersected by largo rivers flowing from the interior, which, after passing through lofty precipitous gorges in the Coast Ranges, traverse the lower-lying country in deeply cut channels and ravines. All the entrances to these streams, with the exception of the Gordon River, are obstructed by sand bars. The Arthur and Henty rivers at certain seasons are so completely blocked by these treacherous barriera that a traveller with sufficient caution can cross dry-footed, yet not without experiencing the feeling that he is sinking to eternity. The Gordon and Pieman are the only navigable streams; the latter, emptying its waters into the Indian Ocean, is exposed to the prevailing westerly and north-westerly winds, it has also the disadvantage of a difficult entrance, with a bar covered by only two and a-half fathoms of water, over which in boisterous weather it is impossible for vessels to pass; but this, dangerous obstacle once over there come deep reaches, in places one-quarter of a mile wide, extending inland for twenty miles, where ships of any tonnage might safely float.

Further along its course, its channel being shut in by precipitous banks from two to four hundred feet in altitude, the flood waters caused by torrents of rain and thaws of snow on the inland mountains have no outlet, there by raising this river, and many others on the coast so situated, sixty feet above the ordinary level, and sometimes leaving the boat of some unhappy prospector thirty or forty feet high and dry in the fork of a tree. The Gordon flows into the south-east corner of Macquarie Harbour, and is navigable for thirty miles. It is, without exception, the grandest and most picturesque river in the island, for the monotony of the densely timbered high hanks of the other streams is varied by large pine and blackwood covered Hats, beautiful cliffs of black limestone intersected by veins of calcspar, small wooded islands, and lovely views of distant mountains.

## Harbours.

The coast line bears towards the south-east, and is formed of successions of soft sandy beaches, backed by stunted scrub covered dunes; craggy cliffs of quartzite, slate, serpentine, limestone, and granitic rocks, ranging from fifty to one hundred and fifty feet in height, sometimes found jutting out into the sea, with huge isolated detached masses, boldly defying the angry ocean; and scattered here and there high ranges stand out in bold relief a few miles from the shore. Toward the southern part the outline is even more rugged, where barren hills rise perpendicularly from the waters of the ocean. Here and there are two large indentations—namely, Macquarie Harbour and Port Davey. The latter is the only harbour on the coast where large ships can enter; it is a magnificent sheet of water, completely land-locked and sheltered by high quartzite ridges. Near the entrance to the Davey River, located in the north-east portion of the harbour, a settlement was formed many years ago by men engaged in pine cutting, but owing to the exhaustion of that valuable timber in places of easy access, and an in hospitable climate, all that now remains of that busy settlement is a deserted village, with decayed and desolate huts and once well kept gardens grown wild. About a quarter of a mile from the narrow rocky entrance of Macquarie Harbour the soundings average two fathoms; but as this ocean bar is protected by a long point formed by Cape Sorell, small steamers are able to cross and enter in unless the weather is exceptionally stormy. The harbour extends twenty miles towards the south-east, and its northern shores are formed principally of raised beaches and upheaved submerged forests, where, embedded in blue clay, may be found huge tress of semi-lignite containing impressions of existing plants. Here we do not find the bold outline or the grand scenery of Port Davey; yet beautiful bays and inlets covered with flocks of black swan, jutting promontories, small timbered Islands, and distant views of prominent mountains everywhere delight the eye of the traveller.

On Sarah Island, situated in close proximity to the outlet of Birch Inlet and lying opposite to the steep spurs of Mount Sorell, the extreme southernmost point of the West Coast Range, a penal settlement was formed in 1822, but after twelve years was disbanded, and now ruined dungeons, decayed log-constructed docks, tall fruit trees clad with the Macquarie Harbour vine *([unclear: MwktenbtcHa ad pressa])*, half hidden by luxuriantly growing raspberry canes and English rye-grass, are the only indications and monuments of prison work, and of the first population on the West Coast. For a lapse of over forty years the natural beauties of this lovely spot remained undisturbed by civilization until the mineral discoveries at Mount Heemskirk brought enterprising miners and citizens to Long Bay and Swan Basin, who have erected two small townships on a large area of land now reserved and surveyed by the Lands Department for the future town of Strahan.

Trial Harbour is a small open rock-bound bay, exposed to the prevailing winds, therefore impracticable for navigation except in extremely fine weather; being only two miles distant from Mount Heemskirk, it served as the main depot for landing the heavy plants used in classifying and crushing the tin ores of this locality, and consequently saved mining companies a large expenditure which would have been entailed if their machinery had been brought over the soft beaches and treacherous Henty River from Macquarie Harbour.

The only other inhabited port is the Pieman River, settled immediately after the stanniferous discoveries at Mount Heemskirk. Yet there are other slightly known inlets in which fishing and piners smacks frequently anchor with sufficient safety in stormy weather, and there is little doubt that these small havens will eventually become as useful depots to future mining districtsas Trial Harbour has been to Mount Heemskirk,

## Timber and Scrubs.

The coast line is fringed by stunted scrubs of ti-tree and banksia matted closely together, but the lower-lying broken country for the most part is covered by forests of myrtle *(Fagus cunninghami)*, sassafras *(Atherosperna moschatum)*, celery, top pine (*Phyllocladus rhomboidalis)*, and many species of the eucalyptus. with an undergrowth of dense scrubs of shrubs of many different genera, some bearing lovely blossoms and foliage, or berries of all hues. Of these the wharata *(Telopea truncata)*, native lilac *(Prostanthera rotundifolia)*, climbing heath, and native laurel *(Auopterus glandulosus)*, are the most lovely. The heath adds brightness to the sombre gloom of the woods, and of the above-mentioned plants is the only indigenous one to this part, and is found covered with bright green leaves and clusters of long scarlet flowers, fall decayed stumps or fallen giants of the forests. Twined together in a close network, defying the passage of mortal man without the aid of his axe or billhook, these forests are surrounded by impenetrable thickets of horizontal (*Anodopetalum biglandulosum)*, ti-tree *(Leptospernum lanigerum)*, native rose (Banera *rubioides)*, scrubs forming barriers so harassing and detrimental to surveying and exploration.

Long strips or patches of useless button grass *(Gonnoschcenus* [unclear: sphcerocejihalui]*)* country, in many localities, take the place of the scrubs. These open areas must not be mistaken for pastoral land, for not only is the soil of an unproductive nature but the coarse herbage unfits it for any use. The button grass consists of round tussocks from two to four feet in diameter and one to five feet high; it is found at all altitudes, in wet swampy flats, on dry barren ridges, or on the summits of high ranges.

Before being burnt the locomotion is excessively tiring for the traveller, who must either spring from tussock to tussock or sink deeply in the soft black slush, or when wending his way on the higher lands has to wind his course between the tussocks, so as to avoid being tripped by the entanglement of long wiry leaves. The prospector hails the sight of this country with delight, for when fired it burns furiously and sweeps the scrubs of hated banera, always found adjacent to its edge for miles, and gives a freer passage and a sight of mother earth to the searchers of mineral wealth, besides freeing the land of destructive pests and venomous snakes.

Along the large flats and brinks of the rivers, the graceful white blossomed pinkwood *(Eucryphia billardieri)*, the pyramid-shaped pencil cedar *(Athrotaxis selaginoides)*, and valuable black wood (*Acacia melan-oxylon)*, King William (*Athrotaxis cupressoides)*, and Huon pine *([unclear: DaciyiKitin fmniii'tii])*, beautify and add wealth to this barren country, for more durable woods for ship-building and furniture-making cannot be obtained in Australasia than the far famed logs of blackwood, King William and Huon pines, exported during the last half century from the western streams to the other colonies.

Of late years the Government have altogether restricted the whole sale slaughter of the pines, supposing that the supply would soon be exhausted by the reckless destruction of young timber. In this respect the conservation was a wise legislation, but the absolute restriction is a mistake, because it has been a crushing blow to the development of mineral wealth. Formerly small crafts could afford to bring necessary supplies at cheap rates, if a return load of pine was obtained, thereby saving the exorbitant dues now paid for the charter of steamers, who are obliged to return homeward bound empty laden. It is also a mistaken idea to imagine that the pine is on the eve of extinction, for on many of the rivers and their tributaries I can vouch from personal knowledge of the existence of extensive beds of Docydium franklinii.

In a country so excluded and shut off from the settled districts by the want of overland communication, the Governmental powers ought rather to have fostered the principal resources than put obstacles in the way of development, which might have been easily obviated by forming stringent regulations and insuring sufficient supervision to prevent the wasteful cutting of timber and needless destruction of small trees.

Many of the mountains are completely hidden by the variable foliage of alpine shrubs. The one most peculiar to this district is the Fagus gunnii, the deciduous tree indigenous to Australasia; its habitat is on the snow-covered heights of the Western Ranges, where it grows in dense patches, attaining an altitude of four to twelve feet. No other locality in Tasmania produces a more beautiful variety of rare ferns; notably among these is the Aspidium hispidum, growing in greatest profusion in the gullies of the Pieman district : it was first described as a new species in Tasmania through the instrumentality of Mr. George Lefroy, but discovered years previously to his visit to the West Coast. The Macquarie district wholly claims the delicate Lindsaya trichomanoides, which is found in the sunshaded chasms of the West Coast Range and occasionally met with south of the harbour in deep valleys.

Two of the rarest filmy ferns, new to Tasmania, were brought from this locality into the settled districts by myself in 1883. I had hoped that one of the species might have proved a new discovery to the world; fronds were forwarded to Baron von Mueller for determination, and the illustrious botanist concluded that the first was the rare Hymenophyllum marginatum, one of the smallest filmy ferns, hitherto only known in localities in the neighbourhood of Port Jackson, New South Wales. The Other, a tomentose little fern, gathered from the bark of the King William pine, proved precisely identical with Hymenophyllum malingii, hitherto only known from New Zealand.

## Agricultural Land.

Western Tasmania is destitute of any extensive areas of agricultural land, and the Government, instead of encouraging settlement, have unwisely reserved the whole district for mineral purposes, thereby shutting out the small farmers from selecting the patches of rich deep soil met with on the shades and banks of the. harbours and rivers : and where there might have been comfortable little holdings to be a help and stay to the mining industry the lands lie untilled, and not one cultivated paddock can be found in this quarter of the island.

The existence of grass is only found on the sandy hummocks along the coast, growing in rough tussocks, quite unfit for pastoral purposes, even if the areas were more extensive.

The rivers are stocked with a plentiful supply of fresh water fish, although the variety is not numerous and those fish only worthy of notice are the eel, herring, lobster, and black fish. Three species of eels abound in all the streams, and to estimate the quantities that can be caught may be instanced the fact that a friend and myself have bagged eighty, weighing from one to four pounds each, during a few hours' fishing in the evening. This haul was made during a time that Mr. O. Meredith and myself were the only inhabitants on the West Coast. We had made our way overland with the expectation that a vessel which had preceded us with men and supplies would be able to cross the Pieman bar, but owing to [*unclear:* seu'ie] westerly gales she did not perform her mission until two months had elapsed. During six weeks of this time we had to invent means to secure food, and subsisted almost entirely on eels, crawfish, and black swans. Although living like aborigines in this precarious fashion many a pleasant evening was spent on the river fishing, or with a punt full of waddies excitingly chasing and pulling down the flapping moulting swan, or spending a happy day in the seaweed gulches of the coast, capturing an abundant supply of crawfish. We both agreed that the eel had the most sustaining and nourishing properties, and instead of [*unclear:* riring] of their constant use we became excessively fond of them; and hooking a large one of six pounds weight on Christinas eve, as a treat, saved it for our dinner next day, and relished it with perhaps as much gusto as if we had been feasted on the national dish of old England. The herring *(Protocroctes [unclear: viarirnu])* is the most delicate and delicious fresh water table fish in the colonies, and affords excellent and exciting sport to anglers. They frequent the shallows and rapids of the large rivers, and may be seen especially in the early morning and evening swimming in large shoals and throwing their bright silvery bodies out of the water while in hot chase after an imprudent white moth, their principal food.

Since the importation of the English brown trout *(Salmo fario)*, these beautiful little luxuries have become almost extinct in the once famous herring fishing streams of the south, and all Tasmanians hail with delight the proposed scheme of Mr. Saville Kent, the inspector of fisheries, to artificially breed and restock these streams with the locally called cucumber mullet. The lobsters *(Astacopsis franklinii)* are not plentiful, and as yet have only been captured in the Arthur, Pieman, and Gordon rivers.

The black fish *(Gadopsis marmoratus)* was supposed to be confined to the northern rivers; yet one western stream, the Arthur River, has an abundant supply. They may be captured in the evening, in still pools, sluggishly swallowing the bait.

The flounder, sole, ling, skate, and rock cod frequent the salt waters of the harbours, and the excellent trumpeter *(Lartis necatelu)* and crawfish the deeper waters of the ocean bays.

# Animals.

The tiger *(Thylacinus cynocephalus)* and devil's *(Sarcophilue ursinus)* chief habitat is on the coast, principally in the undisturbed portion south of Macquarie Harbour, where they find sufficient prey in kangaroo *(Halmatarus bermettii)* and wallaby *(Halmatarus billardieri)*, only found in small numbers, picking up a living on the coarse grassed hummocks.

Tiger cats (*Dasyurus maclatus)* overrun the woods, and are the scavenger and most plucky animals of the forests, and unlike the cowardly snapping tiger, fight bravely to the last. The sleepy wombats *(Phascolomys wombats)* roam over the button grass plains, making their domiciles under the shade of the thickly thatched tussocks, or burrowing long underground tunnels at the edge of the forests, They are numerous in all parts, and often prove good friends to the provisionloss pioneer and miner. On one occasion, when my supplies were unavoidably delayed, myself and brother travelled over the Western Ranges, and subsisted entirely for five days on roast wombat; and many other cases may be instanced where life has been saved by the use of their flesh, which is not to be despised, and surpasses the insipid preserved meats and soups so commonly used in the

It is only within the last two years that many of the smaller animals of Tasmania found in the unpopulated regions have become known to the zoologist. Dr. Higgins, and Mr. Petterd, of Launceston, undertook the work of description, and solicited collections of specimens from every locality in the island, and in many instances received entirely new species. Being on the West Coast at the time, and always anxious to forward any scientific investigations, I collected all the varieties of kangaroo rats, antichians, and rats that came under my observation. Four of them proved to be new species to the island, and described by "Dr. Higgins, in a paper read before the Royal Society, as follows :—Red kangaroo rat *(Potorous rufus)*, Antectinus moorei, Mus castaneus, and Mus pachyurus.

# Minerals.

Inferences may be drawn that this beautiful wild waste, with its limited area of rich soil and timber lands, will remain a natural wilderness with a sparsely scattered population unless the mineral resources are developed. The day will come, and not at a far distant date, when men of all nationalities will be enticed to the golden west in search of wealth. I speak from practical experience of the country, the result of extensive exploration; and have we not also the predictions of greater men, the renowned geologists, Cuout Stezlecki, Clarke, and Gould, who maintain that this will become one of the richest mineral parts of Australasia, but one of the last to be developed? The strata in the Pieman and Heemskirk districts has a strike of about 10° E. of N., but in the Mncquarie and Port Davey portion about the same variation to the westward. The formation generally belongs to the Silurian epoch, containing zones of productive auriferous country, highly remunerative in parts, but in others almost barren. Stanniferous masses of granitic rocks oceur in many places bursting through the other strata.

The Pieman River goldfields commence a little north of the Long Plains, and are situated between the granite slopes of the Meredith Range on the east, and the quartz and conglomerate cliffs of the Norfolk Range on the west; the auriferous belt is four miles wide and extends for twenty-four miles S. E. to the Pieman River, At the base of these ranges two large Streams, the White and Donaldson rivers, cut the surrounding strata in deeply worn channels. A third stream, the Savage River, flows through the intervening country, and between it and the White River a long dividing spur extends south to the Pieman Range. This spur comprises a series of tertiary gravels of the pliocene epoch, resting on a micaceous schist bottom, and overlaid by a more recent quartz conglomerate, cemented together with a siliceous binding. These tertiaries or ancient rivers have partly been encroached upon by disintegration and denudation, and the watercourses; these gravels now form the secondary washes, mined at one time with such good result.

The more recent streams rise from the breaks, and furrow othe sides of the dividing spur; and from these shallow, easier worked, secondary deposits gold has been traced to the older tertiaries; but owing to the little encouragement given by the mining regulations to prospectors, when this field carried a large mining population of miners, little attention was paid to the heavier and more lasting auriferous depostis.

The quality of the gold of this district is of a high percentage of purity, and is dissimilar in character to any discovered in Australia; it is beautifully crystallized in deulrictic plates of united crystals, or clusters of the large crystals formed in to suggest . Associated with it are quantities of the rare minerals, iridium and [unclear: osiri] and at one time it was thought that these [unclear: heaver] metals exceeded the commercial value of gold but sample of them being sent to England the returns showed that, instead of increasing, it diminished its value, as the great weight and infusibility of the associates were detrimental to easy extraction of the precious metal.

Only two auriferous reefs have been discovered in this district, and owing to the difficulty of road making this more permanent branch of the mining industry has not as yet been fully established. Besides the before-mentioned metals large lodes of specular iron follow the strata of the country; and smaller veins of carbonate of copper, asbestos, graphite, and galena are occasionally met with in quantities not sufficient to be remunerative.

The King River gold fields are situated in the same zone of silurian rocks, but considerably farther south, at the western base of the West Coast Range, and are at the present time absorbing most of the attention of the speculators and miners of this portion of the island. The zone follows the valley of the Queen River, and in this stream, and in many of its eastern and western tributaries, rich patches of alluvial gold, shed from quartz veins, in close, proximity, have been worked with satisfactory results. But, unlike the Pieman district, this field has not the promising indications of deep leads; yet there is every appearance of its becoming a rich reefing country, and until there is further expenditure on the miserable tracks from Macquarie Harbour it will remain undeveloped for as many more years as it has been since its discovery. In 1882, Mr. C. Lynch, the first discoverer, a most energetic prospector, succeeded in tracing the gold from the alluvial flats to a rich reef, from the cap of which one hundredweight of specimens was taken and forwarded to Hobart; on being assayed, a yield of nearly two ounces of gold to the pound of stone was obtained.

The principal stanniferous deposits occur in the granitoid rocks, porphyries and metamorphic schists of the Heemskirk Range and surrounding hills. The tin ores are beautifully crystallized and considerably associated with tourmalines and chlorites : they are found in impregnations, bunches, or solid leader masses in variable lode stones. Other minerals are found in small quantities associated with the veins of cassiterite; principally among these are galena, copper, bismuth, and molybdenite.

Great excitement prevailed for a few years after the discoveries were made, and large syndicates were formed to work many of the multitudinous sections applied for and leased from the Government; expensive plants of crushing and classifying machinery were erected before the mines were properly opened out or tested; a wild over-speculation ensued, and before any legitimate mining was done or any of the lodes proved a crash came and destroyed for a time the prospects of this grand stanniferous country.

The western granite base of the Norfolk Range and the northeastern slopes of the Meredith Range have also been unsuccessfully worked for tin ores, but not in such an extensive or expensive a mode as the deposits of Mount Heemskirk.

Large lodes of galena found within the last few years at Mount Zeehan, and reported favourably upon by the Inspector of Mines, promise to become a lasting resource to this district.

South of Macquarie Harbour is the least known part of the West Coast Still here there are good indications of gold, silver, and copper country, and it only requires time, money, and a helping hand from the ruling powers to change this district and the whole of the West Coast from a sterile waste to the most populous and thriving mining territory of Tasmania.

The Chairman spoke in favour of the paper just read, and quoted many instances referred to therein from his own personal experience in Tasmania, when examining the gold mining features of the West Coast.

On the motion of Mr. J. P. Thomson, seconded by Dr. Waugh, a vote of thanks was passed to Messrs. Romilly and Moore for their papers, and the meeting then closed.

Front Cover

An Account of the Chief Libraries of New Zealand.

An Account of the Chief Libraries of New Zealand.

With an Appendix

Containing the Statutes Relating to Public Libraries in that Colony.

By C. W. Holgate, B. A.

Member of the Library Association of the United Kingdom, and bellow of the Royal Colonial Institute.

decorative feature Dryden Press: J. Davy and Sons. 137, Long Acre, London. 1886.

*Price One Shilling and Sixpence*.

Dedicated with the Greatest Respect to Sir George Grey, K.C.B.

# Introduction.

SHORT as this pamphlet is it requires a brief introduction to explain its origin and purport.

In 1884, I spent some months in Australia, and as I visited the chief towns in all the colonies except West Australia, I inspected the various libraries therein, and recorded all the information which I could gather with regard to them in a paper, which I sent to England, and which was read for me at the Annual Meeting of the Library Association of the United Kingdom, held at Dublin, in October, 1884.

That paper, owing to various causes for which I am not to blame, awaits the publication of the annual volume of the Transactions of the Association for 1884.

After leaving Australia, I spent nearly three months in New Zealand, going through the islands from north to south, and visiting all the chief libraries, and the results of my investigations are contained in this pamphlet.

With the exception of those marked with an asterisk, I visited all the libraries described, and I have to thank their librarians for their courtesy, and for the kind assistance which they gave me; and I also thank those other gentlemen to whom I wrote for information, for their letters, and for the reports, catalogues, &c. which they sent me.

I have endeavoured from the information thus obtained to give a short account of the various libraries, not so much with a view to comparing them as to place on record their position and value, at a time when intense interest in all the colonies, and their institutions, is being shown by the mother country. I trust that the addition, by way of an appendix, of the Acts of Parliament relating to Public Libraries in New Zealand, may be useful to librarians in that colony, and interesting to those who have a taste for library matters.

I had at one time intended to add a list of the newspaper press in New Zealand; but, as I find that Messrs. Gordon and Gotch have supplemented their invaluable Australian Directory by a Dictionary of the Australasian Press, and that Sell's Dictionary of the World's Press, and the Year Book of New Zealand, both contain lists of the chief newspapers, I have contented myself with recording the names of the daily journals of those towns whose libraries I have described.

Some unexpected work, since my return to England, has occasioned the delay in the appearance of these pages. I trust, however, that they will not on that account have lost all interest for my New Zealand friends, whose forbearance I ask for this and any other shortcomings.

I should mention that my account of the Auckland Free Public Library, formed the subject of a paper read before the Library Association, in April, 1886.

19th May, 1886.

# An Account of the Chief Libraries of New Zealand.

# Auckland.

decorative feature

The former capital of New Zealand; population, 30,952. *Daily Papers*—"New Zealand Herald," "Evening Star."

## THE FREE PUBLIC LIBRARY.

## Edward Shillington, Librarian.

THIS, the first and destined to be the greatest of the public libraries in New Zealand, was the first of the libraries in this colony which I visited on arriving from Sydney in November 1884, and therefore with a short account of its history I will commence this paper on New Zealand Libraries.

The attention of visitors to Auckland arriving by sea is at once drawn to the existence of a Free Public Library by a large printed notice-board on the weighing-office of the harbour, announcing the locality and the hours during which the library is open, by order of the Town Clerk. I will endeavour to give a brief account of the earlier history of this library, as told me by the courteous librarian, Mr. Shillington, which I think deserves to be recorded, because ere long the library is to be moved to new and handsome buildings, now in course of construc- tion, and the early struggles of the library will be forgotten when it is located in its new home and enriched by the "Grey" collection.

It appears that a Mechanics' Institute and Library was first established in Auckland in 1843, and lasted until 1880, when the ratepayers of the city determined to adopt the provisions of the Public Libraries Act, and the library of the Institute, which had known many ups and downs, was merged in the collection of works placed upon the shelves of the then created Institution. The subscription to the Mechanics' Institute had been *£1* per annum, and a classified catalogue of its library was published in 1871. There was also, from the first days of the Provincial Councils in New Zealand until their abolition in 1876, a library belonging to the Council of the Province of Auckland. This contained some very valuable works, but access to them was confined to members of the council and certain other privileged persons only, for a period not exceeding three months at a time. The library was open daily from 10 a.m. to 4 p.m., and a classified catalogue of its contents was published in 1873. When the Free Public Library was created in 1880, the Provincial Council Library was amalgamated with that of the Mechanics' Institute, and formed the nucleus of the present library. It is now necessary for a moment to refer to the several Acts of the New Zealand Legislature which enabled the present library to be created. In 1869 was passed the 32 and 33 Victoria, No. 67: "An Act to promote the Establishment of Public Libraries." This Act was supplemented in 1875, by the 39 Victoria, No. 88, "The Public Libraries Powers Act," and in 1877, was passed the 41 Victoria, No. 47, "The Public Libraries Subsidies Act." In the appendix to this paper will be found the above Acts printed *in extenso*, from which my readers will be able to gather what provision exists in New Zealand for the creation of Public Libraries. In the year 1880, the people of Auckland determined to take advantage of these Acts, and on September the 7th, 1880, the present building was opened as a Free Public Library by the Mayor, Mr. Thomas Peacock.

At the same time, Sir George Grey, K.C.B., whose name must be for ever associated with every movement of progress made by New Zealand, promised in due time to give his own valuable library at Kawau to the Auckland Free Public Library. Those of my readers who have visited the Public Library at Capetown, and who have seen the Grey collection there, or who know of it by reputation, will easily understand what Auckland has to look forward to; for the collection to be presented to this city is in its way quite as valuable as that presented to Capetown by Sir George Grey in 1861. But before saying more at present about Sir George Grey's munificence, I must briefly describe the library founded in 1880, which is so soon to be a thing of the past.

The present building is situated at the corner of High Street and Chancery Lane, it is a wooden structure, and was formerly the entertainment hall of the old Mechanics' Institute, and about seventy people probably can find room to read in it comfortably. There is a small separate room for lady readers attached to it, and the librarian's dwelling is in the rear, but from no point of view did the building strike me as being suitable for a Library. However, it was, no doubt from the first, only intended to supply the wants of readers until funds could be found to build a more commodious structure, and the funds having at last been acquired, the building, worthy for the library which is to be, is now being erected. Despite many and grievous defects, the present library, has, thanks to the energy of Mr. Shillington, and of the Committee, who are well looked after by the Press, fought a good fight. It has also established a position of sound educational value, and created a real taste for reading and study, which no schools could ever have done, and it has effectually paved the way for the more thorough appreciation of the treasures which it is to inherit. The regulations in force when I visited the library in 1884, seemed wise, and were in good working order. It is open every day in the year except Christinas Day and Good Friday. On holidays however, it is only open from 7 to 10 in the evening, and on Sundays from 2 to 9.30 p.m. Silence is enforced, smoking prohibited, books are not allowed to be taken off the premises, and readers are requested to leave on the tables—for the attendant to replace—any books they may have taken from the shelves. Persons under 14 years of age are not admitted; a lavatory is provided, and readers are requested to use it, to prevent as far as may be the soiling of the books by dirty hands.

The library opened in 1880, with about 5,000 volumes upon its shelves, the larger and most valuable portion of which had belonged to the Provincial Council. At the end of 1883 there were 6,186 volumes in the library, 621 having been added during the year; at the end of 1884, 6,620 was the total, and at the end of 1885 the total was 6,751 volumes. Biography is the largest class of literature on the shelves; then comes history, and then science, and then fiction.

Commenting on the report for the year 1885, presented at the beginning of last December, the *New Zealand Herald* of 17th December, 1885, has the following passage in a leading article, which I think is so much to the credit of the library that I give it *in extenso*:—"On some former occasions we took the opportunity of commenting on the tendency to spend money in undue proportion on light literature, to the prejudice of works of standard merit. This tendency, however, cannot be said to exist now; and it is most gratifying to learn that it has been removed by gradual but steady improvement on the part of those frequenting the library.

"To this, the report of the Librarian, which appeared in our yesterday's issue, bears explicit testimony. After enumerating the different classes of books contained in the catalogue, he says that, whereas fiction held the sway until within the last year or so, not more than thirty per cent, of books in this department are now in demand; and, that even under the head of fiction, while the writings of well-known authors such as Dickens are much perused, sensational writers are seldom asked for. The most popular section of the Library is that which comprises such subjects as architecture, agriculture, botany, geology, chemistry, engineering, mining, mechanics, manufactures, painting, engraving, etc. These are precisely the works which are calculated to advance the culture as well as the practical education of the people; and it is pleasing in the extreme to find the Librarian state in his report that the calls for works on the above subjects are very much greater than the library, in its present limited state, is able to meet. Works of reference, we are told, are also much in request, as well as those on history, travel, law, poetry, and even theology. This report, as a whole, certainly gives one of the most satisfactory accounts of a public library that has come under our notice for a considerable time past. It contains a high compliment to the growing taste of the reading portion of the community, and shows incontestably that books of the highest merit will, if placed within their reach, be in the end always preferred by the great body of the people. It moreover shows very clearly the direction in which an addition to the volumes at present in the library is most urgently called for, and ought to render the task of selection, referred to by the Mayor, one of comparatively easy performance. With the treasures which generous donors have already conferred on it, to be yet followed by similarly noble gifts, and, with the taste of the people encouraged to observe the line it is now pursuing, the time is not remote when our Free Public Library will take a leading place in the list of our civic and educational institutions."

The library is visited by over 600 persons daily on week days, and by over 300 on Sunday afternoons, according to the most careful estimate. A book is kept, in which readers and visitors are requested to sign their names, and during 1883, 3,000 persons appended their signatures. There is at present no printed catalogue, nor is there likely to be until the new buildings are opened, and the Grey collection added. Since 1880, however, Mr. Shillington has, unaided, and with great labour, prepared a manuscript catalogue in two parts: the first of authors, with press marks given; the second, an inventory of the works arranged alphabetically by short titles, and there is also an elaborately prepared index. There are several weak points connected with the library as it now is; first, it has inherited a good deal of useless literature from the old Mechanics' Institute; secondly, the sets of works and odd magazines on the shelves are not so complete as they should be; and thirdly, the collection of works relating to New Zealand, and of the early newspapers, is poor.

It seems to me most desirable, and most important, that this library which is destined to become the greatest in New Zealand should at once, and at whatever cost, make good this last defect. The cost will be considerable no doubt, and the difficulty in getting complete files of the early newspapers for binding, and of early pamphlets relating to the colony will be great, but both cost and difficulty could and should be overcome in such a pre-eminently desirable, nay, even necessary undertaking.

The management of the library is in the hands of a committee of the City Council, the Mayor being president. It is supported by a halfpenny rate, and at the outset its income did not exceed £300, but on the enlargement of the city boundaries in 1882, the rateable population of Auckland was largely increased, and the rate now produces about *£560*.

In 1882, Parliament placed *£6,000* upon the estimates for distribution amongst public libraries, by the Education Department, and the Auckland Free Public Library received £155 8s. id., but since that year the maximum grant has been limited to *£50*.

In 1883, a munificent bequest was made to the Auckland City Council by Mr. Edward Costley, part of which was directed to bedevoted towards building a Free Public Library and Art Gallery. The matter has been taken in hand, and has been progressing ever since; when I was in Auckland designs had been called for, and about forty had come in, the best being by a firm of Melbourne architects, but I did not hear which was eventually chosen. However, the actual building is at last started, the first stone having been laid on the 5th June, 1885, and I hope that in the course of this year the citizens of Auckland may boast of a handsome new building and a valuable library.

George Augustus Sala, who visited Auckland last year, in one of his contributions on "The Land of the Golden Flcece," to the *Daily Telegraph*, speaks with some interest of the new library, which he says is approaching completion, and I learn from the *New Zealand Herald* that the internal fittings of the library, and the judicious expenditure of the book fund to replenish the ample space in the new building, are now the subject of the anxious consideration of the committee. I may fitly mention here that the *New Zealand Herald*, and the *Auckland Evening Star*, the two daily papers of this city, have persistently and ably championed the cause of the Free Public Library, pointing out unsparingly its defects of management, supervising its financial affairs, and encouraging its progress as a great educational institution.

I must now go on to say a few words about Sir George Grey's valuable library. The promise of this gift was made in 1880, but as there were then no means of housing and utilising the collection, it remained, and remains till the new library is ready, at Kawau, the island home of this veteran statesman and man of letters. On June 5th, 1883, Sir George Grey delivered an address to the citizens of Auckland, in the Theatre Royal, on "The Principles which should guide the citizens in founding a Free Public Library." This address was afterwards published in pamphlet form, and the author was kind enough to send me a copy of it. I can commend it with great confidence to all librarians. It is very pleasant reading, and it contains interesting accounts of the acquisition of some of the treasures in the collection, but the most valuable part is that which explains the favoured position of Auckland as a centre from which "to flood the Pacific with learning, and to dominate with a just and righteous supremacy—not of tyranny, but of intellect—over the great extent of islands which surround."

Sir George Grey, in writing to me, explained the reasons which had induced him to found the library at Cape Town, and he goes on to *say*, "New Zealand appeared to me to occupy a similar position with regard to the Pacific Ocean; situated alone in a great waste of waters, and destined largely to influence the numerous coloured and only partially civilised races which lie to the north of those islands. For New Zealand also, I therefore wished to provide a similar equipment, and I have done my best to give such an outfit for these two great outposts of civilization for the Southern Hemisphere." In his address, he further urges the necessity of founding a library fitted to cultivate persons of many nations, who will throng to the future capital of a great ocean; and he shows how by placing his choice, and in many cases unique books and Mss. at the disposal of the library, the learned from all parts of the world will be compelled to visit Auckland "to drink at sources of knowledge which they can obtain in no other place." This pamphlet is well worthy of the attention of librarians as an eloquent piece of special pleading in behalf of free public libraries, from one whose knowledge of books is as great as have been his good fortune in acquiring them, and his readiness in making them available to all students and bibliophiles. Froude, and Baron von Hübner have their words of praise for this library in their recent works, having been privileged to sec it and its owner at his charming island home. I shall always regret that I was not able to visit Kawau, and learn from the collector and owner more of the history of the formation of this library; Sir George Grey, however, in answer to my request for some particulars, kindly wrote to me at some length, and told me of his treasures, amongst which are several early Mss., a considerable number of Caxton's and early printed works, tall copies and first editions, and not a few State Papers. One of the most interesting items is a series of draft despatches to foreign Ambassadors, written by Thurlow, and corrected in some cases by Oliver Cromwell's own hand.

I do not think I need, in a paper like this, attempt to give a long list of the treasures of the English and other presses which Auckland is soon to possess, these will be duly catalogued, and will be found to be perhaps of more value than I have made out. But I must add, that perhaps the chiefest treasures of all, will be found among the works relating to the languages of the native races of Australia and the Pacific Islands. Many of these are in Ms., and are from the pens of early explorers, missionaries, and others, and as Sir George Grey says in his address, the possession of them will give to those choosing to make use of the Auckland Free Public Library, the key to all the languages of Polynesia. Until the new library is completed, we shall have to wait for full knowledge of the extent, and value of the Grey library, for its six thousand volumes have never been catalogued; let us hope that we shall not have long to wait, but that with a worthy building, and with such a grand collection, there may arise someone able and willing to do the work of making it known to the world of students, through the medium of a good catalogue.

Sir George Grey writes as to the formation of his library:—"From early youth I have been a collector of books, and have been aided in my purchases by able men, such as Bohn, Boone, and Quaritch: I have had very valuable books given to me by persons in every rank of life: have had many books left me: have spent a good deal of money on books in most years of my life."

Lastly, I must mention that not the least valuable and interesting feature in the Grey Library, is the collection of autograph letters of distinguished men of the present century In his letter to me, Sir George says:—"As I have lived in an age of discovery and movement, to do this" (*i.e.* to form this collection), "was to preserve a record of the history of the world at a most interesting period, written in all the confidence of friendship by the men who made the history." Of these, and many more such treasures, as these, is the Free Public Library of Auckland destined to be possessed, and I think we may feel sure that a good use will be made of them.

## Supreme Court Library. William Crick, Librarian.

This library, which was commenced when the Supreme Court was first established in Auckland, now contains about 6,000 volumes of strictly legal works. It is open daily, Sundays and public holidays excepted, between 9 a.m. and 4 p.m., on Saturdays 9 a.m. to 1 p.m. The Supreme Court, occupies a fine site, nearly opposite Government House, and is a handsome building of red brick and stone; two small rooms in it are set apart for the library, these are already over crowded, and additional space for the due expansion of the library is much wanted. The library contains a good collection of English and Colonial law reports and text books. The English reports and new editions of text books, are sent out bound as soon as issued, from Messrs. Stevens and Haines, and so the authorities are kept up to date. All the works relating to New Zealand law arc to be found here, including the scarce work of James Macassey, published at Dunedin in 1873, of cases decided in the Province of Otago, between the years 1861-72; and the New Zealand Jurist, edited by Mr. G. D. Branson. It is only quite recently, in 1883, I think, that the New Zealand Law Reports, in the same form as the series of the English Law Reports, were started, under the auspices of the Council of Law Reporting for New Zealand, and edited by Mr. William Fitzgerald. This Council, which deserves to be mentioned for having introduced an uniform system of reporting of cases decided in the various courts of the colony, consists of ten members, viz., the Attorney and Solicitor-General, *ex-officio*; and two members from each of the cities of Auckland, Wellington, Christ Church, and Dunedin. A printed catalogue of this library was issued in 1874, sm. 8vo., pp. 106, but it is out of date, and the Librarian has accordingly prepared in manuscript a new one in two parts, the first of authors, the second of subjects; and it is ready for printing whenever the Council permits. Mr. Crick has also prepared some elaborate collections of reports in the leading provincial newspapers, of civil cases tried in the superior courts. These are of some value to the library, as there was apparently a period when the reports of cases were to be found in newspapers alone, which is but one more proof of the value of the early Colonial newspapers. The library is accessible to the members of both branches of the profession, and is supported out of the fees received for the examination of students, &c.

It may not be amiss to note here, that the two branches of the legal profession were amalgamated in New Zealand in the year 1869, by the Act 32-33 Victoria, No. 63, which created the New Zealand Law Society, an incorporated body with a common seal, and a council of not more than fifteen, nor less than nine members; all lawyers in New Zealand now, whether barristers or solicitors, are members of this society, and as such are qualified to carry on their profession. Since 1879, management of the library, has been in the hands of the Council of the Law Society of Auckland. This Society came into existence after the passing, in 1878, of the District Law Societies Act, 42 Victoria, No. 36, which was an Amending Act of the New Zealand Law Societies Act of 1869, already alluded to. By section 14 of the Act of 1878, it was provided that all fees payable under the Law Practitioners Act of 1861, and any Acts amending the same, should form one fund, and should be under the management of the Council of such District Law Societies as were created by the said Act of 1878, to be by them disposed of in the purchase and maintenance of law libraries, in such towns in New Zealand as the Council should direct, both for the use of the Supreme Court and any other court in that district, which the Council should approve of. It only remains to be said with regard to this library, that with additional space, and with a printed catalogue, it would be more accessible to students than it is at present, and as there is no lack of law students in Auckland, it is very desirable that both these requirements should be seen to.

## Auckland Institute and Museum.

## T. F. Cheeseman, F.L.S., Curator.

This Institution was founded in 1868, and the present buildings in Princes Street were erected in 1876. Besides the museum and art gallery, which contain interesting and valuable collections, there is a small library of about 3,000 volumes—mostly of a scientific character—which is accessible to all persons using the museum for purposes of study or reference. Amongst these 3,000 volumes, must be reckoned the best collection of works on New Zealand in Auckland, and possibly in the whole colony; these were the gift of a munificent donor to the museum, T. Mackelvie, Esq. The library is open on week days from 10 a.m. to 5 p.m., and Mr.

Cheeseman informed me that about ten per cent, of the persons visiting the museum, consulted the library. During the last five years the library has made considerable progress, due partly to its having lately been subsidised by the Government, under the Public Libraries Act. It shares to the extent of £10,000 in the Costley bequest to the city of Auckland, to which I have alluded in writing of the Free Public Library. I he trustees of the museum have lately acquired some extra land to the south of the present building, and propose to build on it before long. When they do so, new premises with enlarged accommodation will be devoted to the library. A classified catalogue of the library was printed in 1881, but a new edition will be wanted soon, as a system of exchanges with other scientific societies, as well as an enlarged expenditure, and some valuable donations, have increased the library very considerably.

### * Auckland Teachers' Library.

## Mr. J. L. Sinclair, Librarian.

This library, which is designed for the use of teachers in the State Schools, contains about 900 volumes of history, science, and general literature. It is maintained by an annual subscription of 5s. from head, and 2s. 6d. from pupil teachers, and has about 150 subscribers, half of which are women. Books are lent out for a period not exceeding a month at a time, and, on being labelled O. P. S. O. "on public service only," are transmitted free of charge by the post office. This library has a printed catalogue, issued in 1881. It is located in the Wellesley Street School, Auckland.

There is a branch of the Young Men's Christian Association in Auckland, established in 1855, with a building at the corner of Wellesley and Albert Streets. It possesses a library of 3,000 volumes, open daily to members of the Association from 8 a.m. to 10 p.m. Librarian, A. Nightingale.

# Napier.

Capital of the district of Hawke's Bay. Population: 5,756. *Daily Papers*—"Hawke's Bay I Ierald," "The Daily Telegraph."

### Napier Athenaeum and Mechanics' Institute.

## Mrs. Isabella Caulton, Librarian.

This institution was founded on the 3rd November 1859, but no arrangements were made for the reception of a library until 1863. The present library in Browning Street was opened in 1865, and the present reading-room in 1873. The institute was incorporated by Act of Parliament in 1876, and in September 1878, the reading-room was first opened on Sunday afternoons between the hours of two and five p.m. In 1879 the ratepayers of Napier were polled, to decide whether the Public Libraries Act of 1869 should be adopted, but the proposal was negatived by a majority of 64 votes. In 1882, new buildings at a cost of£300 were added; in 1883 the library received an addition of upwards of 1,200 volumes, and as many as 400 members were on the books. Another attempt was made this year to adopt the Public Libraries Act, but it was unsuccessful. At the annual meeting on the 30th July, 1884, the matter was again discussed, and it was resolved, as an experiment, to open the reading-room of the institute free to the public for a period of twelve months. The promoters of this movement desired to see to what extent, absolute freedom of admission to this portion of the Athenaeum, would be availed of. What result was reported at the annual meeting, in July 1885, I have not yet heard; I can only, therefore, say for myself that when I visited the Athenaeum in December 1884, I found an excellent supply of periodicals in the reading-room, and a fair supply of works of reference, and that I much appreciated the privilege of being allowed to make use of the room. The subscription to the Athenaeum is 21s. per annum; but persons under the age of fourteen are, if properly introduced, permitted to borrow books on payment of 5s-per annum. The reading-room is open daily from 9 a.m. to 10 p.m., and on Sundays from 2 to 5 p.m. It is closed entirely on Christmas Day, Good Friday, and New Year's Day. The library contains about 4,000 volumes, of which 1,400 are works of fiction. A printed classified catalogue (8vo, pp. lxxx. 79) was compiled and published by Percival Bear in 1884. About 3,600 books are borrowed during the year.

It is worthy of note that the present librarian is a lady—Mrs. Isabella Caulton—whose connection with the Athenæum extends over ten years. Napier Athenaeum has done good work in the past, and has still an extensive career of good work before it, whether the Public Libraries Act is adopted in this very pleasant little town or no.

# Wanganui.

Population: 5,000. *Daily Papers*—"The Wanganui Chronicle," "The Evening Herald."

## * Wanganui Public Library.

## W. C. Watkins, Librarian.

This library was incorporated under the Public Libraries Powers Act, 1875. The annual subscription to it is 21s., and it is open daily (Sundays and public holidays excepted) from 9 a.m. to 10 p.m. It contains about 3,000 volumes, and has a printed classified catalogue—8vo. pp. 115, issued in 1878, price is. The element of fiction is much the strongest in the library. The financial position of the library is fairly satisfactory; it participated to the extent of *£11*7 3s. 2d. in the Government Subsidy to Libraries in 1883.

# Wellington.

The Capital of New Zealand. Population: 20,563. *Daily Papers*—"New Zealand Times," "Evening Press," "Evening Post."

## Athenæum and Mechanics' Institute.

## William Hamilton, Librarian.

There are a few interesting items in the history of this institution which I venture to record very briefly. A site for an institute was first granted in 1843, on Lambton Quay, by the then Governor, Captain Fitzroy, and the first stone of the building, which bore the name of the "Port Nicholson Mechanics' Institute, Public School, and Library," was laid with Masonic honours in May 1844, Colonel Wakefield being president, and John Knowles, Secretary of the undertaking. Owing to unfavourable circumstances the building was not opened until 1849, 250 volumes being then upon the shelves, purchased for *£20*, sent to England in the previous year.

The *New Zealand Spectator and Cook's Straits Guardian* of May 9th, 1849, records that Mr. Bushell had been appointed librarian at 6s. a-week! and the same paper for 7th November, 1849, records a balance of £5 4s. old., and notes that £ 10 had been sent home to England for more books, and that £ 1 had been expended in binding. The institute, from various causes, did not receive the support, or create the interest which it was hoped, and after six-and-twenty years the Legislature was applied to for powers to build and to incorporate. An Act of Incorporation was accordingly passed in 1875, the President at that time being the Hon. William Fitz-Herbert, C.M.G., and the Secretary, Walter Hill.

The *New Zealand Times* of 28th March, 1876, reporting the annual meeting of the institute, records the fact that there were then 700 volumes—250 being added in 1875— that there were 550 members, and a small balance at the bank. On the 20th January, 1877, on the site of the old buildings, was laid the first stone of the present handsome wooden buildings, by the Marquis of Normanby, then Governor of New Zealand; these were completed at a cost of £8,000. The library and reading-rooms are open daily (Sundays and public holidays excepted) from 9 a.m. to 10 p.m. The subscription is 21s. per annum, or for youths under 17 years of age 10s. 6d. The rules, which were drawn up at the incorporation, seem very suitable and work well. There is a separate room for ladies; two reading-rooms, one for daily papers the other for weeklies. The library is contained in a room 30 ft. by 40 ft. square—members have access to the shelves. The record of borrowings is kept under the name of the borrower. The annual general meeting of the Athenaeum is held in May.

In May 1884 there were 682 members, 9,000 volumes, 507 having been added during the previous year, and 19,627 having been in circulation. £219 was spent on books, papers and binding, and there was a balance of £143. There is at present no printed catalogue. In 1883, the idea of printing was mooted, but met with little encouragement from the members of the Athenaeum.

Two attempts have been made in Wellington to start a Free Public Library under the Act, for which the imposition of a penny rate would have been necessary, but both have been unsuccessful, the opponents of the movement being three times as numerous as the supporters. The officers of the Athenaeum would have been quite ready to hand over the building and library entirely into the hands of the City Council for the free library, but apparently the people of Wellington are quite contented with the present state of things. The Wellington Athenaeum receives no support now whatever from Government, but depends entirely upon the subscriptions of its members, and the rents received for a portion of its premises; it is however, in its way, doing good work in Wellington, and is paving the way for an eventual Free Public Library.

## The Library of the General Assembly of New Zealand.

# Angus Macgregor, M.A., Librarian.

This library, the finest and most important, as is fitting, in New Zealand, was founded in 1865, when the seat of Government was moved from Auckland to Wellington. There were then about 4,000 volumes, and in 1886, F. Guillaume, of Chester Square, London, published a catalogue of books relating to New Zealand, recently added to the Library of the General Assembly of New Zealand, which was, I believe, the first step towards a printed catalogue of the works in this library.

The library is contained in the handsome wooden building, wherein are located the chambers of the Legislature of New Zealand. I should mention that the chief buildings in Wellington were for a long time constructed entirely of wood, owing to the frequency of earthquakes, and the risks run by buildings of stone and brick. It is said that the Government Offices at Wellington are the largest wooden buildings in the world, but I cannot vouch for the absolute accuracy of this statement. Of late years earthquakes have been less frequent and less destructive, and the new buildings of Wellington are no longer of wood. Unfortunately for the books, the rooms containing the library are on the most exposed side of the Assembly buildings, and though their arrangement and economy are admirable, the books, which mostly come out bound from home—and exceedingly well bound—have suffered somewhat from the damp.

Mr. Macgregor has for some time past been meditating a re-arrangement and re-classification of the library, and has proceeded some way with it, but has deferred the renumbering of shelves and books until the question of new buildings has been finally decided. During the last nine years there have been frequent talks of new buildings, and £ 14,000 was once placed on the estimates for that purpose, so that in a few years I hope we may hear that new build- ings are actually commenced. The library, though space is sadly wanted, will not have really suffered for the delay, for every year brings fresh experiences in the construction of library buildings, particularly from America, and fresh interest in librarianship as a profession, and in the administration and progress of libraries.

The Assembly Library now contains about 26,000 volumes, and is augmented by about 1,500 annually, so that a supplement to the catalogue has to be issued about once a-year, at the commencement of the session. The system of international exchanges is fully maintained, and the library has also to thank many private donors for their munificence. Amongst these I may fitly mention the names of Hugh Carleton, Alfred Domett, W. B. D. Mantell, and John Sheehan.

The management of the library is vested in a committee of twenty, ten being chosen from each House of Legislature; these twenty appoint a committee of six out of their body, three from each House, to be the Selection Committee. The Selection Committee practically determines the literature to be selected for the shelves, taking into consideration the suggestions made by members of the Legislature in a book kept for that purpose. The Agent-General in England, as a rule, is empowered by the Committee to order new books for the library to the amount of £ 100, from time to time. The annual amount at the disposal of the Committee appears to be a Government grant of *£600,* and another £ 100 produced by the fees on private bills. On this revenue the Committee keep up the standard and character of the library to the highest point as a library of general reference. An annual report is made by the librarian to the Chairman of the Library Committee, usually in the month of June, and is then presented to the House, and published with other parliamentary papers and reports. These reports afford some interesting reading to librarians and others. In 1882 Mr. Macgregor notes that two new rooms had been placed at his disposal, with shelf accomoda- tion for 6,000 volumes, which had been nearly all absorbed, showing that a large number of volumes must have been practically inaccessible before. To display the new disposition of the library then made, a capital plan of the distribution of works, both on the ground floor and in the galleries, was issued, and has since been published with the catalogue—I found it of great service. A new agent was appointed in 1882; a historical register of all the books added to the library from time to time was commenced, and has since been kept up, and a system of press-marking was instituted for the first time.

In the report of 1883, Mr. Macgregor notes the introduction of handy catalogues of various departments of literature, which he intends to continue and make a feature of in the next general catalogue. Also that the library had suffered in the way which all parliamentary libraries seem to suffer, from some of its rooms having to be given up and others made use of instead—the Sydney Parliament Library in particular—has been much hampered in its usefulness owing to this cause.

In June 1884, Mr. Macgregor reports another change of agents, the Agent-General for New Zealand in England having been appointed to act for the library, and he has appointed Messrs. Bell & Bradfute, of Edinburgh, to act under his supervision. There is no doubt that the appointment of the Agent-General, who has long manifested an interest in the library, will be productive of very good results, some of which had been already felt when I visited the library in December 1884. In this report it is also recorded that in response to an offer made by Lord Derby, it had been decided to send copies of all the official publications of New Zealand to the Library of the British Museum, Lord Derby promising in return that all the Imperial official publications should be sent to the Assembly Library.

Three more useful pieces of work were done during the year 1883-84, and they were:—1, a catalogue of all the pamphlets in the library; 2, a list of all maps and charts; 3, a subject index of the general catalogue of 1880 and of the supplement of 1882.

During the recess, the privilege of using the library has for some years past been extended to residents in Wellington, on certain conditions. These have been altered from time to time, but the following rules were in force when I was in Wellington. The library was administered during the recess, by a committee of all Members of both Houses residing in, or within fifteen miles of Wellington, three of these to form a quorum. Admission to full privileges of the library was granted to some fifty under-secretaries and Government officials in Wellington, a list of whose names was posted up in the library. During the year 1883-84, 700 volumes were issued to these persons during the recess. In addition, however, to these fully privileged persons, any person applying to the Chairman of the Recess Committee was admitted to study in the library, but during the same period only forty persons availed themselves of this permission. Mr. Macgregor says that there are few real students to speak of in Wellington, and the privilege of borrowing books is the only one which is sought after.

Mr. Macgregor very kindly permitted me during my stay in Wellington to make use of the library, and I spent four days at work in the small room, No. 4, I think, in which were kept some of the chief treasures—tall copies, early editions, and valuable illustrated works; and also all the American and Canadian publications, congressional records, and other State papers.

Now for a few words with regard to the contents of the library, which, for all ordinary purposes may be regarded as a first-class reference library. It contains some very fine early editions of the classics, a good collection of works of history, biography, and travel, and of parliamentary papers and statistics. There is an excellent collection of bound volumes of colonial newspapers, I suppose no library except Melbourne has a better. These will be invaluable to the future historian of New Zealand: there cannot be less now than 2,000 volumes of newspapers on the shelves of the Assembly Library. I regret that there is not so good a collection of works printed in and relating to New Zealand, and the countries adjacent to it, as there might be. It seems to me, that a really complete department of the library devoted to Australasian literature, would be worth the consideration of the Library Committee, for it would be an immense boon both to present and to future members of the legislature, as well as to students and writers of history in days to come.

I have mentioned that the library has had many private benefactors, besides the various Governments with which it carries on a system of exchanges; and I may add that one of the most valuable works in the library was the gift of a private benefactor, Bishop Monrad—two immense folio volumes of rare etchings and engravings, valued at £2,000. And now, lastly, a few words as to the catalogues of the Assembly Library. The earliest appears to have been that published in 1867, (8vo, pp. 213), an author catalogue. The next was a classified catalogue, published in 1872, the library then containing 8,700 volumes. Then, in 1875, came an elaborately classified catalogue, compiled by Ewan McColl, 8vo, pp. 351. In 1880, the library then containing 18,562 works, as compared with 11,450 in 1875, a new catalogue compiled by the then librarian, Ewan McColl, was published—8vo, pp. xvi. 557. In this catalogue, which is correct up to March 1880, the same elaborate system of classification is adopted as in that for 1875, and an index of author's names is given. It is well got up and printed, and a very careful piece of work throughout. Since that date annual supplements to the catalogue have been issued, and in 1884, these annual supplements were issued as a separate volume, with plans of the distribution of books in the library, and with a carefully prepared index of subjects. Mr. Macgregor very kindly presented me with copies of these various catalogues, and also entrusted me with copies for presentation to the Library Association, which I duly delivered on my return home. It is proposed in future to continue the annual supplements, and every five years to issue a new general catalogue, and when I was at Wellington there was some talk of reverting to an author catalogue, with a full index of subjects.

It will, I hope, be gathered from this account, that the Assembly Library is really a valuable one, and that with the not distant prospect of new buildings, and the re-arrangement which is in contemplation, it will occupy an even more useful position in New Zealand than it now does.

I am under much obligation to both Mr. Macgregor, and his courteous and able assistant, Mr. David Smith, for the information they gave to me, and for the ready manner in which they assisted me in looking up various points in the history of New Zealand, in which I was interested. I hope some day the Library Association of the United Kingdom may have the pleasure of welcoming these gentlemen, and many others in Australasia engaged in library work, amongst its most active members.

## SUPREME COURT LIBRARY.

I was enabled to vist this library through the kindness of my friend, Mr. Edwin G. Jellicoe, barrister-at-law, of Wellington. It is contained in a small room in the Supreme Court building, and has, I suppose, about 2,100 volumes of strictly legal works, reports, and text books. The management of the library is in the hands of the Council of the Wellington District Law Society. It is open to all members of the legal profession, practising in the Wellington Judicial District, who have paid their fees for the current year. Also to managing and articled clerks, on their receiving permission from the Council of the Law Society. No books are allowed to be taken beyond the precincts of the court, and "no books are to have the pages turned down, or to be dog's eared, marked with pencil, ink or otherwise, or in any way defaced, torn or injured, or left lying open when done with." Breach of any of the rules regulating the library, renders the persons committing such breach liable to a fine of £2 2s., which can be exacted by the Council of the Law Society.

A printed catalogue of this library was issued in 1872 (8vo. pp. 38), and a more recent edition in 1882 (8vo. pp. 68). This last is an interesting little *brochure*, neatly printed, and containing:—Rules of the library, explanation of abbreviations of the reports, general alphabetical catalogue under authors' names; catalogue of the law reports under the different courts, giving the dates covered by the various series, &c.; a table of regnal years, and an index of subjects with names of authors who have written on any subject. The library appears to be much used, but needs space and an increased expenditure to make it thoroughly adequate to the wants of the profession.

## THE LIBRARY OF THE COLONIAL MUSEUM.

## Mr. Kirk, Librarian.

In the Colonial Museum, at Wellington, are located the head-quarters of the New Zealand Institute, which has, perhaps more than anything else, advanced the interests of science in this colony. It has now about 1,300 members, seven affiliated institutes, and it has issued fifteen volumes of valuable Transactions. The New Zealand Institute has under its care in the Colonial Museum a library of some 10.0 volumes. Some of these belong to the Wellington Philosophical Society, which is in the position of an affiliated institute. Amongst this number must also be reckoned 2.0 volumes formerly the old Provincial Council Library of Wellington. The Athenaeum has made several attempts to get these books handed over to it, but hitherto unsuccessfully. Here also is contained the large scries of Patent Office publications, presented by the Commissioners in England. The Institute maintains a large system of exchanges, and consequently the library is being rapidly increased, and additional space is already needed. The works in the library are almost all of a scientific character, and include a collection of old medical works, said to be of value, presented by Sir David Monro. Reports of societies, transactions, and magazines, form a large and increasing branch of the library. Members of the Institute, and of the Philosophical Society, are allowed to borrow works from the library; but it is open free to any person to consult or read in, and more and more persons every year are making use of this privilege. The library at present has only a manuscript catalogue.

## Wellington Diocesan Library.

This is contained in a small wooden building, situated in Mulgrave Street, and has about 2,000 volumes. It is open on application to the Secretary, on any week day between 10 a.m. and 4 p.m., to any clergyman in Anglican Orders, and probably to any other person, for purposes of reference. The library is strictly theological and is not up to date; it has, however, some valuable sets of older works—there is a catalogue in manuscript.

With the libraries in Wellington, I come to an end of my account of the chief libraries in the North Island of New Zealand. There are, however, Athenaeums, mechanics' institutes, or public libraries in most of the towns in this Island, and after those I have already mentioned, probably the libraries in the following towns would deserve notice, viz:—Coromandel, Gisborne, Grahamstown, Masterton, New Plymouth, Russell, and Tauranga.

I applied to some of these institutions for particulars, not being able to visit them, but received no answer; but when one is travelling about letters sometimes miscarry, and the postal arrangements in New Zealand are somewhat defective, especially when compared with those in Victoria and South Australia. However, I think I have mentioned all the more important libraries, and will conclude by noticing that in 1884, 149 libraries in the North Island shared in the Government Grant to the extent of £2,495 5s. 5d., their total income apart from the subsidy being £3,972 13s. 7d.

# Christ Church.

Capital of the district of Canterbury. Population, 30,715. *Daily Papers*.—"Lyttleton Times," "The Press," "The Evening Star," "The Telegraph."

## Canterbury Public Library.

## Howard Strong, Librarian.

The name of this library is rather misleading; for the benefit of my non-New Zealand readers, I must therefore explain that the library is under the control of the Board of Governors of Canterbury College, which is an affiliated branch of the University of New Zealand. It seems to me, therefore, that the proper name for this library is the "Canterbury College Public Library," though the most fitting title of all would be "The Free Public Library of Christ Church," for such to all intents and purposes it assuredly is, when all is said and done.

Bor the particulars which I am about to give relating to this library, I am indebted to Mr. F. G. Stedman, the Registrar of the College, and to Mr. Howard Strong, the Librarian of the Canterbury Public Library, when I visited it in 1884-85.

It appears that in the year 1870, a "Museum and Public Library Bill 'was passed in the Provincial Council of Canterbury, with the object of providing a suitable library for the province, in Christ Church. Unfortunately, though this Bill was passed, a Bill to provide for the endowment of the library was lost, and it was not until 1872 that a motion was carried, requesting the Superintendent of the Province to reserve 100,000 acres of pastoral land, as an endowment for the proposed institution.

On May 2nd, 1872, Mr. W. Rolleston, then the Superintendent, at the conclusion of his speech opening the proceedings of the Provincial Council, used the words—"The establishment of a free public library will be brought under your attention; private efforts have already been invited to raise a portion of the necessary funds. The benefits of such an institution are for all time, confined to no one class, to no particular locality, and to no one period in the history of a community as supplementing the educational institutions which you have so liberally endowed. I trust the proposal will have your favourable consideration." During the following session were passed, in accordance with this recommendation, the Canterbury College Ordinance 1873, and the Canterbury Museum and Library Ordinance Amendment Ordinance, 1873; by this last, all the powers vested in the Trustees created by the Bill of 1870, were transferred to the Board of Governors of Canterbury College, with whom the management of the library thus created has remained ever since.

Since 1873, the library has been maintained partly by grant from Canterbury College of £500, and partly by the subscriptions of persons wishing to take out books, and there have been occasional grants of small sums from Government. The building and books purchased by the grant from the College, as well as the books belonging to the Old Provincial Library, which arc in the library, belong absolutely to Canterbury College.

There is no need for me to go into the financial position of this institution, more than to say that it is not satisfactory, and that there is a dispute as to the endowments, which will, I hope, personally, be ended by Canterbury College eventually handing over the library, free from debt, to the authorities of the city of Christ Church who, by bringing it under the Public Libraries Act, could easily make it a credit to the city.

The present buildings are fairly convenient, and consist of two reading-rooms, and a large room containing the library, which is divided into two branches: I, the reference library; 2, the circulating library. There are also other rooms and offices. Subscribers to the Institution, who nominally have to be recommended by a Governor of the College, alone have the power of borrowing books; during 1884 there were 445 subscribers at £ 1, and 28,330 books were borrowed, and the library contained 9,143 volumes in the circulating branch, and 6,804 in the reference branch.

During 1883 £130 were expended on new books, £91 on newspapers, and £50 on binding and printing; the agents for the library in London are Messrs. Sampson Low & Co., who are authorised to send out boxes of new books to a certain amount each month. I understand that the grant from Canterbury College is applied strictly to the replenishing of the reference department of the library. Admission to this is obtained by persons in Christ Church on the authorization of a Governor, the person signing an undertaking to observe the rules.

It is painful to have to record, that either the Governors must be very careless in admitting unworthy people, or, that the people in Christ Church who undertake to observe the rules, must be unusually forgetful of their undertakings. Otherwise it is hard to account for the shamefully large list of books stolen from, or damaged, in the reference library during the last two and a-half years. This is, I believe, the only so-called free library in Australasia, to which admission orders have to be obtained, and it is the only free library in Australasia which has suffered severely at the hands of the persons thus admitted. The only remedies which seem to me possible, are, to increase the staff of attendants—now much too small—and to do away with admission orders once and for ever; put the readers on their honour without these formalities and undertakings, and the books will take care of themselves.

The circulating department is not free from faults; subscribers are permitted to have access to the shelves, and are allowed to use the library as a reading-room. But worse than this, between the hours of twelve and two, this part of the library is usually invaded by a host of boys who stand reading at the shelves, many of these boys are neither subscribers nor the sons of subscribers, hut the librarian has no power to remove them. It also frequently occurs that subscribers come in and ask for a book, which is not to be found on the shelf, but it is really in the library, being read by some person who has no right to be in the library at all. One day when I visited the library seven persons were pointed out in it who were non-subscribers. The evils of a semi-free public library, such as this is, are painfully apparent, and it is much to be hoped that they may soon be remedied, and that so may be removed the only one blot which clings to the fair fame of Christ Church, to my mind the most charming of all New Zealand cities.

The circulating library is open daily from 10 a.m. to 9 p.m. except Sundays, Christmas Day, Good Friday, and general holidays. The reference library and reading-rooms are open also on Sundays, between the hours of 2 and 5, and 7 and 9 p.m. It is found that there is an average of about twelve persons availing themselves of the privilege of using the library on Sundays.

I have said a good deal about the weak points of the Canterbury Public Library, though I have not given nearly all the notes I made as to its shortcomings, I must now say a few words as to its good points. To begin with, the books arc arranged well in the library, the records of borrowings are well kept, the books for signatures of subscribers and visitors are also up to the mark, and there is a suggestion book which has been kept going since 1874. I do not recollect seeing in any library in New Zealand, and in but very few libraries at all, a book which for the most part contained such useful suggestions, many of which had commended themselves to the attention of the committee. Then lastly, as to the catalogues: that of the circulating department was printed in 1880, 8vo, pp. 121, xxxiv. It is a classified catalogue, with an index of author's names, and also a carefully compiled index of subjects. From it, it is apparent that there is a good deal of "fiction" in the library, but very little of what one may fitly call rubbish; travel, history, and biography make a fair show. Since 1880, the catalogue of the circulating department has been kept up in manuscript, under authors' names, and is kept on the librarian's table. The catalogue of the reference deparment was printed in 1879, 8vo, pp. 145, xi. It is a classified catalogue with an index of authors' names, and is a good piece of work. One at once gathers from it that there is a backbone of really valuable matter stored on the shelves, which makes one all the more anxious that it should be properly cared for and treated. There is a good collection of political works; Migne's Patrologia Grasca; fine set of the Anti-Nicene Fathers; the Chaucer and Early English Text Society's publications; the Art *Journal*; Ruskin's Works; Arber's reprints; and the Reports and Transactions, amongst others, of the British Association, Cambridge Philosophical Society, Linnean Society, and of the Society of Arts.

Such, roughly speaking, is the Canterbury Public Library, with a past full of struggles, a present, with many uncorrected abuses, but without any doubt a future of great usefulness, and possibly one which will add distinction to Christ Church.

Since writing the above, I have seen the report on the Canterbury Public Library, presented at the last annual meeting in July. From it I learn that the library was closed for stocktaking—a proceeding which has been long neglected—in May, and that the circulating branch was found contain 9.339 volumes, of which 3,856 were works of fiction, 1,083 of travel, and 243 of poetry and the drama. The reference branch contained 6,990 volumes. During the previous year 475 volumes had been added to the circulating, and 181 to the reference branch. An increase in the number of periodicals was approved of; reductions had been made in the amount of subscriptions in order to induce the taking of family tickets, and a system had been introduced of allowing visitors to Christ Church, on payment of two shillings, to enjoy the full privileges of the library for one month; and on the whole, the library seems to have taken a decided turn for the better.

## * Supreme Court Library, Christ Church.

This is under the management of the Canterbury District Law Society, and is open daily from 9 a.m. to 6 p.m. (except Sundays and Supreme Court holidays). All admitted legal practitioners, clerks of solicitors, pupils of barristers, and any other person, if properly recommended, and on payment of 21s. a month, are permitted to use the library. The library, which is strictly legal, contains about 3,000 volumes, and no books are permitted to go beyond the precincts of the court. A printed catalogue was issued in 1883, 8vo, pp. 94., which is very similar in arrangement and get-up to the catalogue of the Supreme Court Library, Wellington, already described.

Besides the Canterbury Public Library, and the Library of the Supreme Court, there are in Christ Church, libraries belonging to the Canterbury Museum, Canterbury College, and the Philosophical Institute of Canterbury. This last which is small, and almost entirely scientific, is stored in one of the rooms at the Canterbury Public Library.

That at Canterbury College, may be called a students' library, and is distributed throughout the various lecture rooms.

That at the Museum will eventually, no doubt, be of value, and more attention is being paid to it every year. It consists chiefly of scientific works, and of transactions of learned societies, and has received during the last few years many valuable donations from different parts of the world.

# Hokitika.

Capital of the district of Westland. Population, 2,600. *Daily Papers*.—"The Hokitika Guardian," "Evening Star," "West Coast Times."

## The Westland Institute.

## R. Hilldrup, Librarian and Secretary.

This is an affiliated branch of the New Zealand Institute, and has its head-quarters in the Town Hall Buildings, Revell Street, Hokitika. It possesses a reading-room, open daily from 9 a.m. to 10 p.m., and on Sundays from 2 to 6 p.m.; and a library open for the exchange of books daily. The library contains about 2,000 volumes, a classified catalogue of which was published in 1884. I visited the rooms on a Saturday night, and saw them I suppose to advantage. The Institute is paving the way for a larger, undertaking some day in the quaint little town of Hokitika.

# Nelson.

Population, 6,764. *Daily Papers*.—"The Colonist," "The Evening Post," "Evening Mail."

## * The Nelson Institute.

## Marion M. Clarke, Librarian.

This is the only library in Nelson; it was established in 1841, and now contains about 6,000 volumes. The subscription is 10s. a year. Fiction largely predominates. During 1884, 9,641 volumes were issued to 241 borrowers, and there were 250 subscribers on the list. The library is open at intervals during the day, from 9.30 a.m. to 9 p.m., but is closed on Sundays and public holidays. There is a free reading-room and museum in connection with the Institute, open from 9.30 a.m. to 9 p.m. on week days. The rules of the Institute were revised in 1880, and in 1881 a printed classified catalogue was issued, supplements to which have been issued for 1881, 1882, 1883. I am glad to be able to record another lady librarian in New Zealand.

# Oamaru.

Population, 5,791. *Daily Papers*.—"The North Otago Times," and "The Oamaru Mail."

## * Athenæeum and Mechanics' Institute.

## Henry Richmond, Librarian.

This was established in 1865, but has lately, in 1882, been almost recreated and started in a very handsome new building, which I regret I was unable to visit. Mr. Richmond has kindly, from time to time, sent me copies of the *North Otago Times*, and of the *Oamaru Mail*, containing notices of the annual report, &c., and from them I gather the following details.

For the year ending January 31st, 1885, the sum of *£61* was spent on new books and binding, and £68 on magazines and newspapers, and the subscriptions of membersamounted *to £226* 15s. The library contained about 4,500 volumes, and, during the year, 9,472 had been circulated, 7,610 of these being works of fiction; 413 new works had been added, and a considerable number of donations were reported.

During 1885, the Athenaeum, appears like other things in Australasia, to have been suffering from the general depression, for at the annual meeting in February, 1886, the revenue showed a falling off, and the books circulated were less in number than in the previous year. However, an able committee and an energetic librarian will work wonders, and the Oamaru Athenaeum is established on too permanent a basis now to fear retrogression.

The reading-rooms are open daily between 9 a.m. and 10 p.m. (Sundays and public holidays excepted), and the library at intervals during the day for the exchange of books; there is a separate reading-room for ladies, and a good supply of English and Colonial newspapers.

The rules with regard to the institution are carefully drawn up, and seem to work well. A system is maintained of bespeaking books which are in circulation, and on the return of the book in question, it is retained for twenty-four hours in the library, for the applicant, who is advised, if he has so arranged, by post, of its return. A neatly got-up classed catalogue was issued in 1883, 8vo., pp. 76, and is, I understand, interleaved and kept up to date. This Athenaeum is a public library, incorporated under the Public Libraries Powers Act, 1875, and in 1883, received a grant of £209 from the Government, but since that date the grant has not exceeded £50 per annum.

# Dunedin.

Capital of the district of Otago. Population: 42,794-*Daily Papers*.—"The Otago Daily Times," "Evening Herald," "Evening Star," "Evening Tribune."

### Athenæum and Mechanics' Institute.

## James Paterson, Librarian; John Barr, Hon. Sec.

This Institution, located in a rather overcrowded building, in the Octagon at Dunedin, succeeded in 1859 an earlier 'Mechanics' Institution," founded in June 1851. The objects of this earlier institution were to found a reading-room, museum, classes for public instruction, and lectures; but it did not prosper. The present Athenaeum, however, seems to be flourishing both from a financial and literary point of view. In February 1884, at the annual meeting, a balance of *£66* was reported, after an expenditure of nearly *£600* in books, binding, and newspapers, the total receipts for the year having been £1,591, of which £982 were produced by subscriptions. I should think the library must now contain nearly 20,000 volumes, but as there are a very considerable number of novels in 3 vols, my readers must not imagine that the library is really so powerful as its numbers make it appear.

Subscribers have access to the shelves, and, judging by the number of persons I saw taking out books on an afternoon, they must be great readers; however, the books, which came out from home bound strongly in half-calf, cloth sides, seem to be able to withstand the wear and tear.

After the elements of fiction and periodical literature, which seem most in demand, history and biography make a fair show. The arrangement of books on the presses, and cataloguing, is well done, and makes the borrower's work easy; additional space is here, as also in many other places, sadly wanted. There are two reading-rooms, with a large and excellent assortment of English, Australian, and New Zealand newspapers and magazines upon the tables. There is also a small room entirely devoted to works of reference. Mr. Paterson keeps the various ledgers of borrowings, &c., and the stock books and catalogues up to date, with great carefulness, and they would afford some interesting statistics.

The reading-rooms are open every week day, from 9 a.m. to 10 p.m., and on Sundays from 2 to 6 p.m. The library is open for the exchange of books at various intervals during the day. The Athenaeum was incorporated 7th December, 1870.

A classified catalogue was published in 1881 (8vo, pp. 293), just the book for the borrower from a lending library in which access to the shelves is permitted. This catalogue has also an index of author's names. A supplement to it was published in 1882; it has sold very fairly well amongst members of the Institution.

There have been attempts at various times, and a good deal of talk about establishing a Free Public Library in Dunedin. So far the attempt has been unsuccessful, and as the ratepayers did not instigate the movement, and as at present there is no earthly reason to call upon the Athenaeum to efface itself, it will probably be many years before there is anything of the kind in Dunedin. From the point of view of the Athenaeum authorities, "The members did not see the necessity of sacrificing their own interests, and those of the Institution they had fostered, to a remote and undefined expectancy of public advantage." Judging by Mr. Barr and Mr. Paterson, the Athenaeum is fortunate in its officers. These gentlemen gave me information, time and attention, for which I am glad, though so long afterwards, to be able to express my gratitude.

### Library of the Supreme Court, Dunedin.

## Joseph Wood, Librarian.

Mr. Barr kindly took me over this library, which is located in an upper room in the Supreme Court buildings, and is open on all court days from 10 a.m. to 4 p.m. It is a long, narrow room, and was formerly used as the Provincial Council Library; but, being surrounded by noisy thoroughfares, it did not strike me as well adapted for study.

There are about 5,000 volumes of reports, texts, treatises, and commentaries, and there is a manuscript catalogue kept up to date. A very neat little printed catalogue was issued in 1874 (cloth 16mo. pp. 57), and I was told that there had been a more recent edition, or that one was shortly to be issued, which I hope is the case. The rules as to admission, management, &c., of this library are practically the same as at the law libraries of Auckland, Wellington, and Christ Church, of which I have already spoken.

### Library of the University of Otago.

## William Henning Mansford, Registrar and Librarian.

The University of Otago was founded in 1869; but in 1874 it practically ceased to be anything more than an affiliated college of the University of New Zealand, having surrendered its right to grant degrees, &c.; but by courtesy it is still, and will probably always be spoken of as the University of Otago.

The buildings of the University are very handsome, and I am much indebted to Professor J. Mainwaring Brown, M.A., L.L.M., and to Mr. Mansford, the former for his introductions, the latter for his personal attentions, which enabled me thoroughly to appreciate the position and working of the University.

In 1872 a Free Public Library of Reference was founded, chiefly by public subscription, in connection with the University, and it now contains "about 5,000 volumes which for the most part have been especially selected by the Professors for the use of Students." It is contained in a handsome room, 55 ft. long by 25 ft. wide by 35 ft. high, in which shelf room for 15,000 volumes could conveniently be found. There are some fine portraits in oils on the blank walls, including portraits of the Queen and Prince Albert, Captain Cargill, Dr. Burns, and others.

Though the library is nominally "public," sometimes a month passes without any stranger coming in. The truth is that there is no cultured leisure class at present, and everybody is still for the most part intent on making money. Here is stored the old Provincial Council Library of Otago, which is samll, and but for a few such items as a complete set of the *Otago Times* from the commencement, possesses little of interest. There is at present but little attempt made at a scientific arrangement of works upon the shelves. It is difficult to say that the library is stronger in any one department than in another, for neither classics, mathematics, science, or literature are really good; there arc however, some good sets of transactions, and a few scattered works of real value.

The catalogue is at present in manuscript, and I regret to add that there is an air about the library as if it languished for funds and management. I suppose the truth is, that the library has suffered from the fact that the Professorial Board, in which its management is entirely vested, has lately been expending the sum of £42,000 in new buildings) houses for Professors, laboratories, &c., and so has not had time to give any consideration to the wants of the library. However that may be, in the future interests of the University the library deserves and will repay attention. The rules of the library are dated as long ago as 1875, and do not call for any special comment. I hope before many years a printed catalogue may make its appearance and awaken public interest in Dunedin, in what may very well become the not least valuable part of the University.

### The Library of the Otago University Museum.

## Professor Thomas Jeffery Parker, B.Sc., Lond., Librarian and Curator.

The Museum to which this library is attached is situated in King Street, Dunedin, some little way from the University buildings, and cannot be called handsome; it is however most convenient inside, having a fine central hall with two galleries, and other wings are in contemplation. The library located in the museum, is contained in one of the back 100ms, and comprises about 5,000 volumes, half of which are the property of the University, the other half belonging to the Otago Institute, which holds its meetings here.

The library may be said to date from 1865, when the nucleus of the present museum was formed after the exhibition. It is open every day on which the museum is open, viz., from 12 to 5 p.m. on week days, and on Sundays and public holidays, from 2 to 5 p.m. The library is apparently under the control of the Otago Institute, whose members are alone allowed to borrow works from it, but it is open to any person using the museum, for purposes of reference and research.

I may describe the contents of the library, by saying that there is a good collection of works on all branches of natural history; and that so far as funds permit, the librarian endeavours to keep pace with the records of modern discoveries in all branches of science. There is a brief printed catalogue, issued in 1879.

# Invercargill.

Capital of the District of Southland, population, 4,596. *Daily Papers*.—"The Southland Times," and "The Southland Daily News."

### The Atiienæum.

## W. E. Hallam, Librarian.

A handsome building, situated in the main street, dating from 1876, and comprising a subscription circulating library, reading-rooms, and a museum. The subscription is *£1* per annum, or for ladies and youths under 16, 10s. Strangers visiting Invercargill are granted admission free to the reading-room, which is open on week days, from 9 a.m. to 10 p.m., and on Sundays from 2 to 6 p.m.

One word as to the reading-room; it is without doubt the most commodious in New Zealand; it is admirably stocked with papers, and the privilege of using it will be warmly embraced by any person compelled to stay in Invercargill, which I am forced to admit is a town of exceeding dullness and *ennui.* A separate room is reserved for ladies with duplicate copies of the chief papers, and so far as buildings and arrangements go, the Athenaeum has evidently been built with a view to meeting the wants of Invercargill twenty years hence, when her population may be five times as great as it is now.

The buildings are good throughout, and the property is a valuable one, and is likely to become increasingly so. During 1884, the subscriptions of members amounted to £293, and the rents, &c., swelled the total receipts to £1,234, a sum of about £420 was spent on books, binding, and newspapers, and the Athenaeum had certainly something to show for it.

The library now contains over 5,000 volumes, about 800 of which are works of fiction; biography, and history are fairly represented, the works are throughout, so far as I could judge, in good order and very well bound. A catalogue was published in 1876, and a new edition in 1882, 12mo., pp. ix. 73, this last, which is a handy little book, gives besides a classified catalogue, a list of members, rules, bylaws, and the Ordinance of Incorporation, which was passed 20th July, 1871; there is also an appendix with an index of authors.

Besides the library of the Athenaeum there is also a small library of legal works in the buildings of the Supreme Court at Invercargill.

With Invercargill I come to an end of my account of the libraries in the South Island, and in New Zealand. There are, however, in the South Island in the following places, viz. Akaroa, Alexandra, Blenheim, Clyde, Cromwell, Grey-mouth, Naseby, Port Chalmers, and Timaru, libraries of growing importance, which will demand the attention of a later writer. In 1884, 207 libraries in the South Island shared in the Government grant, their total income from subscriptions being £5,577 7s. 9d., and the subsidy they received in addition being £3,484 19s. 9d.

## *A Tabular Statement showing the Distribution of the Public Libraries Subsidies according to Education Board Districts*.

EDUCATION DISTRICTS.No. of Libraries. 1883 1884 Income of Libraries. 1883 1884 Amount of Subsidy. 1883 1884 £s.d.£s.d.£S.d.£.S.d.Auckland ... ...91882,359I12,052391,2121591,35481Taranaki ... ...66106211521766701169191Wanganui ... ...81182951555211269752 5619Wellington ... ...17161,7111764657055982288 16Hawke's Bay ... 21281,299122 8742547 7112526150Marlborough ...4519060190122751961081 63Nelson ... ...26256457746310733913365 1811North Canterbury ...71712,3551741,818881,081441,123188South Canterbury ...91060319540857216195196141Westland ... ...15167154106509728572 36241Otago ... ...59562,2281811 1,548 08969103948159Southland ... ... 27241,000524980643892 378120Totals35435614,0451809,550145,9921465.98052 42 The Chief Libraries of New Zealand.

I think it is worth while to insert here before concluding, a tabular statement shewing the "Distribution of the Public Libraries Subsidies according to Education Board Districts," for the years 1883 and 1884, which I have put together from the returns in the New Zealand Parliamentary papers, kindly lent to me at the Agent-General's Office, Victoria Street.

The whole of the vote of £6,000 was apportioned in each year, but after a majority of the payments had been made, certain deductions had to be made owing to some mistake on the part of one of the libraries. It must be noted that in, and since 1884, the maximum subsidy to any library was limited to £50; and the only income recognised as entitling a library to share in the subsidy, was that derived from subscriptions and voluntary contributions for the ordinary current expenditure. It must also be noted, that, if in 1884 the vote had been distributed in strict proportion to the incomes of the several libraries, eleven would have received over £50. Of these Canterbury Public Library would have received £150; Auckland Public Library, £148; Oamaru Athenaeum, £105; Timaru Mechanics' Institute, £75; and Wanganui Public Library, £75; the other places being Masterton, Nelson, Cromwell, Turanganui, Christ Church Y.M.C.A., and Thames.

Lastly, I may mention that the Education Department in New Zealand, has for some time past recognised the value of libraries in the State Schools, as evidenced by the reports of Mr. O'Sullivan and Mr. Lee, Inspectors of Schools, in the report of the Minister of Education in 1883, and by the report of Mr. H. Hill, B.A., Inspector for the Hawke's Bay district, in 1884. This last gentleman writes thus:—"It would seem teachers are beginning to realise that a library is a necessary part of every well equipped school," and to this I think I may add, that the people of New Zealand have long since realised that a library is a necessary part of every well equipped town, and that they have done, and arc doing their best to make their libraries worthy of their towns.

# Appendix.

# New Zealand.

# Tricesimo Secundo et Tricesimo Tertio

# Victoriæ Reginæ.

# No. LXVII.

# Analysis.

# Title.

# Preamble.

- Short Title.
- "Governing Body."

- Governing Body may adopt this Act with the consent of ratepayers.
- Mode of voting.
- Qualification of voters. Majority to determine. Notice of adoption.
- Rate not to exceed one penny in the pound.
- Tower for governing body to borrow for purposes of Act.
- Lands may be appropriated, purchased or rented for the purposes of this Act.
- Property of Library to be vested in governing body.
- General management to be vested in governing body or a committee thereof.
- If any meeting determine against adoption of Act no other meeting to be called for a year.
- Libraries to be free. Schedule.

An Act to promote the Establishment of Public Libraries.

[3*rd September*, 1869.]

Whereas it is expedient to promote the establishment of Free Public Libraries for the instruction and recreation of the People

BE IT THEREFORE ENACTED by the General Assembly of New Zealand in Parliament assembled and by the authority of the same as follows:—

- The Short Title of this Act shall be "The Public Libraries Act, 1869."
- The expression "Governing Body" where used in this Act with reference to the words "city" "town" "village" or "district" shall as the case may be mean the City or Town Council City or Town Board Highway Board or Road Board or any body of persons by whatever name distinguished having the power of levying rates for the improvement of such city town village or district under any Act of the General Assembly of New Zealand or of any Act or Ordinance of a Provincial I Legislature thereof.
- It shall be lawful for the Mayor or Chairman of any governing body on the request of the governing bodies over whom such Mayor or Chairman respectively presides or on the request in writing of ten ratepayers residing in the city town or district to ascertain whether the provisions of this Act shall be adopted for such city town or district in manner following that is to say by causing a notice to be inserted in some newspaper published in such city town or district or if there be none such in some newspaper published in the Province in which such city town or district is situate specifying on what day not earlier than ten days after the publication of such notice and at what place within the said city town or district the ratepayers are required to signify their votes for or against the adoption of this Act which votes shall be received on such day commencing at nine of the clock in the forenoon and ending at four of the clock in the afternoon of each day and the said notice shall be to the effect of Form No. I. in the Schedule hereto annexed.
- The Mayor or Chairman as the case may be shall appoint a person or persons for taking the said votes and they shall be taken by such person in the same manner as at the election of members of the governing body of the city town or district and such questions may be put to each voter and with such liability in case of a false answer as at the elections of the members of the governing body of such city town or district.
- Every ratepayer who shall be entitled to vote for the election of the governing body of a city town or district shall be entitled to vote for or against the adoption of this Act and the Mayor or Chairman shall examine the votes and shall by public notice in manner hereinafter mentioned declare whether more than one-half of the votes given have been given in favour of the adoption of the said Act and the adoption or non-adoption of this Act shall be determined by the majority of votes. And notice of the adoption of this Act shall be forthwith given by publication in the newspaper in which was published the notice appointing the day for determining whether this Act should be adopted or not and if it shall be determined in manner aforesaid that the provisions of this Act shall be adopted for such city town or district the same shall thenceforth take effect and come into operation in such city town or district and shall be carried into execution in accordance with the laws for the time being in force relating to the governing body of such city town or district.
- It shall be lawful for the governing body of such city town or district to levy a rate in like manner as the city town or district rate is levied which rate shall be called "The Library Rate" but the amount payable in such city town or district in any one year shall not exceed the sum of one penny in the pound upon the annual value of the property rateable under the Act or Ordinance constituting the governing body of the town.
- For carrying this Act into execution it shall be lawful for the governing body of any such city town or district from time to time subject to the borrowing powers conferred on such bodies to borrow at interest such sums of money as may be required on the security of the yearly amount of rate authorized by this Act.

- The governing body of any city town or district may from time to time appropriate for the purposes of this Act any lands vested in such governing body and may also purchase or rent any lands or suitable buildings and the said governing body may upon any lands so appropriated purchased or rented respectively erect any buildings suitable for Public Libraries and may repair and improve the same and fit up furnish and supply the same with all requisite furniture fittings and conveniences.
- All lands and buildings so appropriated purchased or rented by the governing body of any city town or district for the purpose of a Library and all other real and personal property whatever presented to or purchased for any Library established under this Act shall be vested in the governing body of the city town or district in which such Library is situate.
- The general management regulation and control of Libraries established under this Act shall be vested in and exercised by the governing body of the city town or district in which such Libraries are situate or in such committees as such governing bodies may from time to time appoint the members whereof need not be members of the governing body. And such governing body or committee may from time to time purchase and provide the necessary fuel lighting and other similar matters books newspapers and maps for the use of the Library and cause the same to be bound and repaired when necessary and appoint officers and dismiss the same and make rules and regulations for the safety and use of the Libraries and for the admission of the public.
- If any meeting called as provided by this Act for the consideration of the propriety of adopting this Act shall determine against the adoption thereof in any city town or district no meeting for a similar purpose shall be held for the space of one year at least from the time of holding the previous meeting.
- The admission to all Libraries established under this Act shall be open to the public free of all charge.

# Schedule.

# No. I.

IN pursuance of the provisions of "The Public Libraries Act 1869" the ratepayers of the [*city town or district of*] are required to signify at the place under mentioned their votes for or against the adoption of the aforesaid Act.

(Signed)
A.B. Mayor
or Chairman.
N.B.—The place for voting is *[here insert the place appointed for voting]*.

# No. II.

NOTICE is hereby given that this [*city town 01 district*] has adopted the provisions of he Public Libraries Act 1869" at a meeting of ratepayers of the said *[city town or district)* duly held under this Act.

Dated this day of
(Signed)
A.B. Mayor
or Chairman.

# New Zealand.

# Tricesimo Nono

# Victoriæ Reginæ.

# No. LXXXVIII.

# Analysis.

# Title.

# Preamble.

- Short Title.
- Contents of the declaration.
- Duplicate declaration, how disposed of.
- The Registrar to file one and deliver the other.
- When to become incorporated.
- What existing institutions may do.
- Directors and trustees.
- By-laws.
- Officers.
- Failure to elect provided.
- What fines may be imposed.
- How enforced.
- Witnesses.
- Application of fines.
- When shares transferable.
- Shares to be personal property.
- Dissolution provided for.

An Act to confer Powers on Public Libraries and Mechanics' Institutes.

[21*st October*, 1875.]

Whereas it is expedient to declare that certain powers shall attach to public libraries, mechanics' institutes, museums, and other such like literary or scientific bodies:

BE IT THEREFORE ENACTED by the General Assembly of New Zealand in Parliament assembled, and by the authority of the same, as follows:—

- The Short Title of this Act shall be "The Public Libraries Powers Act, 1875."
- Any number of persons, not less than ten, having subscribed or holding together not less than twenty pounds in money or money's worth for the use of their intended institution, may make and sign a declaration (in duplicate) of their intention to establish a public library, mechanics' institute, athenæum, or other similar institution, as the case may be, at some place to be named in such declaration, in which they shall also state,—
  - The corporate name of the institution.
  - Its purpose.
  - The amount of money or money's worth subscribed by them respectively, or held by them for the use thereof.
  - The names of those who are to be the first trustees for managing its affairs.
  - The mode in which their successors are to be appointed and new members of the corporation admitted, or the mode in which by-laws are to be made for such appointment or admission, or for other purposes.
  - Generally such other particulars and provisions as they may think necessary, not being contrary to this Act or to law.
- One duplicate of such declaration shall be filed in the office of the Registrar of the Supreme Court of the province by one of the subscribing parties, who shall, before such Registrar, acknowledge the execution thereof by himself, and declare the same to have been executed by the other parties thereto or by their attorneys.
- The Registrar shall keep the duplicate so filed, and deliver the other to the person who filed it, with a certificate of the same having been so filed and of the execution having been attested before him, and such duplicate, or any copy thereof certified by such Registrar, shall be *prim? facie* evidence of the facts alleged in such declaration and certificate.
- When the formalities aforesaid have been complied with, the persons who signed such declaration or the directors or the office-bearers, and the committee for the time being of any such institution, and their successors, shall be a body corporate and politic, and shall have the powers rights and immunities vested in such bodies by law, with power to such corporation, in their corporate name, from time to time to acquire and hold to them and their successors, for the uses of such corporation, any messuages lands tenements or hereditaments situate within the province.

- In case of a mechanics' institute or public library (or both united) established or in existence when this Act comes into operation, the directors, trustees, or the office-bearers and committee thereof, for the time being, may make and sign a declaration of their wish or determination to become incorporated according to the provisions of this Act, stating in such declaration the corporate name to be assumed by such institution; and also with such declaration file, in the manner hereinbefore provided, a copy of the constitution and by-laws of such institution, together with a general statement of the nature and amount of all the property, real or personal, held by or in trust for such institution.
- The affairs of every such corporation shall be managed by the directors or trustees thereof for the time being, appointed as hereinafter or by any by-law of the corporation provided, who, or a majority of whom, may exercise all the powers of the corporation and act in its name and on its behalf and use its seal (if any), subject always to any provisions limiting the exercise of such powers in the declaration aforesaid or in any by-law of the corporation.
- Such trustees, or a majority of them, may make by-laws binding the members and officers thereof, and all others who agree to be bound by them, for all purposes relative to the affairs and business of the corporation, except as to matters touching which it is provided by the declaration that by-laws shall be made in some other manner.
- The members of every such corporation may, at their annual meeting, to be held on the day appointed by a by-law of the corporation, choose from among themselves a president, and may appoint (except it be otherwise provided in the declaration or by-laws) a librarian, treasurer, and secretary, or such other officers as they think necessary, and fix and pay their remuneration (if any), and may also choose a board of directors or trustees of such corporation, who shall hold office for one year or such further time as may be hereinafter limited or permitted.
- A failure to elect trustees on any day appointed for that purpose by the declaration or by any by-laws shall not effect the dissolution of the corporation, but the trustees then in office shall remain in office until their successors are elected, which they may be (if no other provision be made therefor by the declaration or by-laws) at any meeting of the corporation at which a majority of such members are present, in whatever way such meeting may have been called.
- Every such corporation may by its by-laws impose a fine not exceeding one pound on any member contravening the same, or on any person not being a member of the corporation who has in writing agreed to obey the by-law for the contravention whereof it is imposed.
- Any such fine, if incurred, and any subscription or other sum of money which any member or other person may have agreed to pay to the corporation for his subscription to the funds of the corporation for any certain time, or for the loan of any book or instrument, or for the right of entry to the rooms of the corporation, or for any other privilege or advantage afforded to him by the corporation, may be recovered by the corporation by action in any Court of competent jurisdiction, on allegation and proof of the signature of defendant to some writing by which he has undertaken to pay such subscription or to obey such by-law, and of the breach of such undertaking, which breach, as regards a promise to pay any sum of money, shall be presumed until the contrary is shown, and as regards the contravention of any such by-law may be proved by the oath of any one credible witness.
- In any action to which the corporation may be a party, any member or officer of the corporation shall be a competent witness, and a copy of any by-law bearing the signature of the defendant, or being certified as a correct copy of such by-law by the president or other two officers of the corporation, shall be *prim? facie* evidence of such by-law.
- Any fine incurred may be recovered in like manner as a subscription or other sum of money, and all fines so recovered shall belong to the corporation for the use thereof.
- If it be provided in the declaration or by the by-laws of the corporation that the shares of the members in the property of the corporation shall be transferable, then they shall be transferable accordingly, in the way and subject to the conditions mentioned in the declaration or in the by-laws of the corporation, if by such declaration such transfers are to be regulated by them.
- All such shares shall be personal property, and by the declaration or by-laws permission may be made for the forfeiture of the shares in cases to be therein named, or for preventing the transfer thereof to others than persons of some certain description or resident within some certain locality.
- Provision for the dissolution of such corporation may be made by the declaration, or it may be therein provided that such provision may be made by the by-laws of the corporation, but no such dissolution shall take place until the liabilities of the cor poration are discharged.

# New Zealand.

## Quadragesimo Primo

## Victoriæ Reginæ.

## No. XLVII.

## Analysis.

## Title.

## Preamble.

- Short Title.
- Grant for public libraries to be in proportion to population, and under control of Education Boards.
- Subsidy to municipal libraries.
- Definition of public library.
- Library Committee.
- General management of libraries.
- Free admission to libraries. Proviso.

An Act to promote the Establishment and Support of Public Libraries.

[8*th December*, 1877.]

Whereas it is expedient to promote the establishment and support of free public libraries for the instruction and recreation of the people:

Be it therefore enacted by the General Assembly of New Zealand in Parliament assembled, and by the authority of the same, as follows:—

- The Short Title of this Act shall be "The Public Libraries Subsidies Act, 1877."
- It shall be the duty of the Colonial Treasurer to apportion the grant for public libraries among the several provincial districts in proportion to the population of such districts, and to intrust to the Education Boards thereof the distribution, in books or in cash, as they shall think fit, of such sums as shall be allotted by such Boards to libraries maintained or partly maintained by voluntary subscriptions in their respective districts, in accordance with, and in proportion to, the amount of voluntary subscriptions received by the respective libraries.
- There shall be issued and paid from the Consolidated Fund, out of moneys to be appropriated by the General Assembly for public libraries, to every municipal or governing body that shall cause "The Public Libraries Act, 1869," to be brought into operation, a sum equal to the amount raised by way of library rate under that Act; such rate and subsidy to be expended in pursuance of the provisions of the said Act, by the governing body levying the rate, in the establishment and maintenance of free public libraries in the city, town, village, or district contributing the rate.
- Any library supported or partly supported by voluntary subscriptions in any district, or any library established under "The Public Libraries Act, 1869," or incorporated under "The Public Libraries Powers Act, 1875," shall be deemed a public library.
- Any Committee appointed by the persons who shall have subscribed towards the establishment or support of a public library as aforesaid shall be a Library Committee within the meaning of this Act.
- The general management, regulation and control of libraries established under this Act shall be vested in and exercised by the Library Committees of the districts within which such libraries are situated. And such Library Committees may from time to time purchase, provide, and deal with all things necessary for the use of such libraries, and appoint officers and dismiss the same, and make rules and regulations for the safety and use of the libraries, and for the admission and convenience of the public.
- The admission to all libraries established or supported under this Act within any borough shall be open to the public free of all charge: Provided that no person not being a contributor of any sum not less than five shillings a year shall be entitled to take books out of any public library.

Programme de Sociologie of D'Histoire Naturelle Des Sociétés

Par Gaétan Delaunay

Paris Librairie De L. Hurtau, (Ancienne Maison Masgana) 12. 13, 14, Galek1Es De L'Odéon 1872

# Chapitre Premier.

*Qu'est-ce que la Sociologie?*

Comme la Biologie étudie les phénomènes de la vie chez les végétaux et les animaux, la Sociologie est une science qui a pour objet I'étude des phénomènes vitaux présentés par ces groupes d'êlres qu'on appelle les sociétés.

*Quel rang la Sociologie occupe-t-elle parmi les autres sciences?*

La Sociologie est la dernière venue et la plus élevée de toutes les sciences. Après la *Physique* et la *Chimie*, qui étudient les corps bruts célestes (*Astronomic)* et terrestres *(Physique proprement dite)*, et qui sont apparues tout d'abord, est venue la *Biologiel* qui éludie les corps vivants, végétaux *(Botanique)* et animaux *(Zoologie)*. Enfin vient la *Sociologie* qui étudie les groupes d'animaux ou corps sociaux.

*Quelles sont les bases de la Sociologie?*

La Sociologie s'appuye directement sur la biologie, et tous les phénomènes sociaux sont réductibles en phénomènes physiologiques. Mais comme, d'une part, tous les phénomènes de la vie chez les individus sont, réductibles en phénomènes physico-chimiques, et que, d'autre part, tous les phénomènes physico-chimiques ne sont au fond que des phénomènes mécaniques, il s'ensuit que la base fondamentale de la Sociologie est la *Mécanique*. De môme qu'il y a une mécanique physique et une mécanique animale, il doit donc y avoir une mécanique sociale, et c'est cette mécanique que nous nous proposons d'étudier.

*Quelles sont les limites de la Sociologie?*

De mème qu'on n'a jamais trouvé de limites précises entre la physique et la biologie, entre les corps inorganiques et les corps organisés, de mème la biologie et la sociulugie ne sont pas séparées l'une de l'autre par une ligne de démarcation bien tranchée. Où commence la société? l'accouplement, par exemple, peut-il ètre considéré comme un phénomène de Sociologie ou comme un acte biologique?

D'un antre côté, la sociabilité, qui fonde et organise les sociétés, n'élnnt que le développement d'une ou de plusieurs facultés intellectuelles, pourrait être étudiée au point de vue de la biologie, et la Sociologie ainsi envisagée ne serait qu'une partie de la psychologie ou physiologie du cerveau.

*Quelles ont été les phases de la Sociologie?*

Comme la physique et la biologie, la Sociologie a dû traverser deux phases successives avant de devenir une véritable science. La première période de la Sociologie ou période théologique a été close par la révolution de 1789, qui a fait entrer la Sociologie dans la période métaphysique. Enfin à Auguste Comte revient la gloire d'avoir fait de la Sociologie une science positive.

*Procédés pour arriver à la notion du mécanisme des êtres sociaux*.

La Sociologie étant une science physique doit avancer par les mêmes procédés que lesautres sciences. Les procédés pour arriver à la notion du mécanisme des sociétés sont donc l'observation et l'expérimenlation.

Comme instruments de la Sociologie, nous trouvons encore la lecture, l'écriture etles mathématiques, qui nesont quedes moyens à l'aide desquels nous acquérons les autres sciences. Les mathématiques s'appliquent à la Sociologie comme aux autres sciences. M. Quételet, en effet, vient de publier un *Traité d' anthropométrie* dans lequel il prouve que la loi des coefficients du binôme (loi binômiale) s'applique au poids, à la force, à la vitesse et même aux *qualités morales et intellectuelles de l'homme*.

*Observation*.—Elle comprend tous les matériaux fournis parla paléontologie, qui nous révèle l'histoire des époques antéhistoriques. Quant aux époques historiques, nous les connaissons par l'histoire ancienne, du moyen âge, moderne, contemporaine; à l'histoire se rattachent la mythologie, l'archéologie, la linguistique. L'observation emprunte encore des données à la géologie, à la géographie, à la démographie, à l'ethnographie, à l'anthropologie, etc., etc.

*Experimentation*.—«On peut, dit Molcschott, appliquer l'expérimentation aux sciences sociales : en Toscane, par exemple, on abolit la peinede mort, et l'on voit immédiatement le nombre des crimes diminuer.» Mais cette manière de procéder revèt an caractère d'empirisme, et n'est point du tout conforma à la méhode expérimentale

Suivant no iis, en Sociologie comme en biologie, il est plus prudent d'expérimenter sur des animaux quo sur des hommes. Quand on voudra rechercher ce qui constitue essentiellement telle ou telle fonction sociale au point de vue de la physiologie générale, il faudra étudier les organismes inférieure de préférence aux organismes supérieurs. Au contraire, ceux-ci devront toujours être préférés a ceux-là, toutes les fois qu'on fera de la physiologie spéciale.

Prenons un exemple : suivant M. Henri Sainte-Claire Deville, la morale doit être traitée comme une science expérimentale. De même que les physiologistes ont pu connaître le fonctionnement du corps humain en étudiant sur les animaux le rôle des différentes pièces de la machine animale, les moralistes peuvent connaître le fonctionnement de l'âme (ensemble des facultés morales), en éludiant cette ame sur les animaux qui possèdent à un degré moindre, il est vrai, toutes les facubés intellectuelles et morales de l'homme, le premier des animaux. De même que les pathologistes peuvent produire artificiellement des maladies chez les animaux en les soumettant à certaines conditions pernicieuses, les moralistes peuvent, en faisant varier méthodique ment les circonstances au milieu desquelles vivent les animaux, apprendre comment naissent et se développer!lies vices qui sont les grands dissolvants de leurs sociétés comme de la notre. Dans la question spéciale de l'éducation, on peut donc découvrir les causes physiques des défauts et des vices dans les enfants qui, à certains moments de leur développement, sont si près des animaux.

«Au moyen des meutes de chiens, dit M. Sainte-Claire Deville dans un Mémoire présenté à l'Académie des Sciences morales et politiques et ayant pour but de prouver expérimentalement les inconvénients de l'internat dans l'éducation, au moyen des meules de chiens, on observe et l'on développe chez les îndividus, en outre dos vices propres aux carnassiers et malheureusèment aux enfants, la coquetterie fort utile au maintien de la race, l'avarice représentée par la manie de l'enfouissage, l'instinct du vol, etc. Au moyen des troupeaux de ruminants, des habitants des haras, des volières, des oiseaux et des insectes domesliques, on fait également un grand nombre d'observations curieuses de morale animale, et quelques expériences dont les résultats peuvent ètre très-instructifs pour nous-mèmes.

Les béliers étant séparés des brebis dans les champs, mais surtout dans les bergeries, contractent les habitudes les plus dangereuses pour les facultés de reproduction, j'allais dire les vices les plus honteux. En général, toutes les fois qu'on rassem- ble et qu'on fait vivre en domesticité restreinte des animaux d'un même sexe et surtout des animaux du sexe masculin, on remarque d'abord une grande excitation des instincts de reproduction et ensuite une perversion redoutable de ces mêmes instincts. Mettez-vous au contraire, soit en troupeaux, soit surtout en liberté complète, ces animaux destinés à vivre en société, vous voyez tout de suite dominer les caractères normaux de l'animal, Bientôt les organes de reproduction ne paraissent plus excitables qu'à des intervalles fixes et réguliers. Aux sentiments les plus pervers qui rapprocheraient les milles succède très-rapidement la jalousie, qui suscite entre eux des combats où les plus faibles succombent au profit de l'amélioration de la race par la seule intervention des individus les plus vigoureux. Ceux-ci fondent la famille ou la horde. Ainsi la présence seule des femelles suffit pour guérir radicalement les mâles de tous les vices de la vie séquestrée. Eh bien, ce qui se passe dans un troupeau se passe également dans une réunion d'enfants miles, quelle qu'elle soit, élevée par qui que ce soit, défendue par les règles de la surveillance la plus étroite, fùt-elle de jour et de nuit.»

Nous n'avons fait cette citation du Mémoire de M. Sainte-Claire Deville que pour prouver que le moraliste peut faire des expériences de morale comme le physicien fait des expériences de physique, et que l'observation et l'expérimentation, ces deux instruments de la méthode positive, sont applicables a la Sociologie comme aux autres sciences naturelles.

*Qu'est-ce qu'ume Société?*

Suivant nous, une société n'est point un *être moral*, comme disent les jurisconsultes, mais un être réel, un corps vivant, une forme supérieure delà matière, organisée, un véritable organisme comparable aux organismes déjà connus en biologie et soumis aux lois générales de la vie.

C'est pourquoi nous définirons la Sociologie la *biologie des sociétés*. Appliquant à cette science la définition que MM. Littré et Ch. Robin ont donnée de la biologie, nous dirons donc que la Sociologie est une science qui a pour sujet les sociétés vivantes et pour but d'arriver, par la connaissance des lois de l'organisation, à connaître les lois des actes que ces êtres manifestent, et réciproquement.

## *But de cette etude*.

Nous nous proposons d'étudier non-seulement les sociétés humaines, mais encore les autres sociétés animales. Suivant nous, ilest impossible de séparer les sociétés les unes des autres, les sociétés animales et les sociétés humaines se continuant par une progression insensible; c'est pourquoi nous les réunissons toutes sous le nom de *règne social*.

## *Division de la Sociologie*.

La Sociologie n'étant autre chose que la biologie des sociétés, doitètre divisée en :

Premièrement. Au point do vue *statique;*

*Anatomie sociale*, qui étudie l'organisation des sociétés; *Biotaxie sociale*, qui étudie les lois de l'arrangementdes société; en groupes naturels d'après la conformité de leur organisation, *Mésologie sociale*, qui étudie l'influence des milieux physiques et sociaux sur les sociétés et sur laquelle est fondée l'*hygiène sociale;*

Deuxièmement. Au point de vue *dynamique :*

*Physiologie sociale* qui a pour bat spécial la connaissance des lois d'après lesquelles s'opèrent les actes sociaux;

A la physiologie se rattache la *pathologie sociale*.

A l'anatomie et à la physiologie se rattache *l'embryogénie socialtle* qui étudie l'évolution embryonnaire des sociétés qui se fondent (colonies) aux dépens et à l'image d'une société mère (*métropole)*. Au point de vue *historique* :

*Paléontologie sociale*, qui étudie les sociétés dans le passé et qui n'est autre chose que l'histoire.

# Chapitre II.

# Anatomie sociale.

# Anatomie GéNéRale *De l'individu en Sociologie*,

Dans le règne social comme dans les règnes minéral, végétal e t animal, l'individu varie suivant le point de vue auquel on se place. Ainsi en botanique, pour les anciens l'arbre entier était l'individu; pour certains naturalistes, c'est la cellule; pour Darwin, c'est le bourgeon.

Dans l'histoire de l'humanité, lequel est l'individu de la race, de l'état, de la famille?» dit M.Nœgelé;etil ajoute: Tout dans la nature est individuel, depuis les atomes infiniment petits jusqu'aux corps célestes et aux systèmes de corps célestes, depuis l'atome infiniment simple jusqu'aux organismes infiniment composés et aux séries entières d'organismes que nous embrassons sous les noms d'espèce, classe, règne.»

En sociologie, comme en biologie et en physique, nous trouvons une série d'individus, L'animal est l'individu dont se compose la famille;celle-ci est l'individu dont se compose la tribu, qui ellemême est un individu par rapport à la nation. Mais l'individu primaire est l'animal sociable, l'homme est l'*élément anatojnique dasso*ciétés humaines.

## *Propriétés des individus sociaux*,

L'étude de l'animal et de ses propriétés organiques appartient à la biologie et ne rentre pas dans le cadre de ce travail. Toutefois certaines considérations biologiques ont une telle portée sociale que nous ne pouvons les passer sous silence.

Considéré d'une manière générale et partout où il se trouve, l'individu social varie avec les races dont il fait partie. L'ethnologie est la science qui étudie ces variations de configuration, de couleur, etc.

De plus, l'anatomie et la physiologie des éléments sociaux varient dans chaque société suivant l'âge, le sexe, la profession, etc.

Dans chaque société, nous trouvons des individus dinstincts par l'âge et par le sexe (hommes, femmes, enfants, vieillards, etc.). Au point de vue de l'âge; les individus ne sont pas aptes à remplir leurs fondions dès leur naissance. À leur naissance tous les individus se ressemblent. Ce n'est qu'en se développant qu'ils acquièrent une fonction spéciale. Mais pour cela il faut qu'ils aient atteint un certain degré de développement (stage, apprentissage, limite d'âge, examen, concours), etc. En outre, quand ils ont fonctionné pendant un certain temps, ils deviennent incapables de remplir leurs fonctions et s'en vont pour faire place aux jeunes (retraites, etc.).

D'autres causes que la vieillesse peuvent empêcher les individus de remplir leur rôle social. Telles sont l'hypertrophie, l'atrophieou anémie, les infirmités, les blessures et les maladies. En biologie comme en sociologie, chaque élément anatomique remplit un rôle qui lui est propre et s'altère d'une manière qui lui est spéciale. Chaque profession a ses maladies et sa longévité propres.

D'autres causes peuvent abréger la durée des fonctions sociales; mais comme elles sont purement sociales, elles doivent être étudiées en Sociologie (service militaire, etc.)

Eu résumé, en Sociologie comme en biologie, chaque fonction s'obtient, se remplit, se perd d'une manière qui lui est propre.

Tous les hommes, parties constituantes des sociétés humaines, se nourrissent, se développent, se reproduisent, se meuvent, sentent, pensent, veulent. Mais ces propriétés individuelles ne sont pas également développées chez tous les individus de la société.

Au point de vue de la *nutrition*, les uns ne peuvent se nourrir eux-mêmes (enfants, infirmes, vieillards, malades) et sont à la charge de l'État.

Au point de vue de la *reproduction*, pour que l'individu puisse se reproduire, il faut qu'il ait acquis un certain développement et qu'il soit nubile. En outre, il est démontré, dans notre société française par exemple, que les classes inférieures ont plus d'enfants que les classes supérieures.

Dans les sociétés supérieures, les individus se distinguent par la profession. Chez les uns, le système musculaire prédomine sur le système nerveux (ouvriers, paysans, manœuvres des compagnies de chemin de fer, des ponts et chaussées, etc.). Au contraire, le système nerveux est plus développé que le système musculaire chez ceux qui jouent un rôle dans les administrations publiques et privées et qui pensent plus qu'ils ne se meuvent. En un mot, la dissemblance des individus ou catégories d'individus augmente avec la spécialisation du travail à mesure qu'on s'élève dans l'échelle des sociétés, la spécialisation du travail ayant pour résultat de n'exercer que certaines parties très-limitées de l'organisme au détriment des autres.

## Modes de groupement des individus sociaux.

En Sociologie, plus que partout ailleurs, la dynamique domine la statique; il est difficile do considérer les êtres sociaux ou les groupes d'êtres sociaux indépendamment du ròle qu'ils remplissent, et c'est pourquoi nous ne pouvons séparer d'une manière complète l'anatomie de la physiologie sociale.

Étant donné que les sociétés sont des organismes vivants, il faut absolument que ces organismes comprennent les organes indispensables à la vie. La vie végétale, la vie animale, la vie sociale ne peuvent se manifester que par l'intermédiaire de fonctions qui sont les mômes chez tous les êtres organisés. Suivant nous, il y a une *biologie générale*, qui étudie la vie dans les règnes végétal, animal et social. Cette biologie nous apprend que chez les plantes, chez les animaux, comme chez les sociétés, en un mot chez tous les êtres vivants, la vie résulte de l'exercice de certaines fonctions sans lesquelles elle ne saurait exister. Or, ces fonctions nous sont déjà connues. En somme, qu'est-ce que la vie, sinon la nutrition? et qu'est-ce que la nutrition, sinon un échange continu de matière entre l'organisme et le monde extérieur? Comment la matière pénètre-t-elle dans l'organisme? Par l'*absorption*. Comment en sort-elle? Par l'*excrétion*. Mais la matière ne peut ètre *assimilée* qu'autant qu'elle a subi certaines transformations *(digestion)*. En outre, pour qu'elle soit absorbée par tous les individus composant un organisme quelconque, plante, animal ou société, il faut qu'elle circule dans toutes les parties de cet organisme (*circulation*). Les divers individus d'un organisme ont certains rapports entre eux et avec le monde extérieur, et ces différents rapports ne peuvent s'effectuer qu'au moyen de *functions de relation*. Enfin l'espèce dont fait partie l'individu, plante, animal ou société, périrait, s'il ne se reproduisait pas au moyen de la fonction de *reproduction*.

Donc les fonctions vitales que nous venons d'énumérer sont indispensables à la vie, considérée d'une manière générale partout où elle existe. De plus, il est évident qu'il ne peut y en avoir d'autres que celles-là. Si nous insistons sur cette biologie générale, c'est pour montrer qu'il y a plus qu'une analogie entre les phénomènes sociaux et les autres phénomènes vitaux déjà connus, et que la comparaison de l'ensemble des objets de consommation d'une société au sang d'un animal par exemple n'est pas plus métaphorique que celle du sang à la séve des végétaux.

Il s'agit maintenant de retrouver dans la société les fonctions de nutrition, de relation et de reproduction qui doivent y exister par ce seul fait qu'elle est un organismo vivant.

Quelle est la fonction qui fournit la matière première en sociologie? C'est *Y agriculture*.

Quelle est celle qui la transforme en produits assimilables? C'est l'*industrie*.

Quelle est celle qui fait circuler ces produits? C'est le *commerce*.

Quelle est celle qui règle les rapports de ces fonctions de nutrition entre elles et avec le monde extérieur? C'est le *gouvernement*.

Quant à la fonction de reproduction, c'est la *colonisation*.

Sur cette question de la détermination des différentes fonctions sociales, nous sommes heureux de noua trouver d'accord avec M. Paul Bert qui, le premier croyons-nous, dans une conférence faite à Auxerre, il y a quelque? années, a montré dans les sociétés les fonctions de la vie des individus. «Les éléments, dit M. Bert, sont les citoyens du corps de la république organisée. Ces citoyens ont des propriétés, qui sont communes à tous et d'autres qui sont spéciales à quelques-uns.

Ils ne vivent pas isolés, mais réunis les uns aux autres en sociétés.

Tantôt ces sociétés ne comprennent que des citoyens tous semblables: ce sont des corporations (des systèmes comme les systèmes musculaire, nerveux, etc.). Tantôt elles comprennent des citoyens différents les uns des autres et concourant tous à un but, à une œuvre déterminée: tels sont les organes comparables aux villes.

Enfin le sang, comparable aux ressources de l'agriculture et de l'industrie, nourrit les éléments comme elles nourrissent les citoyens, et il circule dans ses canaux, sous la force impulsive du cœur, comme elles circulent sur les grandes routes poussées par le commerce.

Ainsi sont établies les conditions de la vie pour les organes comme pour les sociétés.

Ces sociétés ne sont pas isolées les unes des autres, elles ne concentrent pas leur activité en elles-mêmes, elles la manifestent au dehors. De plus, elles obéissent aux lois do l'État dont elles font partie. Elles sont dirigées, surveillées, protégées par un gouvernement. Ce gouvernement, c'est le système nerveux... Ce sont elles qui le nourrissent. Chacun des éléments agissant dans sa sphère prépare des matériaux que le sang emporte et avec lesquels il nourrit le système nerveux. S'ils cessaient tous de travailler, le gouvernement mourrait d'inanition et eux aussi. C'est ce qui arrive à la fin quand l'organisme meurt.

Il y a des gouvernements locaux agissant dans une circonscription déterminée. On les appelle dans l'organisme ganglions, moelle épinière, ils sont en rapport avec les villes et les citoyens, les organes et les éléments, par des fils télégraphiques, des nerfs qui les avertissent de ce qui se passe, qui transmettent leurs ordres. Pour toutes les questions dont l'intérêt ne dépasse pas leur circonscription, ils jugent en dernier ressort, pour les autres, ils entrent en communication les uns avec les autres, se consultent, agissent en commun. Pour les plus grandes enfin, celles dont l'intérêt embrasse le pays tout entier, ils ont recours au gouvernement central. Celui-ci réside dans la tête; c'est une partie de ce qu'on appelle l'encéphale.

Là sont les ministères, les organes centralisateurs, régulateurs, qui envoient des ordres à l'empire tout entier, à toute la machine vivante. Nous verrons tout à l'heure quels ils sont.

Au-dessus d'eux plane la volonté, l'intelligence, le chef de l'État. Quand il commande, tout obéit. C'est lui surtout qui veille aux relations extérieures. S'il est intelligent, énergique s'il utilise bien les forces du pays, le pays est glorieux; et de même si l'intelligence emploie heureusement les forces vives de l'organisme, l'être vivant exécute normalement ses fonctions. Mais il n'a pas besoin do s'occuper du détail des questions intérieures. Que deviendrait un chef d'État s'il lui fallait s'occuper de la charrue de chaque citoyen? Que deviendrait l'intelligence s'il lui fallait s'occuper de la digestion, de la nutrition, de l'excrétion, etc.? Tout cela se fait sans elle. Les ministères, les gouvernements locaux, sen chargent; le mécanisme, l'automate, est si bien monté, que tous ces détails de pot-au-feu s'exécutent sans qu'il s'en occupe et lui laissent sa liberté. Lui aussi ce chef de l'État réside dans la tête; c'est un organe spécial, le cerveau proprement dit.

A ses ordres ou à ceux de ces ministères, avons-nous dit, tout obéit. Les lois commandent au commerce. C'est le système nerveux en effet qui règle les battements du cœur, les accélère ou les arrête, c'est lui qui dilate les vaisseaux dans lesquels circule le sang, ou qui les rétrécit. C'est lui qui anime les organes digestifs, qui veille aux mouvements de la respiration, qui est l'incitant des sécrétions, le régulateur de la chaleur animale.

Les gouvernements locaux de l'organisme reçoivent leurs avis tous par la même voie : c'est le toucher général, le toucher de la peau qui les avertit. Mais le gouvernement général a d'aulres ressources : il a, si je puis ainsi dire, une police spéciale, supérieure, admirablement organisée. Celte police, ce sont les sens, la vue, l'ouïe, 'odorat, le goût, qui l'avertissent de tout ce qui se passe de près ou de loin et qui lui permettent de veiller au salut du pays tout entier.

Le chef de l'Etat, le cerveau, n'est point directement impressionné par cette police. Ce n'est pas lui qui reçoit les nerfs quiviennent des organes des sens....

Dans l'état ordinaire des choses, l'intelligence ne sent pas les mouvements intimes de la nutrition; mais qu'un phénomène anomal se présente, la douleur l'avertit; Je chef de l'État s'occupe de cette rébellion, il commande et tout s'ébranle pour conjurer le mal ou pour l'étouffer et rejeter la partie malade, le citoyen rebelle.»

D'après le système do M. Paul Bert, nous retrouvons en anatomie sociale tout ce que comprend l'anatomie proprement dite, c'est-à-dire les éléments sociaux, les tissus, les organes, les systèmes et les appareils.

*Tissu*.—Un tissu social est une partiedu corps social qui résulte do la réunion d'une ou de plusieurs espèces d'individus associés dans un ordre déterminé.

Dans un tissu, on distingue des éléments *principaux* et des *accessoires*. Dans les fabriques, par exemple, il y a un maître, un contre-maître, des employés, un payeur, etc., qui représentent les éléments accessoires, mais l'élément qui prédomine, l'élément principal est représenté par les ouvriers.

Parmi les tissus, les uns sont *permanents*, les autres sont *temporaires;* les uns sont *constituants*, les autres sont *produits* et émanent des constituants, comme l'armée par exemple.

Dans les tissus multiples, les propriétés résultent do l'ensemble des éléments.

*Système*.—On appelle système social l'ensemble des métiers et professions de mémo espèce considérés comme formant un tout. Ce sont les corporations.

*Organe*.— On appelle organe social une partie du corps social formée parla réunion d'ouvriers de plusieurs professions, constitués en atelier ou en groupe d'ateliers. Une ferme, un corps d'armée, une usine, une ville manufacturière comme Rouen, Roubaix, Limoges, le Creuzot, sont des organes ou des réunions d'organes similaires. Chaque organe comprend plusieurs sortes de professions. Dans chaque organe, il y a une administration (système nerveux) et des professions diverses. Dans la mine du Creuzot, par exemple, il y a des mineurs, des chargeurs, des camionneurs, etc.; dans l'usine annexée à la mine, il y a des mécaniciens, des serruriers, etc.

*Appareil,*—L'ensemble des organes d'espèce diverse qui concourt à une même fonction prend le nom d'appareil.

Tous les ouvriers qui fournissent la matière première forment un appareil analogue à celui do la locomotion et qu'on appelle l'agriculture.

Tous les organes sociaux, tous les ateliers qui transforment celte matière première en produits assimilables, forment un appareil analogue à l'appareil digestif et qu'on appelle l'industrie.

L'appareil circulatoire existe un Sociologie comme en Biologie (voies de communication).

Dans nos sociétés en voie d'organisation, l'appareil de reproduction n'est pas encore formé.

Enfin au-dessus de ces divers appareils nous trouvons l'appareil gouvernemental, qui est le plus important de tous.

En anatomie générale, il ne suffit pas de considérer les individus et leurs divers groupements, il faut encore étudier :

Le sol,

Les immeubles produits de l'industrie humaine, habitations, routes, canaux, etc.

Quant aux autres *produits* de l'industrie, ils sont comparables aux produits biologiques et constituent les meubles.

Parmi ces produits, les uns sont destinés à être rejetés du corps social (égouts, résidus, ordures, etc.); leur séjour dans la société pourrait être une cause de maladie ou de mort.

Les autres servent à la transformation des matières premières et sont les instruments de travail (machines). Certains servent à la conservation de la société (armes, fortifications, etc.).

Enfin il importe de considérer l'ensemble des objets en circulation comparable au sang.

## Anatomie Descriptive.

L'*anatomie descriptive* considère le nom, la situation, la forme, la population, la superficie, la densité, les rapports, la structure, le développement des différents organes et appareils d'une société, L'anatomie descriptive, au point de vue *morphologique*, nous montre les sociétés divisibles en un certain nombre de régions à peu près semblables les unes aux autres et dans chacune desquelles nous retrouvons des systèmes, organes, appareils, etc.

Disons quelques mots de ces diverses parties.

*Famille*. «Le premier groupement des molécules sociales vers un organisme est la famille», dit M, le Dr Guépin. Nous ne pouvons considérer la famille comme un groupe social. Dans les sociétés animales proprement dites, elle n'existe pas. Elle n'est donc pas nécessaire à la constitution de la société. C'est dans les tribus simiennes seulement que la famille paraît devenir un groupe permanent. Mais, comme le dit fort justement M. Je Dr Coudereau, il n'est point certain qu'elle y ait été le point de départ de la tribu.

Pour nous, la famille est un groupe spécial, limité, répondant à un besoin spécial relatif à la reproduction de la société. C'est le besoin de reproduction qui a produit la famille. Ce sont les autres besoins organiques qui, à mesure qu'ils se multipliaient, ont enfanté tous les groupes sociaux, depuis la *tribu* jusqu'aux *Etats-Unis*.

Comme les autres parties de là société, la famille jouit des fonctions vitales, mais son développement est limité, si l'on en juge par les systèmes de parente qui ne varient guère. La reproduction de la famille semble aussi limitée et la question des mariages consanguins n'est pas encore résolue.

En résumé, la famille est un groupe biologique et non socio-logique. *Tribu*. Le premier terme de l'agrégation sociale est la tribu. Les sociétés inférieures ne sont constituées que par une tribu. Les sociétés supérieures comprennent un nombre plus ou moins considérable de ces groupes primaires, Dans nos sociétés européennes, la *commune* représente la tribu des sociétés sauvages et constitue, pour ainsi dire, le *zoonite* du corps social. Toutefois, nous verrons, quand nous en serons à la physiologie sociale comparée, que cette division des sociétés supérieures en communes est arbitraire et que les zoonites sociaux (indépendance de la commune) correspondent à un état d'organisation relativement inférieur et comparable à celui des annelés.

## Anatomie Des Régions.

L'anatomie des régions nous enseigne la position respective dos vides, routes, voies Ferrées, lignes télégraphiques, etc.

## Anatomie Comparée.

Enfin l'anatomie comparée étudie comparativement chaque partie des sociétés par rapport aux modifications de leur structure dans les diverses sortes de sociétés.

# Chapitre III.

# Physiologie sociale.

Elle comprend l'étude de toutes les fonctions organiques des sociétés. Nous avons eu l'occasion d'énumérer ces fonctions, lorsque nous avons parlé des appareils sociaux. Los fonctions de la vie sont les mèmes dans les sociétés que dans les êtres. Tissus, sys- tèmes, organes, appareils se retrouvent dans les sociétés avec leurs attributs, leurs usages et leurs fonctions propres.

Fonctions végétatives : digestion, absorption, circulation, sécrétions et exhalations, assimilations sociales; fonctions animales : sensibilité, locomotions sociales. Fonctions de la vie individuelle, fonctions de la vie de l'espèce ou reproduction. Telles sont les diverses parties de la physiologie sociale.

Dans cette division des grandes fonctions sociales, toutes les professions, toutes les manifestations de la vie des sociétés trouvent leur place. L'agriculture, l'industrie, le commerce, la politique, le droit, la morale, l'esthétique, la linguistique, la science, etc., sont des dépendances de la nutrition, de la reproduction, de la locomotion et de l'innervation sociales.

Classification des fonctions sociales d'après la physiologie sociale.

Nous disons que les sociétés prises dans leur ensemble ont toutes les propriétés végétatives et animales des êtres organisés, c'est-à-dire qu'elles se nourrissent, se développent, se reproduisent, sentent et se meuvent. En Sociologie comme en Biologie, les propriétés végétatives apparaissent d'abord, les propriétés animales ne viennent qu'ensuiœ.

## *Origine des sociétés*.

Avant de parler du développement des sociétés, il est naturel de dire quelques mots de leur origine et de leur formation. C'est le besoin qui détermine le groupement des animaux en association. Les premiers groupes sont réunis par une nécessité momentanée; exemple : l'accouplement, l'allaitement, le change, le relai, etc. A ces groupes temporaires succèdent des groupes permanents, qui grossissent et se compliquent à mesure que les besoins organiques se multiplient, et auxquels on adonné le nom de famille, tribu, nation, etc.

La sociabilité se développant chez les animaux les pousse à s'associer pour la satisfaction de leurs communs besoins, et l'on peut dans chaque société classer toutes les fondions sociales d'après les fonctions biologiques des individus sociaux.

## *Nutrition sociale*.

Les sociétés se nourrissent comme les autres êtres. A la nutrition se rattache la *digestión* ou industrie qui fabrique les objets de consommation, Ces produits circulent constamment dans toutes les parties de la société par l'intermédiaire du commerce (c'est la *cir- culation*)

«Les globules sanguins soutiennent le commerce dans l'organisme, et ce premier argent mérite plus de soins que celui que le proverbe indique comme le second sang : *I danarí* il *scundo sangue* (l'argent est un second sang, proverbe italien.» Muleschott.)

. Chaque individu puise dans le torrent circulatoire les objets de consommation nécessaires à la satisfaction de ses besoins, et rejette dans la circulation les produits usés qui ne lui sont plus utiles *(excrétion)*. Parmi ces produits, les uns sont expulsés du corps social (ordures, égouts, etc.); les autres sont utilisés à nouveau et rentrent dans la circulation, où ils sont l'objet d'une nouvelle consommation (chiffons, etc.). La plupart des individus sociaux n'absorbent les produits en circulation qu'autant qu'ils travaillent, et il est intéressant d'étudier la relation qui existe entre la consommation et la production, entre le salaire et le travail. Certains individus ne remplissent aucune fonction et sont nourris néanmoins comme s'ils travaillaient.—Tous les phénomènes de la nutrition sociale sont soumis à des lois spécialas (codes civil, de commerce, etc.), correspondant au grand sympathique, etc.

## *Développement social*.

Les sociétés se développent grâce à la faculté de reproduction que possèdent les individus qui les composent. La mort partielle s'accomplit à tout moment dans toutes les parties du corps social vivant, c'est-à-dire que les individus usés meurent et sont remplacés par de nouveaux. Ces individus descendent des individus disparus lorsque la société est inférieure, de même que chez les êtres inférieurs tous les éléments anatomiques proviennent les uns des autres. Dans les organismes supérieurs, au contraire, les fonctions ne sont plus héréditaires. Dans nos sociétés qui sont en voie de développement, certaines fondions sont héréditaires, d'autres ne le sont pas, mais le nombre de ces dernières s'accroît de jour en jour.

Lorsque l'assimilation sociale remporte sur la désassimilation, la société se développe, exemple : l'Angleterre, l'Allemagne. Lorsque dans une société le nombre des naissances ne dépasse pas celui des décès, la société est stationnaire, exemple : la France. Lorsqu'il meurt plus d'individus qu'il n'en naît, la société est en voie d'extinction. C'est ce qui arrive aux tribus sauvages en contact avec les Européens.

Le développement d'une société peut avoir lieu autrement que par reproduction. Une société se développe par l'adjonction d'individus étrangers à la société *(immigration)*.

Les sociétés out donc une vie comparable à celle des individus qui les composent. Cette thèse a été soutenue bien des fois, et nous n'avons pas besoin d'examiner les phasesde la vie sociale : enfance, adolescence, etc,

Les causes d'extinction dos sociétés sont multiples. Une société est éteinte lorsqu'elle n'existe plus en tant que société. Une société peut dépérir comme les races indigènes de l'Océanie et de la Guyane, ou être assujettie, absorbée, conquise, démembrée. «Une race vaincue, dit M. Broca, peut être esclave comme les nègres d'Afrique. Si elle n'est pas assez intelligente pour cela, elle recule comme lus Peaux-Rouges, ou elle est détruite comme les Tasmaniens, si elle ne peut reculer.»

## *Reproduction sociale*.

Une société se reproduit par multiplication des individus sociaux de la même façon qu'elie se développe. Quand la société ne peut plus se développer là où elle vit, alors elle se reproduit par gemmation ou par scissiparité: par *gemmation*, lorsque l'embryon, c'est-à-dire la colonie, reste en rapport avec lu métropole; par *scissiparité*, lorsque la colonie se sépare de la société mère pour constituer une société propre.

La fécondité sociale varie d'une société à l'autre. Ainsi «1000 habitants fournissent, année moyenne, en France, 42 naissances et 61 en Angleterre.» (Dr Bertillon.)

Elle varie aussi avec l'âge de la société. Ainsi au commencement du siècle, en France, on comptait annuellement 37 naissances par 1000 habitants de tout âge, on n'en compte aujourd'hui que 26, tandis qu'en Angleterre il y en a 35.

Mais la reproduction n'a pas seulement lieu entre les divers membres d'une société, elle a lieu aussi entre les individus appartenant à des sociétés différentes et l'élude des croisements ethniques et de leur influence sociale doit être faite ici.

## *Fonctions sociales de relation*.

Les sociétés sont en relation avec le monde extérieur et avec les autres sociétés. Le pouvoir délibératif dirige leurs actes, qui sont accomplis par le pouvoir exécutif. Pouvoir délibératif pouvoir exécutif se retrouvent dans les êtres et dans les sociétés supérieurs. Réception, perception des demandes, délibération, décision, exécution des ordres, tels sont les actes administratifs communs aux organismes animaux et sociaux.

## *Rapports des sociétés entre elles*.

«La concurrence vitale existe entre les nations comme elle existe entre les individus, et les sociétés supérieures tendent continuellement à s'accroître aux dépens des sociétés inférieures.» (Schaafausen.) Poussée par le besoin, une société envahit le domaine d'une société voisine et le pille, comme font les fourmis et les hommes, ou bien elle asservit une société inférieure.

Chez les fourmis, comme chez nous, l'*esclavage* a été la conséquence de la guerre. «Le guerrier conquérant, dit M. Broca, lue les hommes et garde les femmes pour son plaisir. Le mélange des sangs est donc à peu près inévitable et les caractères de la race victorieuse sont modifiés par ce croisement.»

Les esclaves donnent naissance à des enfants qui sont esclaves à leur tour, et c'est ainsi que se constituent les *castes*. Puis la situation des esclaves se modifie, soit qu'on les affranchisse, soit qu'ils s'affranchissent eux-mêmes par la révolte.

C'est ainsi que l'esclavage dans les sociétés supérieures se transforme successivement en *servage, prolétariat*, etc.

C'est encore le besoin physique qui pousse l'homme à domestiquer les autres animaux.

Mais ce n'est pas seulement le besoin physique qui dirige les actes d'une société. Chez le sociétés supérieures, ces actes peuvent avoir pour mobiles les besoins moraux affectifs ou scientifiques.

## Physiologie Comparée.

Si nous comparons les sociétés les unes aux autres et que nous étudions les fonctions sociales d'une manière générale et indépendamment des organes qu'elles animent, nous voyons que la marche de l'organisation est la même en Sociologie qu'en Biologie. Chez les sociétés inférieures comme chez les êtres inférieurs, les individus se ressemblent tous, vivent d'une vie indépendante et satisfont eux-mêmes leurs besoins vitaux. Une tribu sauvage, comme celle des Mencopies par exemple, est composée de vingt à quatrevingts individus dont chacun est son propre agriculteur, son propre industriel, son propre éducateur, son propre gouverneur, de même que dans un zoophyte chaque cellule aies propriétés de locomotion, nutrition, reproduction et innervation. Les fonctions sociales sont diffuses dans les sociétés primitives comme dans les premiers organismes. L'agriculture, le commerce, l'industrie, le gouvernement fonctionnent, bien qu'il n'y ait point d'appareil spécial à chacune do ces fondions.

Les fonctions étant communes à tous les individus sont nécessairement très-peu développées.

De pareils organismes sont divisibles. Chaque partie séparée du tout primitif n'en continue pas moins à vivre, car elle a encore en elle les conditions nécessaires au mouvement avil.

Dans ces organismes, la circulation est nulle et les produits sont consommés sur place. Ces produits ne diffèrent que très-peu de la matière première, de même que chez les animaux inférieurs le milieu intérieur diffère très-peu du milieu externe.

Tel est le premier terme de l'organisation des étres et des sociétés.

Si nous passons de ces sociétés primitives à des sociétés plus élevées dans la série sociale, nous voyons les individus différer les uns des autres et les fonctions sociales se localiser et devenir l'apanage d'organes qui leur sont exclusivement consacrés. Si l'on considère la société des castors par exemple, on voit qu'elle comprend quatre sortes de professions : charpentiers, maçons, pionniers et veilleurs.

Dans des sociétés comme celle des fourmis et des abeilles, certains individus travaillent, d'autres sont chargés do reproduire la société comme la reine dos abeilles, d'autres font le guet, d'autres sont guerriers de profession comme chez les fourmis.

A mesure que nous nous élevons sur l'échelle sociale, nous voyons le nombre des professions augmenter avec la spécialisation et la division du travail. Enfin nous arrivons aux sociétés humaines supérieures, chez lesquelles nous trouvons les grandes fonctions sociales subdivisées en une infinité de professions dont l'énumération se trouve dans le *Botin* et qui forment un total dé plus de dix-huit cents.

Dans nos sociétés européennes, la vie d'un organe est dépendante de la vie d'un autre organe. Les professions sont d'autant plus subordonnées les unes aux autres qu'elles se ressemblent moins. Les organes sont unis pour concourir à un résultat unique, et si l'un d'eux fait défaut le but ne peut plus être atteint et l'organisme meurt.

On ne peut enlever une partie du corps sans faire cesser les conditions propres à l'accomplissement des mouvements vitaux qui, pour exister, exigent le concours de l'ensemble des orgaues. Dans un pareil organisme, les produits consommables diffèrent notablement des matières premières (grâce au développement de industrie) et doivent circuler (grâce au commerce) afin de pouvoir être absorbés par tous les individus du corps social.

Ainsi,à mesure que les sociétés et les éires s'organisent, les mouvements vitaux, indépendants chez les organismes inférieurs, deviennent de plus en plus solidaires. L'individualisme fait place au socialisme.

Ainsi les lois qui président à l'organisation des êtres s'appliquent à l'organisation sociale.

En Sociologie comme on Biologie, a l'énergie vitale, au lieu de s'obtenir par l'accumulation d'organes indépendants, s'acquiert par la division du travail physiologique.... La puissance vitale, au lieu de s'acquérir par l'accumulation d'organes spéciaux, sobtient par la hiérarchie et la centralisation des fonctions.» (Milne Edwards.)

La loi des corrélations organiques, celle de la subordination des organes, les lois (le compensation, décroissance, de balancement des organes s'appliquent au développement des sociétés. Il en est de méme de la loi d'harmonie des fonctions.

Ce qui fait, suivant nous, que les sociétés actuelles sont difficiles à étudier, c'est qu'elles ont une organisation rudimentaire comparable à celle des êtres inférieurs. En effet, il n'y a de véritablement organisé dans nos sociétés supérieures que le gouvernement, les voies de communication et les moyens de transport. L'agriculture, l'industrie et le commerce ne sont pas encore organisés. Toutefois les grandes compagnies agricoles, industrielles et commerciales commencent à apparaître et marquent la transition entre l'individualisme représenté par la libre concurrence et le socialisme représenté par l'état.

# Chapitre IV.

# Pathologie sociale.

Nous n'avons pointa nous occuper de la pathologie des individus composant les sociétés, ni de la pathologie comparée, qui étudie les maladies spéciales à cerlaines races, non plus que des maladies spéciales à certaines professions sociales (intoxications, goutte, etc.).

La pathologie sociale comprend l'étude des diverses maladies auxquelles un organisme social est exposé. Qu'est-ce qu'une maladie sociale? «Comme dans la vie des États, dit M. Virchow, de même aussi dans la vie des individus, l'état de santé de l'ensemble est produit par le bien-être et l'intimité des relations des membres isoles. Dès qu'un membre quelconque commence à tomber dans une inactivité nuisible à la communauté ou même à mener une existence parasite aux dépens de l'ensemble, la maladie a pris naissance.»

La pathologie sociale doit être étudiée *dans l'espace*, c'est-à-dire dans les modifications que lui imprime le climat, et *dans le temps*, c'est-à-dire dans les modifications que lui impriment les variations de l'état social.

Ainsi les nations présentent certaines maladies épidémiques à certaines époques de leur développement : chorées épidémiques (Boudin); en Allemagne, danse de Saint-Guy au xive siècle; au xve siècle, tarentisme en Italie; au xvve siècle, toute l'Europe est en convulsion. Actuellement régnent le ramaninjana à Madagascar, le tigretier en Abyssinie, l'astaragaza en Éthiopie. Ces maladies se rattachent à un état intellectuel auquel la religion n'est pas étrangère.

Il y a donc une sorte d'évolution pathologique propre à chaque société.

Suivant nous, on peut faire la pathologie interne des sociétés, de môme que leur pathologie externe, voire même leur tératologie.

La pathologie sociale comprend l'étude de tous les troubles locaux et généraux dont les sociétés sont le siège : chômage, grève, révolte et tous les autres accidents se rapportant aux révolutions politiques et sociales.

De plus, les crimes et les sinistres (épizootie, incendie, inondations, etc.) relèvent de la pathologie sociale.

## *Pathologie interne*.

Nous ne pouvons traiter dans ce programme cette branche de la Sociologie; nous voulons dire seulement quelques mots des maladies sociales les plus fréquentes.

*Anémie sociale.*— Si la société manque de ressources, il y a disette, alors les individus les plus faibles succombent à la famine. Quand la famine est extrême, les individus s'entre-dévorent (antropophagie correspondant à l'autophagie biologique). C'est ce qui est arrivé au xIe siècle en Europe, et dernièrement en Algérie et en Perse.

Ordre dans lequel les individus qui doivent être victimes disparaissent.

Histoire des famines qui ont décimé l'Europe.

Influence des disettes sur le développement de l'être social, «

«Danslesannées de cherté excessive du blé, la mortalité augmente; les naissances, les mariages diminuent.» (Bouchardat.)

Ces épidémies, ces famines pourraient étre étudiées aussi bien en biologie qu'en sociologie.

Cependant il est de véritables maladies sociales causées, il est vrai, par la non satisfaction des'besoins physiologiques, mais dont l'étude appartient spécialement à la Sociologie.

En Biologie comme en Sociologie, en cas de déficit du budget, le gouvernement prélève des impôts; seulement, en biologie l'impôt est proportionnel.

*Autre exemple de maladie sociale*. Sous l'influence do certaines irritations toutes produites par la non satisfaction des besoins organiques, une partie de la société peut s'enflammer : généralement ce sont les corporations ouvrières (inflammation du tube digestif et de ses annexes). Les individus se révoltent (grèves, révoltes, etc.) et sont expulsés,à moins qu'on ne fasse droit à leurs réclamations. Il en résulte un cercle vicieux : le commerce est arrêté, parce que l'industrie ne fonctionne pas, et réciproquement.

La grande querelle des membres et de l'estomac peut être étudiée ici.

Les maladies doivent être étudiées dans la série sociale tout entière.

### *Pathologie externe*.

Une société est détruite par la violence (partage de la Pologne), ou lésée plus ou moins gravement (perte de l'Alsace et de la Lorraine).

### *Tératologie-sociale*.

«Chez un peuple, la prédominance d'une caste reproduit, par un arrêt de civilisation, l'un de ces états du corps humain que l'on appelait autrefois les monstruosités, avant que la tératologie nous eût expliqué leurs conditions physiologiques de formation.» (Dr Guépin.)

### *Thérapeutique sociale*

*Opérations chirurgicales*. La décapitalisation de Paris a eu pour but d'empêcher les troubles de l'industrie de rejaillir sur le gouvernement et peut être considérée comme une opération chirurgicale. Actuellement, les ministères sont à Paris, le pouvoir législatif est à Versailles, Cette séparation chirurgicale des pouvoirs occasionne forcément des retards dans l'expédition des affaires. Il est évident que, si, en biologie, la moelle allongée, où siègent les ministères, n'était pas en communication directe avec les hémisphères cérébaux, où siège le pouvoir délibératif, le temps nécessaire à la transmission des ordres serait accru et les mouvements de l'être seraient ralentis.

«L'économie humaine, dit M. le docteur Guépin, fléchit quand un des organes, un seul, est malade. L'économie sociale souffre, est malade, quand il existe dans son sein des membres ou organes fie la société qui ne peuvent fonctionner selon les conditions régulières et physiologiques de leur vie... Constamment dans l'état de santé, chaque organe reçoit selon ses besoins, et ses be-soins sont proportionnels à son travail, admirable exemple pour I'organisation sociale. Puisse un jour l'humanité le mettre à profit.»

En ce qui concerne l'avenir, suivant nous, à mesure que les sociétés s'organiseront, la solidarité entre les individus, les corporations, les fonctions, ira toujours en augmentant. Actuellement on peut enlever à la société française deux provinces, sans qu'elle s'en aperçoive, ce qui prouve que nos sociétés actuelles sont tout à fait inférieures. Plus tard, la plus petite lésion du plus petit groupe social aura son retentissement dans toute la société,

# Chapitre V.

# Biotaxie sociale.

# *Classification des sociétés*.

On ne peut prendre l'ethnologie pour base de cette classification, attendu qu'il n'y a guère que les sociétés animales proprement dites qui soient formées de races pures, et encore il y a certaines sociétés de *fourmis* où règne l'esclavage qui comprennent plusieurs espèces de *fourmis*.

Nous ignorons si les sociétés animales ont été jamais classées. Quant aux sociétés humaines, elles ont été classées de différentes façons. On a pris pour base le degré de civilisation, et pour caractéristique de la civilisation, la religion, ou les moyens industriels en usage dans chaque société, ou la condition de la masse et celle de la femme et des travailleurs. M. Pruner-Bey a classé les société? d'après le système de numération; M. Fetis, d'après le système musical; M. César Daily, d'après le style architectural. On les a classées d'après l'archéologie, la linguistique, l'industrie, la jurisprudence, la forme politique, l'esthétique, la mythologie, en un mot, d'après les diverses manifestations de la sociabilité.

Ces classifications nous paraissent défectueuses, parce qu'elles ne peuvent s'appliquer qu'aux sociétés humaines et qu'elles sont faites à des points de vue particuliers.

Il existe d'autres classifications qui sont plus naturelles, parce qu'elles reposent sur la biologie et sur le développement des besoins sociaux. Ces besoins sont d'abord végétatifs, puis successivement sensitifs, moraux, affectifs, scientifiques. Le besoin physique, la morale, l'esthétique, la science marquent les quatre degrés du développement social.

Suivant nous, c'est encore à la biologie proprement dite qu'il faut emprunter sa classification naturelle, «La zoologie n'étudie pas des caractères, des propriétés considérés isolément, abstraction faite en quelque sorte des individus, mais des individus doués d'un ensemble de propriétés inséparables de leur substance.

La formation des groupes naturels consiste à saisir, entre des espèces plus ou moins nombreuses, un tel ensemble de caractères analogues et essentiels que malgré leurs différences caractéristiques, les êtres appartenant à une même catégorie quelconque soient toujours en réalité plus semblables entre eux qu'à aucun des êtres d'un autre groupe.» (*Dictionn*. de Littré et Ch. Robin.)

Suivant nous, cette méthodede classification peut être appliquée en Sociologie. On peut retrouver en Sociologie les caractères biologiques des embranchements, des classes, des ordres, des tribus, des familles, des genres, des espèces, des variétés.

Nous croyons que les sociétés doivent être classées suivant leur degré d'organisation.

Chez les sociétés inférieures analogues aux *zoophytes*, il n'y a pas de gouvernement ni, à plus forte raison, de délégation gouvernementale. Il n'y a pas de lois ni d'institutions civiles. Il n'y a que des coutumes instinctives; les fonctions sont à peine ébauchées. Chez d autres sociétés, dont l'organisation rappelle celle des *mollusques*, le système administratif naît et se complique de plus en plus à mesure qu'on s'élève sur l'échelle sociale. Il y a un chef auquel obéissent les membres de la société. Les coutumes se transforment en lois écrites, de même qu'en biologie l'instinct fait place à l'intelligence. Il y a des voies do communication, un rudiment de capitale; le commerce et l'industrie commencent à se développer.

D'autres sociétés sont organisées comme les *annelés* et forment une véritable fédération. Il y a un gouvernement central avec des délégués dans chaque province. Chaque province se suffit à elle-même, A son agriculture, son commerce, son industrie, son gouvernement, sa police propres. Ces provinces ont une administration autonomique, mais elles sont soumises à une autorité supérieure.

Enfin, nousarrivons aux sociétés *vertébrées chez* lesquelles s'opèrent la centralisation et la fusion des zoonites sociaux. Alors la division du travail, la spécialisation des fonctions sont extrêmes Les différentes parties de la société sont unies par une solidarité telle, qu'on ne pourrait diviser l'être social sans compromettre son existence.

Au point do vue de la répartition des sociétés sur le globe, on peut dire de l'ensemble des sociétés ce qu'on a dit des faunes. Les sociétés australiennes sont colles qui nous représentent au plus haut degré les caractères des sociétés primitives. Puis viennent les sociétés indiennes, africaines, sud américaines. Ici, il serait nécessaire de créer un mot ayant en Sociologie la signification qu'ont les expressions faune et flore en biologie. Quant à la répartition des sociétés, on peut l'apeler la *Sociographie*.

# Chapitre VI.

# Mésoiogie sociale.

# *Influence des milieux sur les sociétés*.

*Influence du milieu physique*. Cette influence est grande pour ceux qui pensent que los transformations animales, et par conséquent sociales, marchent de pair avec les transformations géologiques, et que l'apparition et le développement des êtres et des sociétés ne sont qu'une évolution de la planète.

Le froid éteint toute vie sociale dans certaines sociétés animales et humaines. C'est ainsi que les sociétés formées par les Lapons, les Esquimaux, etc., pourraient être considérées comme des sociétés *hibernantes*.

L'influence du climat sur les actes d'une société est réelle. Dans les pays froids la vie est plus difficile que dans les pays chauds, et les peuples du Nord, poussés par le besoin, émigrent ou envahissent les pays du Midi.

Dans les pays chauds, au contraire, la vie est facile, la concurrence vitale moins grande, les besoins sont moins pressants, le travail moindre.

Comme le besoin est le principal mobile du travail et du progrès, il en résulte que les peuples du Nord se développent en général plus vite que les peuples du Sud.

La question de l'acclimatement est intéressante au point de vue de l'embryogénie sociale. «La connaissance des justes rapports des sociétés entre elles et aussi avec les milieux qu'elles habitent est nécessaire pour comprendre et diriger les grands mouvements humanitaires que nous réserve l'avenir,» (Docteur Daily.)

La mésologie comprend donc encore la connaissance des justes rapports des sociétés entre elles et aussi avec les milieux qu'elles habitent. Il y a à considérer l'influence du milieu social auquel une société peut être exposée. Nous avons traité cette question lorsque nous avons parlé des rapports des sociétés entre elles.

# Chapitre VII.

# Embryogénie sociale.

Lorsque, suivant la loi de Malthus, une terre ne peut plus nourrir la société qui l'habite, certaines parties de cette société sont obligées de temps en temps de se détacher du corps social pour aller fonder une nouvelle société appelée colonie.

Les sociétés supérieures comme les animaux supérieurs, pendant les diverses phases de leur vie embryonnaire, présentent la plus grande analogie de structure avec les sociétés ou les animaux inférieurs adultes. L'évolution d'une colonie représente l'évolution de la société mère, avec cette différence toutefois que l'embryon social atteint en très-peu de temps le degré d'organisation auquel la métropole est parvenue au bout de plusieurs siècles.

## *Ordre d'apparition des organes dans une colonie en formation*.

Ce qui s'organise d'abord, c'est un gouvernement (corde dorsale); puis apparaissent les voies de communication (cœur, gros vaisseaux). Ensuite l'agriculture se développe. En même temps les villes se bâtissent et l'industrie apparaît (muscles, tube digestif glandes), etc.

La colonie, pendant le temps de son organisation, est nourrie par la mère; plus lard, si elle est prospère, c'est elle qui la nourrit. Une colonie étant fondée, il peut arriver deux choses : ou elle reste en rapport avec la métropole, et alors la reproduction s'est laite par gemmation; ou elle s'en sépare pour constituer une société propre, et alors la reproduction s'est faite par scissiparité.

Dans nos sociétés actuelles, comme dans les animaux inférieurs, l'ovaire c est l'animal, c'est la société elle-même. Il n'v a pas de fœtus sociaux comparables aux fœtus des animaux supérieurs. Presque toutes les colonies actuelles se fondent par l'adjonction d'éléments appartenant à des sociétés diverses.

Plus tard, lorsque les sociétés présenteront une organisation comparable à celle des êtres supérieurs, la fonction de reproduction se spécialisera. Des colonies, avant de quitter la métropole, s'organiseront à son image. Suivant nous, la colonie agricole et industrielle de Mettray (Indre-et-Loire) est un spécimen de ce que seront les embryons sociaux futurs.

# Chapitre VIII.

# Paléontologie sociale.

La paléontologie sociale n'est autre chose que l'histoire des sociétés animales et humaines. Paléontologie proprement dite, histoire antéhistorique, histoire ancienne, du moyen âge, moderne, contemporaine: telles sont les sources auxquelles la paléontologie sociale emprunte ses données.

Elle comprend l'histoire des sociétés vívanles et éteintes. Elle montre que les sociétés actuelles descendent par voie de transformation des sociétés qui ont vécu aux différentes époques do la formation du globe.

Le transformisme ne peut être nié en Sociologie. Il explique tout ce que, suivant M. Broca, la théorie de l'évolution des espèces explique en biologie, c'est-à-dire l'existence de la série sociale et le mode de répartition des sociétés qui la composent, la succession des formes organiques et leur complication croissante d'époque en époque, le grand principe de l'unité de composition sociale, révolution des phases embryonnaires qui reproduisent à l'état transitoire, chez les sociétés les plus élevées, les conditions organiques permanentes des sociétés moins élevées, l'existence des organes inutiles ou rudimentaires qui doivent être considérés comme les témoins d un état de choses antérieur où ils étaient plus développés et où ils remplissaient une fonction, l'existence des sociétés anomales, produits d'une évolution inachevée ou contrariée par le conflit des causes multiples qui modifient les organismes, l'existence des parasites sociaux, celle des métis féconds ou inféconds, métis dont le degré de perfection décroît à mesure que la distance des espèces mères est plus grande, et enfin l'adaptation des sociétés au milieu.

## *Modes de transformation sociale*.

Les transformations, sociales ne sont pas générales. Certaines sociétés inférieures n'ont pas bougé depuis que nous les connaissons, de même que nous trouvons actuellement des espèces animales et végétales identiques à leurs congénères des époques géologiques.

Il peat se faire que cet arrêt de développement dure un temps plus ou moins long et soit suivi de transformations nouvelles. Mais dans ce cas l'arrêt n'a été qu'apparent. Les générations sont longtemps restées invariables en apparence, mais elles n'en subissaient pas moins une altération interne qui, arrivée à un certain point, devait produire nécessairement une transformation. Exemple : la Révolution de 89, qui était faite dans les idées avant de l'être dans les institutions.

Chez les sociétés supérieures, chaque génération marque un progrès insensible de développement. Ces sociétés perdent des organes et en acquièrent de nouveaux. Mais cette perte et cette acquisition se font progressivement et non d'une manière brusque. Aussi voit-on dans ces sociétés des organes en voie de disparition et-complètement inutiles et même nuisibles à la société rester à l'état rudimentaire pendant des siècles. La même chose se voit dans les animaux. Exemple : l'appendice du cœcum, etc.

Chez les sociétés supérieures, la rapidité de la transformation augmente avec la perfectibilité.

Enfin, en Sociologie comme en Biologie, il peut y avoir des métamorphoses rétrogrades. Quelquefois cette métamorphose peut être forcée. Exemple : le castor, qui, poursuivi par l'homme, a renoncé à la vie sociale, et de maçon qu'il était s'est fait mineur.

## *Agents de la transformation*.

Milieu, concurrence vitale, sélection naturelle, tels sont les agents à l'influence desquels en biologie on attribue les transformations des êtres. Nous croyons que les mêmes causes produisent les mêmes effets en Sociologie qu'en Biologie.

Le milieu social exerce une certaine influence sur les transformations des sociétés, qu'on peut à ce point de vue diviser en trois catégories : celles qui se civilisent elles-mêmes, celles qui se laissent civiliser, et celles qui résistent a la civilisation. Au contact d'un peuple civilisé, tin peuple à demi-civilisé se développe en civilisation; exemple : les populations autochthones de l'Europe; mais pour qu'il y ait civilisation, il ne faut pas que la distance entre les deux peuples soit trop grande.

La cause indirecte sinon première des transformations sociales, c'est l'accroissement des connaissances entraînant l'accroissement du volume du cerveau. La capacité moyenne du crâne s'est accrue en six ou sept siècles de 35 centimètres cubes, et cet accroissement a porté presqu' entièrement sur la région antérieure du cerveau. Les facultés intellectuelles et morales se sont développées d'une manière exceptionnelle. D'après Darwin, la sympathie s'accroît suivant une certaine progression. La sympathie s'étend à la tribu, puis à de plus grandes communautés, à la nation; à toutes les nations, à toutes les races, à tous tes animaux.

Grâce au développement des facultés de sociabilité, les tribus s'unissent pour former les provinces, les provinces se fusionnent pour former les nations, et celles-ci se fusionnent à leur tour pour former les États unis.

Le mouvement de fusion des sociétés se compose de deux phases : la première est marquée parla fédération destribus, provinces, etc., la seconde par leur fusion en un tout indivisible.

Ces changements, qui modifient la forme et le volume d'une société et qu'on pourrait appeler pour cette raison morphologiques, sont toujours accompagnés sinon précédés de changements internes qui modifient l'organisation même du corps social. Dans chaque commune, dans chaque province, dans chaque partie des sociétés, les systèmes, les tissus, les organes, les appareils sociaux se développent, les fonctions se multiplient en même temps que s'accroît la solidarité qui unit les diverses parties de la société. Grâce à ce travail d'organisation, l'individualisme, la guerre, la concurrence vitale, la lutte pour l'existence font place au libre échange, au solidarisme, représenté par les associations et par l'État, qui n'est que la solidarisation des associations elles-mêmes. Le système nerveux social devient de plus en plus prédominant et finira par présider au fonctionnement de tous les autres systèmes.

Mais, comme nous le disions tout à l'heure, l'organisation n'a pas lieu seulement entre les diverses parties d'une société, elle a lieu entre les sociétés elles-mêmes. Le travail ne se divise plus seulement entre les communes ou les provinces, mais entre les nations semblables qui se fédéralisent comme les segments d'un annelé, en attendant quelles se fusionnent complètement pour former d'immenses vertébrés.

Nous croyons que si l'organisation sociale continue à s'effectuer suivant les lois de la Biologie, il arrivera un moment où les organismes sociaux seront comparables en tous points aux organismes supérieurs. M, Ch. Robin a écrit quelque part : «L'économie animale est le type de toute organisation à imiter ou à suivre du pins près possible, toutes les fois qu'il s'agit de donner une communauté d'efforts à ce qui ne peut s'effectuer que par la division du travail.»

Au point de vue pratique, nous pensons en effet que l'application des lois de l'organisation aux transformations sociales hâterait singulièrement l'évolution des sociétés.

Il importe donc que tous les hommes appelés à jouer un rôle dans le gouvernement soient des biologistes. Il importe que le pouvoir délibératif appartienne à la partie savante et pensante de l'organisme social. Alors les actes sociaux seront intellectuels et non irréfléchis. Alors on ne verra plus des hommes politiques demander le retour à la libre concurrence en matière de transport, la décentralisation gouvernementale et autres métamorphoses rétrogrades.

# Chapitre IX.

# La Sociologie peut éclairer certains problèmes de la Biologie.

Nous croyons que la Sociologie ainsi envisagée peut éclairer certains problèmes de là Biologie.

De même que la physiologie a doté la physique de la plus belle découverte de ce siècle, nous voulons parler de la théorie mécanique de la chaleur; de mémo la Sociologie peut fournir la solution de questions controversées en physiologie.

L'opinion de Haller sur la contractilité, par exemple, ne saurait être contestée en Sociologie.

Suivant nous, la Sociologie peut expliquer le fonctionnement du système nerveux, et la psychologie, qui étudie les diverses fonctions du gouvernement, est plus facile à étudier en Sociologie qu'en Biologie.

Nous croyons, par exemple, que la mémoire, don les psychologues font une faculté spéciale, ne peut être localisée dans une partie du cerveau. Nous pensons qu'il doit y avoir une mémoire de la moelle épininière comme il y a des archives de préfectures, une mémoire de la moelle allongée comme il y a des archives de ministères, etc.

# Chapitre X.

# Conclusion.

En résumé, les sociétés naissent, vivent et meurent comme les autres êtres. Pendant leur vie, elles se nourrissent, se développent, se reproduisent, se meuvent, sentent, pensent, veulent, en un mot, s'organisent comme les autres organismes connus. En outre, comme les autres êtres vivants, elles forment une série susceptible d'une classification naturelle.

Mais cette classification ne peut être définitive, attendu que certaines espèces sociales comme certains êtres ne sont pas fixes ni invariables, mais se modifient peu à peu sous l'influence du transformisme, pour donner naissance à des formes spécifiques nouvelles.

De ce parallèle entre les sociétés et ces êtres, nous concluons qu'une société est un véritable organisme devant être observé, étudié et classé suivant la méthode usitée en Biologie. Nous disons que les sociétés sont des organismes. La réciproque a été affirmée souvent. Gœthe a dit : «Un être vivant est toujours une pluralités Pour M, Carl Vogt, l'animal total est un phalanstère. M. Virchow a dît : «On peut appeler l'État un organisme, car il se compose de citoyens vivants. On peut de même appeler l'organisme un État, une société, car il consiste en membres vivants de même origine.»

Suivant nous, la vie est toujours semblable à elle-même, c'est-à-dire que les fonctions par l'exercice desquelles elle se manifeste sont les mêmes chez tous les êtres vivants, et on ne peut pas dire qu'une société n'est pas un être vivant. Suivant, nous, les lois de l'organisation sont les mêmes pour tous les corps organisés, que ces corps soient des plantes, des animaux ou des sociétés. Voilà pourquoi nous pensons que la Sociologie doit nous donner la clef de tous les problèmes de Biologie non encore résolus. En un mot, de même que, suivant la belle expression de M. Claude Bernard, la physiologie n'est au fond que la physique des êtres vivants, de même la Sociologie n'est que la biologie des sociétés.

Paris.—Imprimerie Gauthier-Villars, quai des Grands-Augustins. 55. (Ancienne imp. Bonaventure.)

Paris.—Imprimerie Gauthier-Villars, quai dés Grands-Augustins, 55.
Annual Report of the Collector General of Customs coat of arms
Relative to the Imports, Exports, Immigration and Navigation of the Hawaiian Islands
For the YEAR ENDING DEC. 31, 1885.
*Advertiser Steam Print Honolulu*.

# Report of Collector General of Customs, Hawaiian Islands, 1885.

FINANCE DEPARTMENT, BUREAU OF CUSTOMS,

February 18th, 1886.

His Excellency Jno. M. Kapena, *H. H. M.'s Minister of Finance, &c.*

SIR:—In conformity with the requirements of Section 553 of the Civil Code, I have the honor to submit to Your Excellency the annual report of the business of this Bureau for the year ended December 31st, 1885.

## Exports and Imports.

The total value of exports and imports of merchandise during the year amounted to $12,899,862, as against $12, 832,696 for 1884, showing an increase of $67,166.

The total exports of both domestic and foreign production for 1885 amounted to $9,069,318, showing an excess over the value of such exports during 1884 of $874,135.

The imports of merchandise was $3,830,544, as against $4,637,514 during the preceding year, showing a decrease of $806,970.

The excess of the value of exports over imports of mer- chandise during the year amounted to $5,238,774, being an increase of $1,681,105 as compared with 1884.

During 1885 the specie imports were $724,075, as against $1,180,361 in 1884. The exports of specie during 1885 amounted to $64,602, showing an excess of imports of $659, 473 over the exports for the year.

## Domestic Exports.

The total value of domestic exports for 1885 amounted to $8,958,663, showing an increase in the value of such exports, as compared with 1884, of $880,755.

The exports of sugar show a marked increase for the year. The total quantity exported during 1885 was 171,350,314 pounds, valued at $8,356,061, an increase of 28,695,391 pounds over the total export of the preceding year.

Next to sugar in value among domestic exports stands rice, amounting to $387,296 during 1885. The export of rice fell from 9,493,000 pounds in 1884 to 7,367,253 pounds during 1885, a decrease of 2,125,747 pounds.

Hides stand third on the list of domestic exports. During 1885, the export value of hides amounted to $71,532. Bananas stand next with a valuation of $58,809; and wool $49, 573. The aggregate value of these five commodities constitute 99.60 per cent. of the total domestic exports for 1885.

## Imports of Merchandise.

The value of imports during the year, as already stated, amounted to $3,830,544, a falling off from the imports of 1884 of $842,544, or 22 per cent. The decrease in the value of dutiable goods was $383,420; goods free by treaty, $323,041, bonded goods, $92,332; and goods free by Law, $43,751. Of this decrease in imports $735,468, or 87.29 per cent. occurred during the first six months of the year 1885.

## Commerce with Foreign Countries and Our Carrying Trade.

The total value of our exports to and imports from the United States, during the year 1885, aggregated

$11,874,043, or 92.04 per cent. of the value of our foreign commerce. The value of our commerce with Great Britain was $486,023, or 3.76 per cent.; with Germany, $161,892, or 1.25 percent.; with China and Hongkong, $134,318. or 1.04 per cent.; with Australia and New Zealand, $85,984, or 0.67 per cent.; and with all other countries, $157,599, or 1.24 per cent.

Of the total value of goods transported in our foreign trade 89.05 per cent. was carried by American vessels, 5.68 per cent. in British vessels; German, 2.11 per cent.; 1.81 per cent. in Hawaiian; 1.25 per cent. Norwegian; and in vessels of all other nationalities, 0.10 per cent.

## Tonnage.

The total tonnage of Hawaiian vessels engaged in the coasting trade for 1885 was 9,249 tons, as against 9,826 tons for 1884.

The tonnage entered at ports of the Hawaiian Islands in its foreign trade during 1885 was 190,138 tons, of which 133, 044 tons were American, 43,203 British, 6,610 Hawaiian, 3,257 German, and 4,024 other nationalities.

I may here mention that during the year, 1 steamer, 2 schooners, and 1 brig, with a total tonnage of 669 tons, have been added to the list of Hawaiian registered vessels. The casualties to our shipping for the same period number 5 vessels.

## Immigration and Passenger Movements.

During the year, 5,410 immigrants arrived in the Kingdom. Of this number 3,108 arrived from China, 1,961 from Japan, and 341 from other countries. The departure of immigrants aggregated 1,805, showing an excess of arrivals over departures of 3,605.

The number of passengers that arrived during 1885 was 1,730; departures, 1,783; passengers in transit, 4,327.

## Customs Revenue.

The receipts from all sources during the year amounted to $502,337. This, however, includes the sum of $12,577 realized upon contraband goods, principally opium. Of the total customs revenue collected the duties on spirits amounted to $247,991, or 49.37 per cent.; and upon merchandise, $156,800, 31.21 per cent. The receipts from all other sources amounted to $97,546, or 19.42 per cent. of the total revenue collected.

A comparison with the year 1884 shows a decrease of $22, 804 on the duties levied on spirits, and $35,905 on merchandise.

The total decrease on customs revenue for the year 1885 amounted to $49,399.

A series of tables are herewith submitted giving detailed statements of the exportation and importation of merchandise, and other facts pertaining to the foreign trade and maritime interests of the Kingdom during the year under review.

It will be seen that in the construction of these tables, comparative statements, and other details of value for statistical work, have been added to the tabulated statements that heretofore accompanied the annual report of the Customs Bureau. The growing importance of the foreign and domestic trade of this Kingdom, and the consequent demand for accurate information at home and abroad, suggested this innovation upon the established method.

The following are the tables in the order named:

- Statement showing the quantities and values of principal articles of export, 1885.
- Comparative table by quarters, showing the values of domestic export, 1884 and 1885.
- Exports of domestic products, showing countries to which exported.
- Statement showing values of foreign and domestic exports, 10 years, 1876 to 1885.
- Statement exhibiting the values of imports of merchandise into the Hawaiian Islands for the year 1885.
- Total values of imports of merchandise, 1885, showing countries from which imported.
- Imports and exports of gold and silver by months, during the year 1885.
- Statement of the value of exports and imports, 1876 to 1885, showing annual excess of exports over imports.
- Exports and imports of merchandise from and into the Hawaiian Islands, by countries, for the year 1885.
- Statement showing the total value of exports and imports carried by vessels of each nationality during 1885.
- Value of domestic products carried by vessels of each nationality, 1885.
- Statement showing quantity of spirits, wines and other liquors withdrawn for consumption during 1885.

- Tables showing the number, tonnage and nationality of all vessels entered and cleared at ports of the Hawaiian Islands for the year 1885.
- Statement of the number, tonnage and nationality of vessels entered at ports of the Hawaiian Islands during the years 1876 to 1885, inclusive.
- List of Hawaiian registered vessels, showing number, class and tonnage.
- Statements showing the number and nationality of immigrants that have arrived and departed, and passenger movements for 1885.
- Statement showing quantities and values of imported merchandise and spirits remaining in warehouse December 31st., 1885.
- Comparative table of customs receipts, 1884 and 1885.
- Statistics of imports, showing in detail the quantities and values of merchandise subject to duty, free by treaty, bonded, and free by Law.

Respectfully submitted,

Curtis P. Iaukea,
*Collector General of Customs.*

## Table No. 1.

## Domestic Exports Hawaiian Islands, 1885.

ARTICLES. QUANTITY. VALUE. Sugar, pounds Rice, pounds Hides, pieces Bananas, bunches Wool, pounds Goat Skins, pieces Molasses, gallons Dried Bananas, boxes Betel Leaves, boxes Sheep Skins, pieces Coffee, pounds Fungus pounds Calf Skins, pieces171,350.314 7,367,253 19,045 60,46474,121 19,782 57,941 892 350 8,783 1,675 1,137 26$8,356,06104 387,296 63 71,532 78 58,809 50 49,573 93 15,023 32 7,050 00 4,265 00 1,945 00 1,735 62 283 00 113 70 20 00 4.954 36 $ 8,958,663 88Total value

## Total Value of all Exports Hawaiian Islands, Domestic and Foreign.

Value Domestic.Value Domestic And Foreign.Total value Honolulu Total value Kahului Total value Hilo Furnished as Supplies to Merchantmen (as per estimate) Furnished as Supplies to National Vessels (as per estimate) Value Foreign Goods Total value Specie $ 64,602 00$ 7,855,795 11 1,345,168 00 257,700 77 71,500 00 18,000 00$ 8,958,663 88 89,500 00 110,654 13 $ 9,158,818 01

## Table No. 2. Comparative Table,

Showing the Value of Domestic Exports by Quarters for the Years 1884 and 1885.

18841885INCREASE.DECREASE.Value First Quarter Value Second Quarter Value Third Quarter Value Fourth Quarter Total value $ 2,408,818 59 2,846,161 82 1,772,131 85 1,050,796 56$ 2,639,473 26 3,485,152 09 1,540,491 35 1,293,547 18$ 230,654 67 638,990 27 242,750 62$231,640 50$ 8,077,908 82$ 8,958,663 88$ 880,755 06

## Table No. 3.

## Table of Principa Domestic Products Hawaiian Islands, 1885.

Showing the Countries to which Exported.

COUNTRIESSUGAR POUNDSMolasses, POUNDSRice POUNDS COFFEE POUNDS FUNGUNS,POUNDSBANANAS POUNDSGOAT SKINS POUNDS HIDES, POUNDS CALF SKINS POUNDS Sheep ins POUNDSWOOL POUNDS BETEL LEAVES POUNDS Pacific Ports, United States171,846,62557,9417,362.2001,30060,04619,78219,045268,783474,121850837Australia and New Zealand55Islands int the pacific3,6894,953275China 1001001,137Totals 171,350,31457,9417,307,2581,0751,18760,04619,78219,045268,783174,121350892

## Quantities of the Principal Domestic Exports of the Hawaiian Islands During the Ten Years 1870 to 1885, Inclusive.

YEAR ENDING DECEMBER 31. COMMODITIES. 1876. 1877. 1878. 1880. 1879. 1881. 1882. 1883. 1884. 1885. Sugar, tbs Rice, tbs Paddy, tbs Wool, tbs Tallow .. tbs Pulu .. tbs Coffee, tbs Molasses, .. galls Peanuts .. tbs Goat Skin, pcs Fungus tba Whale Oil, .. galls Whale Bone tbs Bananas bchs Hides, ..pcs Ivory tbs Farina tbs Run galls Horns, lbs. Sheep Skins, ... pcs Cocoanuts Cattle. ......... hd Pol, ......... bill Betel Leaves....bxs Hay, tons Salt ... .tons Sperm Oil, galls, Calf Skins...pcs Dried Bananas, bxs 25,575,905 2,091,370 2,571,987 385,703 369,829 100,586 131,045 151,402 64,616 51,551 11,629 186 11,507 15,995 22,164 4,054 384 410 176 322 805 195 26,072,429 2,259, 324 1,542,663 405,542 827,291 314,432 153,667 139,073 83,947 46,265 35,893 33,518 23,965 14,982 11,105 7,917 5,605 5,455 4,736 3,425 2,000 828 626 163 60 50 38,431,458 2,767,798 2,784,Wil 522,757 239,941 212,740 127,963 93,136 2,312 64,525 22,364 7,254 14,865 13,131 25,309 4,799 467 412 221 180 49,020,972 4,792,818 38,816 646,308 137,001 74,275 87,475 27,675 24,940 2,571 816, 12,869 24,885 2,184 50 167 62 50 168 68,584,871 6,469,840 381,816 19,169 44,846 99,508 198,355 31,013 14,801 14,662 10,977 19,164 22,945 840 2,230 30 223 14 80 114,177,938 12,109,475 459,633 528,913 77,8 98 8,181 221,293 23,402 2,111 28,848 26,007 4,385 12 303 70 93,779,483 7,682,700 102,370 528, 489 119,031 53,415 18,912 268,587 21,368 4,282 20,776 21,972 6,820 29 230 302 114,107,15ft 11,619,000 1,368,705 318,271 32,252 16,057 193,577 24,738 S, 783 44,902 38,955 6,583 1,020 190 142,654,923 9,4'J3,000 46,224 407,023 2,864 465 4,231 110,530 20,125 2,247 58,040 21,026 8,038 416 117 106 171,350,314 7,867, 253 474,121 1,675 67,941 19,782 1,137 60,046 19,045 8,783 350 26 892 651

## Table No. 5.

## Imports Hawaiian Islands, 1885.

ARTICLES. VALUE GOODS PAYING DUTY. 1 29,758 88 254 00 22,147.12 150,903 04 20,230 57 35,800 36 39,394 34 10,684 88 25,545 78 84,923 47 14,441 63 76,887 08 8,477 17 1,199 02 357 00 30,977 01 345 16 94,813 99 6,181 94 3,801 54 Ale, Porter. Beer, Cider ...... Animals and Birds; Building Materials., Clothing, Hats, Boots ...... ..... Coal ana Coke ........ ....... Crockery, Glassware. Lamps, Lamp Fixtures. Diplomatic Representatives (sundries) Drugs, Surgical Instruments and Dental Materials Cottons ....... .. Linens..... Dry Goods.. Silks; . Woolens .... Mixtures .......... Fancy Goods. Millinery, etc .... ... Fertilizer and Bone Meal Fish (dry and salt) Flour Fruits (fresh) Furniture Grain and Feed...... Groceries and Provisions ... Guns and Gun Materials.. Gunpowder......... His Majesty (sundries). Hawaiian Government (sundries). 51,075 11 4,081 56 21,929 66 1,880 44 Hardware, Agricultural Implements and Tools Iron, Steel. etc Jewelry. Plate. Clocks Leather VALUE GOODS FREE BY TREATY. VALUE GOODS IN BOND. VALUE GOODS FREE BY CIVIL CODE. TOTAL. $ 33,301 89 $ 63,060 77 $ 50,475 05 $ 6,017 00 56,746 05 50,301 19 32,353 71 1,800 30 110,090 23 7,115 16 268,109 33 71,576 16 71,576 16 221 11 20,457 68 185 23 185 23 56 99 35,917 35 140,380 95 648 26 180,429 55 1,093 34 11,778 22 68614 26,231 92 13,128 10 26 81 48,078 38 1,836 04 36 51 16,314 18 5,800 73 4,770 93 28,140 45 87,467 74 28,140 45 62,474 87 25 00 70,977 04 143, 146 28 12 32 144,357 62 12,739 82 13,096 82 29,672 68 173 52 60,823 21 200.102 86 200,448 02 297,330 70 6,457 57 398,632 26 3,579 54 242 00 10,003 48 6,831 91 3.861 54 6.831 91 33,807 32 33,867 32 116,540 62 350 13 168,565 86 29,079 67 203 00 8,155 63 30,310 86 22,132 66 39,465 55 41,3345 99

Lumber ... Machinery .... ... Matches. ..... .. ..... Musical Instruments . .... .... .... Naval Stores .. . Oils (cocoanut, kerosene, whale, etc.) Paints, Paint Oil and Turpentine Perfumery and Toilet Articles Plants and Seeds : Railroad Materials, Kails, Cars, etc Returned Cargoes .... Saddlery, Carriages and Materials Sheathing Metal ........... ...... .. .. ... Shooks, Bags and Containers Spirits ... ....... Stationery and Books Tea .. "i..........; Tin, Tinware and Materials ... Tobacco, Cigars, etc .. Wines (light). i... Sundries by permission Sundry Personal and Household Effects Sundry Merchandise not included in the above . Charges on Invoices .. .. 25 per cent. added on Uncertified Invoices Total at Honolulu Total at Kahului Total at Hilo Total at Mahukona. Total Hawaiian Islands Specie Discounts Damaged and Short 381 41 35,239 29 169 89 6,709 69 1,825 18 15,625 56 24,433 58 8,465 30 12,561 36 18,572 27 117,589 78 4,790 04 12,542 30 17,396 80 4,915 08 6,295 51 11,751 37 38,399 61 31,707 94 2,417 64 $1,058,637 25 39,652 62 14,089 30 1,552 43 196,095 82 187,741 84 11,053 13 10,112 86 31,737 55 66,826 76 25,657 53 11,500 72 628 49 14,445 81 118 00 49,281 07 1,357 37 132,999 31 93,339 62 59,365 18 17,502 20 4,915 08 132,003 70 26,534 94 26,989 27 14,642 42 71,219 21 64,679 20 2,410 35 $3,435,245 22 22,684 11 146 39 $ 3,412.414 72 243,775 49 161,104 27 13,250 10 $ 3,830,544 58 195,714 41 152,505 55 10,701 48 3,403 17 29,329 27 50,671 20 1,043 10 2,969 45 1,884 45 30,708 80 5,665 10 45,375 13

84,781 29 30,302 03 28,775 42 $ 1,962,102 25 192,308 87 1441001 94 8,305 42 121 76 58310 530 00 180 85 65 97 8,016 43 88,549 58 167 00 105 40 40,926 90 14,783 57 2,517 57 4,195 84 22 71 $ 218,587 72 130 00 628 49 118 00 1,357 37 1,128 00 1,280 75 26,983 27 14,642 42 $ 195,918 00 11,684 00 3,013 03 3,392 25 $ 724,075 70

# Table No. 8.

# Value of Exports and Imports, Hawaiian Islands, for 10 Years, 1876 to 1885, Inclusive.

Showing Excess of Exports Over Imports.

YEAR. Imports. Exports. Excess Imports. Excess Exports. 1876 1877 1878 1879 1881 1882 1883 1884 1885 $ 1,811,770 56 2,254,356 09 3,046,369 70 39 3,673,268 41 64 4.974,510 01 5,624,240 09 4,637,514 22 3,830,544 58 $ 2,180,741 91 2,577,652 18 3,402,371 84 3,703,717 97 4,875,694 87 6,737,386 56 8,219,016 70 8,021,843 88 8,195,182 63 9,069,318 01 $39,260 42 $ 368,971 35 23,296 89 416,002 14 1,202,426 46 2,189,407 92 3,244,506 69 2,397,603 79 3,557,668 41 5,238,773 43 $ 38,443,530 69 $ 57,042,927 35 $ 18,599.396 66 *Reciprocity Treaty with United States went into effect September. 1876.

# Table No. 6.

# Statement Showing the values of Merchandise Imported at all Ports of the Hawaiian Islands During the Year 1885, by Countries.

COUNTRIES FROM WHICH IMPORTED.Goods Free by Treaty.Goods Paying Duty.Merchandise and Spirits, Bonded.Goods Free by Civil Code.Total.Percent.United States—Pari fir Ports $2,129,036 55 164,650 82$ 412,119 37 12,822 55 409,407 72 141,825 38 96,936 89 11,416 56 10,211 60 1,038 00 $ 120,759 73 3,561 32 47,588 43 14,067 96 21,927 26 6,586 09 4,172 07 915 00$ 97,880 66 29,027 02 5,999 55$ 2,940,837 00 486,023 17 161,892 89 118,864 15 68,626 86 14,383 67 39,916 8476.77 12.69 4.23 3.10 1.79 38 1.04United States—Atlantic Ports. Great BritainGermany China and Hongkong Australia and New Zealand51,024 21France. Other Countries and by Whale ships 8,488 0029,475 84$ 2.302.181 37$ 1.095.778 07$ 218,577 86$ 214,007 28$ 3,830,544 58100.00

# Imports and Exports of Specie, 1885.

Imports. MONTHS.GOLD.SILVER.COIN SPECIMENS.U. S. CURRENCY.January February March$20,000 00 35.0 00 65,410 00 49,88000 75.0 0 0 51,120 00 50.0 00 170,000 00 41,540 00 65.0 00 50.0 00 47,438 00$17 25$297 50$160 00April. 131 00 417 90 159 75 168 00May .. . .June July August September. October November December200 0098 35Total..$ 720,388 00$ 217 25$ 1,267 50$ 160 00Freight and chargs, $2,042 95. Total value of Specie imported. $724,075 70.

Exports. MONTHS.GOLD.SILVER.CURRENCY.January February $ 25,912 46 6,211 05 2,010 00 4,012 34 900 00 4,425 00 4,310 00 900 00 3,459 00 2,330 00 1,945 00March April May June $ 507 45 474 85 286 00 773 00 860 00 732 00 1,473 35 2,425 50July August September $ 655 00OctoberDecember. Total $ 56,414 85$ 7,532 15$ 655 00Total value of specie exported, $ 64,602 00.

# Table No. 9.

# Value of Exports and Imports of Merchandise from and into the Hawaiian Islands, by Countries, During the Year 1885.

COUNTRIES.EXPORTS.IMPORTS.Total Imports and Exports.Per Cent.Domestic.Foreign. Total.United States—Pacific Ports United States—Atlantic Ports Great Britain. 9 8,867,913 60 9 65,292 84 9 8,933,206 44$ 2,759,796 311 181,040 691 486,023 17 161,892 89 118,864 15 68,626 86 54,300 51$ 11,874,043 44 486,023 17 161,892 89 134,318 39 85,984 86 157,599 8492.04 3.76 1.25 1.04 .67 1.24Germany China and Hongkong

Australia and New Zealand, .. All Other 489 70 80 00 90,180 5814,964 54 17,278 00 13,118 7515,454 24 17,358 00 103,299 33Total .....9 8,958,663 889110,654 13 $9,069,318 011 3,830,544 38$ 12,809,862 59 100.00

# Table No. 10.

# Statement Showing Total Value of Exports and Imports Carried by Vessels of each Nationality, 1885.

NATIONALITY.EXPORTS.IMPORTS.Total Imports and Exports.Per Cent of Total.Domestic.Foreign.Total.American ........ .. ... British . ... German Hawaiian ... ..... Norwegian ... All Other ...$ 8,238,631 10 321,637 69 102,100 00 139,452 28 156,842 819 91,650 32 7,152 27 1,129 00 10,722 54$ 8,330,281 42 328,789 95 103,229 00 150,174 82 156,842 81 $3,158,081 74 403,986 08 167,781 70 84,154 77 4,004 36 12,535 84$ 11,488,363 16 732,776 04 271,010 79 234,329 59 160,847 17 12,535 8489.05 5.68 2.11 1.81 1.25 0.10 Total9 8,958,663 88$ 110,654 13$9 069,318 011$3,830,544 58$ 12,899,862 59 100.00

# Table No. 11.

# Showing Nationality of Vessels Carrying Domestic Products. Hawaiian Islands, 1885.

VESSELS CLEARING NATIONALITY.Total Cleared.Without Cargo. With Cargo.Value Dom. Produce.per cent of totalNo.Tons.No.Tons.No.Tons.American ... 184131,0115248.30413282,707$ 8,235,631 1091.96British 3038,7492433,68265,067321,637 693.59Hawaiian196,982134,64762,335139.452 281.56Norwegian 32.29421,21211,082156,842 811.75German 52,37741,6791698102,100 001.14Japanese11,52311,523French27202720Total ..........243181,6569891,76714591,888$ 8,958,663 88100.00

# Table No. 12.

# Spirits Withdrawn from Warehouse for Consumption. During the Year 1885.

ARTICLE. First Second Third Fourth Total. Quarter. Quarter. Quarter. Quarter. SPIRITS AND SPIRITUOUS COMPOUNDS. Rum Gals. 137 36 12 109 294 Gin................................ Gals. Brandy Gals. 5,561 5,228 3,647 6,356 20,792 5,307 3.724 3,522 3,799 16,412 Whisky ..................................Gals. 3,057 3,154 2,781 3,029 12,021 Alochol. Samshoo Cordials, Etc. 254 8,425 102 1,129 5,313 164 1,334 6,941 84 675 6,094 81 3,392 26,773 431 WINES. Champagne................... Doz. Pts. Champagne................... Doz. Pts. Sherry. Gals Pert Gals Light Wines 106 77 414 58 35 144 148 99 162 65 62 251 377 273 971 1,000 3,268 301 1,795 381 3,163 372 8.397 2,114 16,623 MALT LIQUORS. Beer and Porter . ... Doz Qts. Beer and Porter . ... Doz Qts. Beer and Porter .......Gals 8,396 4,849 22 2,236 3,613 1,490 4,558 4,892 675 12,285 8,045 1.674 27,475 21,399 3.861

# Table No. 13.

# Statement Showing the Number, Tonnage and Nationality of Vessels Entered at each Customs District, Hawaiian Islands, 1885.

CUSTOMS DISTRICTS INTO WHICH AND COUNTRIES FROM WHICH ENTERED.AMERICAN.BRITISH.HAWAIIAN.GERMAN.ALL OTHER.total.No.Tons.No.Tons.No.Tons.No.Tons. No.Tons.No.Tons.HONOLULU.Panifie Ports, United Slates11391,2701017,97273,045130112,287Atlantic Ports, United states. 42,701 42,70,Australia and New Zealand1514,0411519,44311,122147331,1193530,498British Columbia .65,180 65,180China and Japan.,..

31,3442912140811,52377,247Islands in N. and S. Pacific14715577273881,780Germany.21,57821,578South American Ports.14321432Great Britain. 53,8191,08264,901Madeira 11,05711,057KANULUI.Pacific Ports. United States339,424839,424Hilo, Hawaii. 15141514MAHUKONA.Pacific Ports, United Slates39863986HILO.Pacific Ports, United States113,61551,866105,481Total No. and Tonnage191183,04433 3343,203186,6106 13,257 54,021253190,138

## Statement Showing the Number, Tonnago and Nationality of Vessels while Cleared at Each Customs District, Hawaiian Island, 1885.

CUSTOMS DISTRICTS FROM WHICH ANDAMERICAN.BRITISH.HAWAIIAN.GERMAN.ALLOTHER.TOTAL.COUNTRIES FOR WHICH CLEARED.No.Tons.No.Tons.No.Tons.No.Tons.No.Tons.No.Tons.HONOLULU.Pacific Ports. United States11687,0291820,06554,32531,43642,315146115,170Australia and New Zealand611,730915,3321527,071British Columbia32,4401473169953,618China and Japan1114,48733,3521337146811,523173,618Islands In N. and S. Pacific31,41399431220, 107 2,350KAHULUIPacific Ports. United States329,195 329,195British Columbia Hilo.15141514Pacific ports, United States82,688 31,377114,005kahulul 15141514MAHUKONA.Pacific Ports, United States Honolulu Kahulul 1 1 1480 272 228 1 1 1486 272 228Total No. and Tonnage..184131,011 3038,749186,98252,37754,537243183,656

## Whailing Vessels at Ports of Hawaiian Islands.

NATION. HONOLULU. TOTAL. INSIDE. OUTSIDE. American No. Tons. No. Tons. No. Tons. 7 1,435 19 6,588 26 8,073

## National Vessels at Honolulu.

ARRIVED.NATION.NAME.COMMANDER.GUNS.FROM.SAILED.DESTINATION.February 3d—May 1st May 12th September 22d September 22d November 21stFrench American Russian. Italian British BritishKergulen— Hartford Djeghit . ... Christoforo Colombo Satellite. .. Constance.Ageuor Fournier J. H. Upshar Chas. de Muller Accumi Eurico. A. H. Alliugton F. P. Doughty6 14 12 10 8 14Callao. Valparaiso ... Callao Yokohama Esqaimault Acapulco.February 11th May 11th May 19th ... September 28th October 10th. November 30thYokohama San Francisco. Nagasaki Acapulco Hilo.. Hongkong. ...

## Table No. 14.

## Table of Arrivals at Hawaiian Island for Ten Years.

## Show Nationality, Number and Tonnage.

NATIONALITY18761877.1878.1879. 1880.1881.1882.1883.1884.1885.No.Tons.No.Tons.No.Tons.No.Tons.No.Tons.No.Tons.No.Tons.No.Tons.No.Tons.No.Tons.American.8875,08211279,58814298,28914992,7981479 13,672186,610German 31,4992 79732,408 86,13693,308107,709115,71664,882 42,95963,257British 2222,7182125,9782934,522 2730,7032631,2013235,3021456,0254253,310 2941,3983343,203Norwegian.21, 033 198418451577151321,781Tahitian..2848 22724176104407308 6264French.21,1891588 42,56839811535124443,2252720Dutch1330Nicaraguan. 14491441Russian1126Bolivian1441275519721441Argentine R.1178Costa Rica.21,404Belgian ..49,188Peruvian.11,368Chinese .. 1 84932,64744,701Swedish25781242Jalnit1167131Honduras ..15081 5801,305Japanese11,523Total..138107,762168116,621216158,543220138,271206134,616258 169,341258172,619267185,316241187,826263190,138

## Table No. 15.

## List of Hawaiian Registered Vessels.

MERCHANTMEN. REGIS TER.CLASS.NAME.TONS.REGIS TERCLASSNAMETONS193 new 216 new 220new 237 newBark Schr. Brig BrigKalakaua Jennie Walker Ninito Hazard401 89.95 137 85.90 245 07.95 159 16.95239new 209 new 249 new 282 newBark Schr Brig TernThos K Poster General Siegel Allie Rowe. Ke Au Hou1121 79.95 39 87.95. 337 47 95 95 15 95

COASTERS. 234 newSloopKahihilani11 .45.95195 newStmrWaimanalo49 81 95166 newSehrNettle Merrill158 77.95179 newSchr.Leahi 103 28 95171 newSchrCat. Ap. Long.43 85 95177 newStmrLikelike 596 58 95215 newSchrKaulkeaouli 139 70.95205 newStmrMoknlii 96 78 95230 newStoopHealani9 67.95205 newSchr.Mokuola17 10 95245 newStmrKapiolani—24 24.95197 newSchr.Lihollho 122 35 95171 oldSchrManuokawai51 45 95253 newSchrDomitila73 25 95221 newStmrIwalani 434 40 95183 newSchr.llaleakala116 75 95188 newSchrWaiehu60 37.95247 newStmrW G. Hall590 05 95190 newStmrKiiauea Hou 271 10 95218 newSchrSarah Eliza22 78 95204 newStmrLehna217 91 95185 newSchrMary E. Foster132 06 95250 newSchrKulamanu.127 35 95243 newStmrKinau ..868 77 95251 newStmrJas. I. Dowsett131 35 95244 newSchrKawailani41 87 95161 newSchrKa piolani 10 78 95219 newSchrMana..107 10 95207 newStmrJames Makee244 15 95180 newSchrWailele75 85.95194 newSehrWai main95 75 9541 newSchr.Rob Roy..25 48 95230 newSchrEmma 94 26 95186 newSchr..Waioli65 68 95240 newSchrRainbow 23 23.95220 newSehrJosephine.8 88 95232 newSchrEhukai ..45 36 95155 newSchr.Mille Morris22 32 95158 newSchrKa Mol ...154 10 95208 newSchrMalolo 133 65 95241 newSc JnkMamo7 26 95242 newStmrPlanter500 20 95218 newStmrC R Bishop281 30.95

RESUME OF HAWAIIAN VESSELS. CLASS NO TONS CLASS NO TONS Barks Brigs Schooners.. . 2 1,526 68 95 1,041 70 95 2,258 40 95Steamers 134,306 70 95 21 12 95 3 Sloops 2 30Tern 195 15 95 Total number, 1884 Total number, 1885 53 51Total tonnage, 1884 Total tonnage, 1885 9,826 29 95 9,249 75 95Decrease in number, 18852Decrease in tonnage, 1885576 54 95

# Table No. 16.

# Passenger Statistics, Arrivals and Departures, Port of Honolulu.

From and to.FROM.TO.Chinese.Adults.Children.Adults.Children.San Francisco. Oregon and Washington Ter. Humboldt and Eureka Japan and China Australia and New Zealand. Islands in the Pacific Atlantic Ports European Ports 1,375 9 7 5 90 65 2 16139 1 6 2 1 121,332 23 3 10 133 29 231 5 4 9 22Totals1,5691611,5302512Total Arrivals for the Year. 1,730 Total Departures 1,783 Excess of Departures 53

Passengers in Transit. From San Francisco, Rouud to Australia and New Zealand 1,855 From Australia and NewZealand, Bound to Stui Francisco 1,3-11 From Victoria, B., Bound to China 1,100 From San Francisco, Bound to China 491 From Tahiti, Bound to San Francisco 10

# Arrivals and Departures of Immigrants, 1886.

FROM.CHINESE.JAPANESE.PORTUGUESE.From.To.From.To.From.To.A.C.A.C.A.CA.C. A.C.A.e.China, via San Francis Japan.. China, direct St. Michaels & West. Is. San Francisco 2,960 11032 6176 1,3861 551,846115 193 24 120 49988Totals 3,070381,502561,8461152171249988 Totla Arrivals Immigrants for the Year 5,410 Total Departures of Immigrants for the Year .... 1,805 Excess of Arrivals 3,605

# Table No. 17.

# Statement Showing Quantities and Values of Imported Spirits and Merchandise Remaining in Warehouse December 31, 1885.

Merchandise Articles QUANTITY. VALUE. DUTICLES. CROCKERY AND GLASS WARE Cases DRIGS AND MEDICINES Hair Vigor Cases Pain Killer Gro Pain destroyer ... Gro Pectoral .................. Cases Pills ... Cases Sarsaparilla Cases FIRE ARMS— Muskets Cases GROCERIES AND PROVISION AND PROVISIONS— Bread Bbls Canned Meats tbs Rice tbs Soap tbs NAVA!. STORES Anehors Pes Chains Pes Latees Cases Rope Colls PAINT S—Lead Csks SHOOKS AND CONTAINERS— Bags Bales TOBACCO AND MANUFACTURES OF Tabacco(Chinese) tbs Cigars M SUNDRIES Total Value table Merelaandise

FREE. OILS—Gasoline .Gals Petroleum Gals tile Gals Total Value Free Goods 5 24 70 32 117 2 120 7 6 4,900 21,250 12,500 6 2 16 5 12 86 1,800 920 1,220 21,590 680 $ 475 00 156 00 1,367 65 341 92 468 00 157 50 480 00 157 22 48 05 725 00 471 70 450 00 74 34 145 22 1,310 00 454 60 2,081 74 284 00 11,161 49 1,654 89 $ 23,350 72 $399 00 3,289 75 258 40 $ 3,897 15 23 spirit. ARTICLES QUAN TITY. VALUE. BUTABLE. SPIRITS AND SPIRITUOUS COMPOUNDS Alcohol ... Gals Brandy .. . Cases do Gals Cordials and Bitters ............... Cases Gln. Cases do Gals Rum. Cases do . Gals Samshoo. Cases do ...................Gals Whisky ........... Cases do Gala All Other Cases WINES— Champagne and other Sparkling Wines ....Cases Light Wines . Cases do ... Gals Port................................ ... Cases do Gals Sherry Cases 6,129 11,528 6,523 313 5,117 2,440 49 3,995 126 1,782 23,349 131 201 643 2,477 418 576 402 354 $ 1,897 25 45,710 76 3,005 98 8,401 20 2,118 10 6,909 19 35,092 70 402 75 3,438 25 3,055 58 2,240 80 2,810 90 MALT LIQUORS— ALe, Beer and Porler. Doz. Pints do do ...... Do. Quarts 1,710 5,062 6,993 34 Total Value Spirits. ...... $ 122,820 92 Value Spirits........ Value Dutiable Merchandise Value Free Goods $ 122.820 92 23,350 72 3,987 15 Total Value $ 150,074 79

## Table No. 18.

## Customs Receipts.

1884, Import Duties, Spirits Import Duties, Goods Import Duties, Bonded Goods Blanks Wharfage Registry Warehouse Storage Kerosene Storage Coasting License M. H. Fund Storage Lights Interest Hospital Fund Buoys Passports Fines and Forfeitures Esplanade Storage Towage Houolulu Kahulul Hilo Mahukona. $ 270.574 77 147,407 91 88,671 60 13,637 60 4,123 33 21,513 85 213 25 1,087 80 3,679 15 3,678 18 1,441 35 10,950 49 1,171 67 5,166 31 9,064 00 338 00 2,927 00 964 85 2,517 47 4,165 62 $ 543,294 00 7,336 72 803 11 302 76 Total $ 651,736 59 1885. INCREASE. DECREASE. $ 247,769 93 115,637 21 34,536 14 12,050 50 3,544 50 20,430 56 167 22 323 69 1,930 91 3,725 24 1,395 55 11,022 13 1,163 14 4,502 83 9,434 00 344 00 2,893 00 12,557 27 2,687 95 7,601 72 $ 22,804 84 31,770 70 4,135 36 1,587 00 578 83 1,083 29 46 03 764 11 1,748 24 $ 47 16 45 18 71 64 8 53 663 48 370 00 6 00 34 00 11,592 42 170 48 8,496 10 $ 493,777 59 6,009 92 2,321 85 228 02 1,326 80 1,518 74 74 74 $ 502,337 38 $ 49,399 21

# Statistics of Imports

# Hawaiian Islands. 1885.

# Goods Paying Duty

# At Honolulu.

ARTICLES.QUANTITY.VALVE.Ale, Porter, Beer and Cider. Ale, European galls doz qts doz pts Ale, Ginger galls. doz qts Ale, American galls doz qts doz pts Beer doz qts doz pts galls Cider galls doz qts cases Porter doz qts doz pts Animals and Birds. Animals—Calf No Cow No Dogs 1,890 10,542 5,210 1 150 300 886 230 2,881 2,350 240 70 8 25 260 560 1 1 5 2 5 1 6 5 2 70 24 3 18 18,622 10 161 73 1,935 57 7,875 23 98 75 1,065 40 82 50 30 00 5 00 50 5 00 21 10 10 00 15 00 35 00 7 50 20 00 22 50Rabbits No Guinea pigs No Monkey No Birds—Canaries No Para quits No Parrots No Birds No Chickens No Chickens and geese Coops Birds Cage

ARTICLES. QUANTITY. VALUE. Building Materials. Blinds pkgs Cement bbls casks Fire clay lbs bbls Glass, window boxes piales cases feet Lime bbls Paving stone No Plaster of Paris lbs bbls sheets lbs casos Sundry building materials Clothing Hats, Boots, etc.6 1,351 2,700 95,680 23,655 50 433 66 237 3,450 1 1,050 200 5 710 10,131 629 14$ 10 00 0,038 13 1.361 84 157 74 3.545 83 1 50 245 50 20 75 7,120.05 647 53Boots, men's and boy's doz pairs parcels pkgs Bools and gaiters, women's pairs Gaiters, men's doz Shoes, boys' and children's doz Shoes, men's doz pairs Shoes and slippers, Chinese—Slippers..prs cases Shoes... pairs Shoes, women's pairs Slippers, women's pairs Sundry boots and shoos doz pairs cases Shoe blacking doz gross bos bbls Shoe findings 27 127 2 1 3 1 165 7 134 5,706 2 9,559 4 3 20 56 6 24 73 1 1873 47 9 01 31 50 152 54 579

38 3,482 55 11 75 6 00 577 23 450 89 1,968 03

Boys' clothing.................................. Children's clothing......................... Coats..........................................doz Collars, men's linen.........................doz parcels Cravats and ties............................doz Drawers......................................doz Jackets........................................doz Ladies' cloaks and mantillas............doz Ladies' underclothing........ ...........doz Shawls.........................................doz Shirts, linen and fine.......................doz Shirts, over.................................doz Shirts, under..................................doz eases Shirts, assorted.............................doz pkgs Skirts, ladies............................ doz Socks .........................................doz Stockings...................................doz Suits............................................doz cases Trowsers and pants.......................doz Trowsers and pants—Chinese..........doz Hats, hoys...................................doz Hats—cloth, felt and wool.................doz pkgs Hats, straw..................................doz Hats, ladies.................................doz Hats and caps, assorted..................doz Oil clothing, assorted.......................doz Rubber clothing, assorted................doz Vests ..........................;..............doz Caps, cloth, etc .......................:.....doz Sundry assorted clothing...................... Sundry assorted Chinese clothing........... Crocjcery and Glassware. Bottles and vials............................doz gross pkgs Demijohns...................................doz Glasses and tumblers..........................doz set QUANTITY. 180 995 4 416 33 183 105 18 461 374 146 815 2 2,292 2 58 2,272 2,038 498 19 418 416 2 1,835 1 1,422 62 1,187 34 86 106 277 845 334 3 2,589 2,907 1 VALUE. $ 2,989 35 2,511 49 5,708 59 1,533 50 861 09 372 15 3,677 54 2,573 66 913 57 5,606 67 4,522 52 2,035 36 2,624 42 13,109 42 644 61 2,867 75 3,581 30 21,463 68 10,310 34 2,518 87 8 50 13,238 32 9,035 40 514 81 5,099 38 879 13 1,312 99 1,152 00 1,310 50 8,753 51 6,355 87 2,280 90 695 81 1,450 87

ARTICLES. Lamps and chandeliers....................doz eases set Lamp chimneys..............................doz Lamp fixtures.................................... Lamp wicks .................................doz Lanterns.......................................doz pkgs Sundry assorted crockery.................... Sundry assorted glassware.................... Drugs, Medicines, Etc. Acid...........................................lbs galls carboys kegs Ammonia ......................................lbs cases Castor oil...................................galls doz lbs cases Chinese medicines.............................. Cream tartar..................................lbs Dental materials................................ Epsom salts...................................lbs boxes Pills..........................................gross doz Soda, ash etc.................................lbs bbls kegs Sponge.......................................lbs doz Surgical instruments............................. Morphine.................................m pills ounces Opium...........................................lbs gross pills Sundry assorted drugs......................... QUANTITY. 197 1 1 2,666 7 183 2 21,170 11 3 1 4,694 1 746 682 1,280 160 50 40 426 72 174 142 84,343 12 4 218 38 60 11 47 28 20 VALUE. 8 1,767 46 1,467 23 1,844 06 6 70 1,245 11 8,767 33 751 20 1,301 59 1,220 67 192 04 1,584 01 5,098 60 22 00 115 90 23 84 345 57 1,209 76 211 56 307 35 671 44 98 79 132 77 23,134 20

ARTICLES. Dry Goods, Cottons—Cambric.........................yds pcs Checks............................yds Corduroy........................yds Cotton wadding................doz Cretonne.........................yds Damask...........................yds pcs Diaper............................yds pes Denims...........................yds Duck...............................yds pcs Drilling..........................yds Gingbams ........................yds Handkerchiefs.................doz Lawns............................yds pes Lining...........................yds Marseilles and pique...........yds Moleskin.........................yds Mosquito net....................yds pes Muslin............................yds pes Napkins..........................doz Nainsook.........................yds Nankin............................pes Prints.............................yds Quilts and spreads.............doz pes Quilting..........................yds pes Silesias...........................yds Sheeting..........................yds Shilling..........................yds Stripes.............................yds Satteens..........................yds Twills.............................yds Table cloths....................doz Towels...........................doz pes Toweling.........................yds QUANTITY. VALUE. 2,112 12 1,463 114 54 670 1,935 14 1,955 567 1,633 595 2 3,199 8,325 3,125 10,586 1,042 1,207 5,194 3,030 17,337 94 11,655 4 75 960 249 89,319 234 1,187 112 35 4,127 228 6,418 1,066 2,680 1,424 29 1,792 42 516 $ 344 61 230 51 98 35 19 87 144 11 226 96 275 61 165 68 70 62 392 70 338 12 1,940 08 2,323 86 60 73 356 40 694 16 3,023 05 1,263 81 196 84 77 92 157 85 6,378 59 3,598 07 84 39 312 77 163 16 373 14 97 30 436 51 224 05 272 38 1,589 81 35 12

ARTICLES. QUANTITY. VALUE. Cottons—Velvet cotton...................yds Sundry assorted cottons......yds pes Linen—Cambric.............................yds Damask.............................yds Diaper................................pes Drill................................yds pcs Duck...............................yds Grass cloth........................yds pes Handkerchiefs....................doz Lawns...............................yds Linen. brown......................yds Napkins............................doz Sheeting...........................yds Towels...............................yds Table cloths........................doz yds Twill.................................yds Sundry assorted linens.........yds pes pkg Silks—Handkerchiefs......................doz pes bxs Pongee..............................box pes yds Plush and velvet...................yds Silk...................................yds pes Satin..................................yds pes Woolens—Alpaca ..........................yds Blankets.........................prs No lot

Baize.............................yds BUCK skins.......................yds Bunting.........................yds pes Cashmere.......................yds Crape...........................yds pcs 536 109,909 627 30 923 2 14,300 20 710 305 18 332 6,562 8,070 326 2,051 41 15 234 1,870 9,845 8 1 990 574 82 1 109 3 2,177 7,521 237 14,194 10 3,153 1.190 1,548 1 30 2,389 54 0 3,448 703 40 $ 192 88 11,481 11 29 22 453 80 15 70 2,478 07 274 11 373 31 638 38 1,346 34 707 83 718 09 668 43 138 25 749 35 539 03 1,543 71 9,639 80 619 60 2,663 63 6,417 91 6,204 87 521 90 3,794 72 22 50 2,483 41 49 16 1,279 59 1,209 42

ARTICLES. Woolens—Doeskins ......................yds Flannel..........................yds pcs Merino..........................yds Mohair.........................yds Plaids..........................yds Reps.............................yds Table covers...................yds doz pcs Serge............................yds Wool dress goods...........yds Sundry assorted woolens...yds pes Mixtures, Worsted—Cloth, worsted....yds, Flax—Burlaps.................yds Hessians..............yds Wool and Silk—Barege......yds Grenadine...yds Wool & Cotton—Blankets....prs Cassimores...........yds Italian cloth..........yds pes Mixtures..............yds Tweed.................yds Union cloth...........yds Water-proof cloth...yds Cotton & Linen— Canvas lining..................yds Sundry assorted mixtures...yds pcs Fancy Goods and Millinery. Beads........................................bchs Berlin and assorted wool...................lbs bdls Bonnets .......................................doz Braid............................................gro doz yds bxs pcs Buttons .........................................gro gt. gro doz bxs QUANTITY. l,860 22,090 27 9,820 179 40 204 24 10 1 3, 727 396 5,258 3,519 6,563 1,994 69 700 501 1,567 2 650 3,2001 381 450 504 10,322 00l 126 200 103 9 132 958 18 5 48 2,305 378 2 3 VALUE. $ 1,956 58 7,831 41 3,603 55 34 91 30 00 179 40 488 35 849 57 2,616 43 7,972 40 2,049 88 368 07 314 25 231 36 66 00 446 21 587 83 628 40 423 30 2,862 72 311 97 173 95 92 20 6,880 49 113 95 557 70 236 92 1,057 20 2,513 51

ARTICLES. Binding......................................doz dollars, sleeve cutis.......................doz Corsets........................................doz case Crochet cotton................................lbs Dusters, feather.............................doz Embroidery.................................yds gro doz Edging.......................................yds pcs Fans....................................................doz gro Fancy featbers............................bnchs doz pcs Flowers and wreaths.......................bxs doz gro bnchs Fringes........................................pcs yds Fichues........................................doz Frillings.....................................doz Gimps.........................................doz yds Gloves—Gauntlets.........................doz Cotton...........................doz Kid.................................doz Silk .................................doz Assorted..........................doz Gold lenf...................................books Hat frames...................................doz Hooks and eyes...........................gro Insertions.....................................yds Lace............................................doz yds pkgs Mitta............................................doz 8 QUANTITY. 2 682 194 1 14 74 72 5,687 384 10 283 6,542, 532 112 1 361 382 357 7 355 107 544 4 170 383 67 88 63 134 11 77 179 166 2 33 7 21 2 521 312 6,250 6,996 22,8150 1 137 VALUE $ 1 33 1,113 03 2,121 41 45 23 473 79 3,166 56 1,364 83 817 43 3,493 88 1,427 45 1,064 37 513 95 66 52 201 48 150 00 136 42 1,690 08 671 55 63 64 225 50 11 63 36 46 490 13 7,576 39 806 43

ARTICLES. Needles........................................M doz gro Parasols.......................................doz Pins..............................................M gro pkgs Hair........................................M gro doz Purses and portmonics...................doz gro Ribbons.......................................doz yds pcs Scarfs........................................doz Silk, sewing..................................lbs doz gro bxs Suspenders and braces....................doz Tape..........................................doz gro Thread, cotton and linen..................lbs bdls gro lbs linen Trimmings...................................yds doz pes TOYS................................................ Ruching.....................,...............doz pcs bxs Umbrellas, alpaca..........................doz Cotton..........................doz Silk.............................doz pkgs Veils and veil stuffs.......................yds Sundry fancy goods and millinery........... Fish, Dry and Salt. Abalon........................................lbs pkgs QUANTITY. 808 6 2 28 5 86 120 9 71 19 136 44 85 1,873 2,773 161 416 2,300 134 235 383 276 9 266 56 1,651 12 8,773 2,544 46 7 96 59 4 65 21 6 4,251 75 9,400 6 VALUE. $ 437 42 295 23 350 30 481 73 880 32 6,227 79 896 16 2,658 72 1,263 84 124 02 7,560 53 760 61 3,126 54 339 64 63 77 270 87 941 38 1,111 08 13,981 43 381 31

ARTICLES. Cuttle fish....................................lbs Herrings.....................................doz kegs Mackerel.....................................doz Salmon.........................................bbls kits Sundry assorted fish........................lbs doz bxs pkgs Flour. Corn meal.....................................lbs Oat meal.....................................lbs doz pkgs Rice flour....................................lbs pkgs Wheat flour................................qr sks Sundry meals.................................lbs bbls Fruits Fresh. Apples.......................................bxs Cocoanuts...................................No Grapes.......................................bxs Oranges and lemons......................bxs Sundry....... ...........................bxs Furntiture. Carpets.......................................yds pcs Curtains and shades.........................prs pcs Curled hair..................................Iks Feat hers......................................lbs Floor cloth.................................yds pcs Looking glasses............................doz sing cs QUANTITY 13,939 45 6 36 6 220 1 28,733 8 428 123 11,024 238 12 27,057 77 56 2 108 6,000 1 1 68 959 64 580 869 541 ],379 355 2,434 35 240 101 3 VALUE. 2,205 50 103 37 11 97 1,220 00 3 50l 4,551 52 185 78 69 17 1,509 65 125 00 9 427 00 20 00 1 00 2 50 220 50 1,813 88

2,189 14 481 09 235 50 1,104 45 954 39

ARTICLES. Hair cloth...................................yds Marting......................................volls Mats. door......................doz Painting and Engraving—Chromos doz Engravings No Pictures.....No. set pkgs Picture frames............................doz gro xs Paper hangings............................rolls Rugs.............................................No truss Sundey assorted furniture..................... Grain and Feed, Hay.......................................... bales Qats...........................................Sks Groceries and Provisions, Arrowroot..................................pkgs Aspayagus..................................doz Bacon..........................................lbs pkgs Becf salt.....................................bbls bif bbls Beans, Canned..............................doz Dry....................................lbs bags bxe Bread ...........................................cs Butter.........................................lbs rolls pkge Candles ........................................lbs doz Caviay.......................................doz Cilery .....................................doz QUANTITY. 232 1,013 40 33 300 1 3 24 2 4 378 261 1 107 60 11 15 220 6 2 1 1-2 58,055 5 3 215 2 1 16,132 77 91 1 3 VALUE. $ 208 82 5,578 07 406 63 997 63 402 27 120 72 671 13 15,838 40 159 25 185 91 11 00 73 81 72 83 39 00 3 10 84 33 73 92 2,501 63 3 20 2 25

ARTICLES. QUANTITY. VALUE. Chese..........................................lbs doz cases Chocolate.......................................lbs cases Cocoa............................................lbs cases box Coffee...........................................lbs Condensed Milk..........................doz cases Crackers......................................lbs cass tins Cahes........................................pkgs tins Currants........................................lbs doz cases Dates.........................................lbs pkga Eggs...........................................pkgs doz Extracts and essences......................doz cases galls bxs Figs..............................................lbs Fruits. assorted, canned and bottled....doz cases Hams..........................................lbs pcs case Honey ....,...........................doz Jams and jollies.............................doz cases box Indigo blue....................................lbs cases boxes 734 1 24 3,976 26 350 4 1 72,765 15 3,569 1 1,668 43 1,368 96 4,041 300 9 3,268 1 1,765 30 232 14 6 27 7 644 6 88 50 2,159 21 1 27 667 6 1 8,443 63 40 612 $ 467 30 1,067 54 120 40 7,899 51 9,381 90 320 50 171 00 482 68 213 23 2,482 15

ARTICLES. Lard............................................lbs pkgs Lobsters........................................doz Macaroui........................................cs Nuts—Almonds...............................lbs pkgs Chinese nuts...........................lbs pkgs Walnuts.............................lbs Sundry nuts............... .........lbs gro Olive oil.......................................doz cs galls pkgs Orange and citron peel.....................lbs doz Oysters, dry....................................lbs pkga Fresh.........................doz cans bxs Peas, canned.................................doz cs Dry......................................Lbs Pickles....................................... doz lbs pkgs jars Pork ...........................................bbls Potatoes........................................lbs bags Preserved meat and game.................lbs doz cs pkgs Pearl barley..................................lbs Prunes.......................................lbs doz Raisins....................................hlf bxs qr bxs lbs doz QUANTITY. 10,880 220 400 1,413 1 7,948 18 24 100 270 1 359 43 206 10 1,662 12 5,651 28 3 2 270 13 1,120 653 533 34 63 1 243,303 296 11,884 79 466 136 176 97 1 7 i 216 1,173 14 VALUE. 8 1.579 00 500 00 14 75 210 72 532 92 10 50 35 93 1.224 29 87 07 024 27 30 50 543 58 23 70 1,089 20 20 20 2.401 24 4.131 86 4 00 13 90 326 57

ARTICLES. Rice.............................................lbs Salt, coarse.....................................lbs scks Dairy...................................bags Fine......................................doz bags Sardines.............................doz hlf tins Sago........................................... lbs pkgs Sauces.........................................doz cs jars lbs pkgs Soap.............................................lbs es gp bxs CS Spices—Allspice.............................doz lbs cs Cinnamon..........................doz lbs cs Cloves..............................lbs doz CS bxs Currie powder.....................doz cs Ginger .......................................doz lbs pkgs Mustard.............................doz lbs cs doz Pepper, black......................lbs doz cs QUANTTTY. 61,550 172,320 300 20 35 30 170 105 3,274 29 2,594 440 3,734 100 752 225,013 259 18 2,585 11 5 30 30 34 74 3 182 6 1 3 72 1 174 1,617 135 272 24 6 11G 1 340 196 VALUE. $ 1,924 77 397 59 30 00 69 58 1,092 78 162 02 3,295 09 14,215 82 117 63 43 47 93 68 48 91 142 89 261 22 378 79 66 05 502 78

ARTICLES. Spices—Peeper, red and while...........lbs doz Sage..................................lbs doz Sundry spices................................lbs pkgs Starch..........................................lbs Sugar.........................................lbs Sugar of Iemon.............................doz Syrup.................................doz Tapioca.........................................lbs cs Tongnes dry and pickled ............hlf bb cs Vermicelli....................................lbs cs Vinegar......................................galls cs Sundry csks Sundry assorted provisions......... Sundry assorted Chines provision GUNS, GUN Materials & Ponder Guns—various..... No Rifles........No Gun caps..........................No Pistola ... ..........No Shot.....................................lbs ..........................lbs bxs kegs Giant .. ...........................lbs QUANTITY 25 12 67 1 83 17 12 2,312 18,594 2 12 15 181 1 1 4 12,317 86 23 6,457 11 9 67 45 40 1.045 100 223 96 1 22,358 615 60 625 30 20 1,950 VALUE. $ 16 07 5 67 44 11 50 72 536 94 37 50 33 61 23 56 141 88 490 11 1,361 11 2,888 11 17,064 94 805 53 1,247 59 911 38 411 14 156 87 672 08

ARTICLES. Powder, gun..................................lbs kegs pkgs cs Hardware—Agricultural Implements and

Tools. Adzes.........................................doz Agate ironware................................cs Axes...........................................doz Bath brick....................................No cs Chain—Dog and halter..................doz Log or ox..........................No lbs Sundry chains....................lbs doz fathoms Fencing wire..................................lbs bdls Files and rasps.............................doz Fish nets...................................pkgs Fry pans......................................doz Galvanized ironware, tubs................doz Tubs............bdls Buckets...........doz Basins.............doz Glue........................................lbs galls Grindstones.................................lbs No floes.........................................doz Horse and mule shoes.....................lbs Hose......................................feet Knives—Butcher...........................doz Carving..........................doz Pocket knives.................cards doz Knives and forks, table.........doz Assorted ..........................doz Lead pipe....................................lbs Lead, pig....................................lbs Lead, sheet..................................lbs A QUANTITY. 10,300 193 3 23 2 4 10 902 5 33 12 1,090 3,840 16 35 57,359 300 677 37 143 59 79 553 28 970 2 17,878 15 36 1,120 19,662; 88 4 33 1,128 29 160 3,357 9,484 26,600 VALUE. $ 2,952 59 10 11 31 07 89 60 18 97 145 89 87 62 143 64 1,737 97 569 23 394 45 249 76 1,431 70 142 09 280 88 264 67 66 97 3,168 55 84 06 21 79 2,615 12 166 74 497 10 100 82 202 68 757 49

ARTICLES. Locks........................................doz Nails, galvanized iron.......................lbs Sundry assorted.......................M lbs Nuts and bolts...............................lbs gro Oil stones.....................................No Pipes, iron...................................feet No bdls Plow fixtures.................................... Razors........................................doz Eules..........................................doz Safes...........................................No Scales, platform..............................No Scales, small..................................No Scissors and shears..........................doz prs cards Screws........................................gro lbs Screw-drivers................................doz Spades.......................................doz Steels.........................................doz Staples.......................................lbs Stoves and ranges..........................No Stove furniture................................ Stove polish..................................doz gro cs Squares........................................doz Twine, wrapping and seine............... lbs doz bdls pkgs coils Vises...........................................doz Washers.......................................lbs Wire—Brass.................................lbs Copper................. lbs Iron.................................lbs Wire netting and cloth......feet yds QUANTITY. 147 28 4 224 1,468 73 2 59,412 2,316 580 165 12 1 1 80 115 2 99 373 1,440 34 55 14 14,204 39 24 15 1 43 7,751 825 125 9 10 2 25,528 704 489 43,232 1,950 528 VALUE. $ 110 91 3 29 26 01 128 11 1 50 6,490 40 81 74 568 26 41 60 110 00 7 50 159 64 433 93 358 26 38 11 290 55 23 68 382 13 214 61 90 39 102 49 175 68 2,322 76 30 52 220 36 86 76 81 53 1,084 50 488 13

ARTICLES. Wrapping paper..........................balss pkgs Wooden Ware—Baskets................doz bales Buckets and pails....doz Brooms.................doz Brushes, paint brushes, etc................ doz Corks..........................................M gro Sundry hardware .............................. Iron, Steel, Etc. Iron, bar................................ ...lbs bars bdls Iron, hoop....................................lbs Iron, galvanized.............................lbs sheets Iron, sheet...................................lbs Railroad Materials. Rails...........................................No Sundry Railroad materials.................... Jewelry, Clocks, Plate, Etc. Cloeks.........................................No cs Plated ware....................................... Silverware......................................... Spectacles & eye-glasses—Specs.........doz Eye-glasses doz Watches—Gold............................No Silver............................No Nickle..........................No Metal.............................No Watch materials................................ Sundry assorted jewelry..................... Suudry assorted cheap jewelry............... QUANTITY. 5 8 964 2 16 8 63 475 384 6,774 747 2,338 1,078 6,194 785 3,995 860 917 1 67 162 27 349 193 184 VALUE. $ 26 00 414 94 50 25 8 00 86 23 764 25 9,051 15 3,554 08 38 78 561 31 127 39 1,527 72 11,033 64 2,145 54 2,359 86 2,245 02 444 92 5,753 56 185 72 4,934 29 3,860 84

ARTICLES. Leather. Calf skins..................................doz Chamois leather............................doz kips Goat and kid skins.......................doz Sheep skins................................doz Sundry leather...............................doz Lumber. Sundry assorted lumber........................ Machinery. Babbit metal.................................lbs Belting........................................feet Centrifugals..................................No Packing.....................................lbs Sewing machines...........................No cases Steam engine...............................No Steam clarifiers..............................No Sundry assorted machinery.................... Matches Matches,...............................gro pkgs Musical Instruments. Accordeons.................................No Banjos.........................................No Brums....................................No nests Fifos and flutes..............................No Guitars......................................... No Harmonicas................................ doz Guitar and violin strings................doz gro eases bxs bndls QUANTITY. 65 13 7 9 1 376 127 1 1,988 3 1 1 2 2 6 477 1 7 3 2 168 395 420 12 60 10 2 17 400 VALUE, 8 1,659 92 129 52 6 00 50 00 29 00 381 41 48 62 41 12 559 00 622 71 129 15 2,452 21 2,111 63 28,475 45 169 89 964 08 101 31 34 14 61 87 772 58 429 77 490 64

ARTICLES. Music boxes.................................No Organs............,........................No Pianos........................................No Violins.........................................doz Sundry musical instruments................,. Naval Stores. Anchors.........................................No Boats...........................................No Chain cable....................................lbs Manilla rope...................................lbs Needles, sail..................................M Oars.............................................No Rosin .....................................bbls Sails............................................No Tar.............................................bbls Sundry naval stores............................. Oil. Cocoanut...................................galls Palm........................................galls Peanut, (China).............................bxa Keats' foot oil...........................galls cases Sundry oil..................................galls cases Paints. Benzole.....................................galls Black paint...................................lbs Blue paint..................................lbs Chalk........................................lbs Green paint....................................lbs Gum shellac................................lbs galls Lamp black...................................lbs Lead, white.................................lbs kegs bbl Lead, red.....................................lbs Linseed oil..................................galls eases QUANTITY. 7 4 13 9 10 4 18,149 5,573 1 50 3 2 135 200 1,606 3,520 368 2 4,552 8 20 3,300 25 3,543 475 343 10 2,151 158,350 461 1 7,028 15,084 21 VALUE. $ 74 35 219 00 2,205 24 226 24 791 56 132 32 173 00 389 11 668 76 13 70 17 00 9 98 30 00 453 06 277 15 100 00 163 53 13,477 96 227 39 1,4386 61 4 50 206 68 7 50 17 20 71 50 129 51 129 91 9,144 75 357 81 7,578 60

ARTICLES. Ochre, red......................................lbs Ochre, yellow..............................lbs Putty............................................lbs Turpentine..................................galls Umber..........................................lbs Varnish........................ ............galls cases Whiting........................................lbs Yellow paint...............................lbs Zinc, white....................................lbs Metallic paint................................lbs Rubber paint.................................lbs galls Sundry assorted paints....................lbs galls kegs cases pkgs Perfumery. Brushes—Hair...............................doz Nail...............................doz Shaving...........................doz Tooth............................doz sets box Combs........................................doz gro Hair oil and pomade.....................doz Essential Oils—Bergamot................oz Citronella................lbs Lemon....................lbs galls Rose........................oz Sundry essential oils...lbs oz Soap, toilet....................................doz gro bxs Sundry assorted perfumery................... QUANTITY. 672 10,015 18,177 240 1,430 798 2 4,874 150 4,150 9,100 252 298 15,900 514 225 13 19 102 12 7 94 600 1 330 111 700 1 51 37 7 4 64 1 39 93 398 VALUE. 9 34 168 61 457 02 135 66 127 37 1,582 92 44 65 27 00 220 33 402 75 572 66 3,037 39 529 75 52 38 17 25 349 71 1,266 91 512 61 25 42 17 69 75 27 26 284 02 819 90 4,507 54

ARTICLES. Saddlerym Carriages and Materials. Axle grease...................................doz Baby carnages................................No ease Bridle bits....................................doz Buckles.......................................gro Bridles........................................doz Bridle heads and reins.....................doz Carts...........................................No Carriages.....................................No Enameled drill...............................yds Enameled duck.............................yds pes Girths and cinchas—Girths.............doz Cinchas............doz Harness......................................sets case Harness dressing...........................doz galls Horse blankets and rugs..................prs Horse brushes...............................doz box Horse combs.............. .................gro Saddles. English.............................doz Saddles Mexican and American.........No Saddles, ladies................................No Spurs.........................................doz pair Stirrups.......................................doz Stirrup leathers..............................doz Wagons........................................No Sundry saddlery and materials............... QUANTITY. 168 65 1 63 30 58 7 9 18 216 768 12 18 129 145 12 1 67 5 200 64 1 5 89 2 6 177 1 7 3 2 1,825,149 121 21 VALUE. $ 113 87 546 04 316 19 20 09 580 24 167 95 486 20 3,354 75 84 96 359 56 603 73 461 77 226 96 134 94 158 66 42 03 8,447 29 15 00 120 39 514 04 43 18 21 43 120 00 1,633 01 118,986 05 495 00

ARTICLES. Spirits. Alcohol.....................................galls Bitters and cordials...........................cs doz Brandy..........................................cs galls China wines....................................cs galls Cologne........................................doz Cinchona wine...............................doz Florida water..............................doz Lavender water............................doz Assorted perfumery........................galls Jamaica ginger................................cs Kennedy's discovery.......................doz Madeira.........................................cs Pain killer and destroyer...................cs doz Port wine......................................cs galls Rum..........................................galls Sherry...........................................cs doz Whiskey.......................................cs galls Stationery and Books. Artists' materials............................... Albums.......................................doz Books, blank................................doz Books, printed............................vols Bookbinders' materials........................... Cards, playing...............................gro Envelopes......................................M. Ink, printing..................................lbs bbls kegs Ink, writing.................................doz Mucilage. ...................................doz Newspapers and periodicals.................., Printing paper..............................rms bndla QUANTITY. 2 4 11 45 5 24 69 42 1 3 2 2 4 83 1 10 6 35 67 32 13 10 197 37 ............9 5 1,761 4 ...........10 57 1,081 1 2 47 12 .........887 2 VALUE. - $ 6 15 151 06 248 28 176 60 185 77 13 15 12 100 16 00 39 00 25 50 1,156 00 5 00 311 00 255 33 37 95 108 66 2,042 70 672 44 88 57 229 50 1,114 10 15 40 518 54 209 12 299 28 218 22 7 50 1,782 57 1,418 62

ARTICLES. Paper, writing...............................rms Pens, quill and steel........................gro Pencils, slate.................................M Sheet and hook music............sheets books Slates, writing.................................doz Types, plates, cuts, etc.......................... Sundry assorted stationery..................... Tea. Tea.............................................lbs bxs bndls pkgs tins Tin and Tinware. Solder...........................................lbs Tin ingots......................................lbs Tin plates....................................bxs lbs Zinc.............................................lbs sheets Sundry tinware and material................. Tobacco and Cigars. Cigars...........................................M bxs Cigarettes.......................................M Snuff...........................................gro Tobacco.......................................lbs case Wines. California Wines—Angelica................cs Muscat..................cs galls Port.......................cs galls White....................cs galls 5 QUANTITY. 278 140 24 7 356 84,925 193 38 152 428 800 2,279 204 2,467 13,566 461 260 1 51 ½ 5,564 1 143 483 1,406 40 83 30 543 VALUE. S 200 15 100 02 108 91 25 22 68 90 2,197 79 3,159 39 17,396 80 100 50 306 51 1,891 31 955 89 1,651 87 5,180 78 154 33 16 00 844 40 436 50 2,550 08 219 35 468 01

ARTICLES. California Wines—Zinfandel...............cs galls European and Other Wines—Claret...................................cs galls Rhine wines........................galls cases doz Wine bitters............................cs Sundry wines.,................................cs galls doz Sundry Merchandise. Aerated waters...............................cs doz Bird seed......................................lbs case Candy............................................lbs cases bxs Charcoal.......................................pkgs Curiosities...................................pkgs pairs Fire works....................................bxs Pkgs Fire wood..................................cords lots Fuse............................................feet crate Joss stick and paper.......................pkgs .cases Lacquered ware..............................pcs sets riants and seeds.............................lbs pkgs Photographic materials......................... Pipes, tobacco................................doz gro Pipe stems......................doz Private effects...........................cs Scientific instruments........................ QUANTITY. 231 235 255 2,513 18 88 230 1 450 2,912 16 9 149 224 1 16,998 18 22 2 41 8 532 206 43 3 25,000 1 507 6 8 24 60 40 .................101 129 197 1 5 VALUE. $ 625 74 2,924 96 563 41 9 00 3,954 32 122 00 24 73 1,899 36 5 50 1,564 56 2,785 26 264 00 238 50 528 30 38 64 115 10 615 23 893 70 248 99 727 34 1,865 26

ARTICLES. Tomb and grave stones.....................No pkgs Trunks.......................................sing Travelling bags..............................doz Sundry assorted merehandise.............. Sundry assorted Chinese mdse.............. QUANTITY. 44 773 38 VALUE. 8 713 32 1.854 95 356 09 8,449 39 7,083 15

# Goods Paying Duty

# At Kahului.

ARTICLES. Ale and Beer. Beer.........................................grails doz qts Clothing, lints, Boots, Etc. Shoesm boys' and children's..............doz Shoes, men's..............................doz pairs Shoes. Chinese.............................pairs Coats.........................................doz Drawers.....................................pairs Jaekets........................................doz Ladies' under wear...........................doz Shawls.........................................doz Shirts, over..................................doz Shirts, assorted.............................doz Socks.........................................doz Stockings......................................doz Suite..........................................doz Trousers...................................pairs Hats.............................................doz QUANTITY. 10 1 2 7 148 532 8 24 4 2 1 42 10 321 8 8 150 55 VALUE. $ 6 50 9 05 56 00 52 40 205 55 17 40 69 52 36 17 37 00 573 00 266 00 543 30 36 25 353 50 305 50 769 75

ARTICLES. Caps..........................................doz Rubber clothing.............................doz Crockery and Glassware. Demijohns..................................doz Glasses and tumblers.......................doz Lamps and chandeliers.....................doz Lamp chimneys..........................doz ease Lanterns......................................doz Assorted crockery..............................., Assorted glassware.............................. Drugs, Medicines, Etc. Acid......................................earboys Chinese medicines............................... Cream tartar.................................lbs bxs Dental materials........................... Soda ash, etc............................. lbs Sponges...................................... lbs doz Syringes....................................No Sundry assorted drugs.......................... Dry Goods. Blankets.................................pairs Cashmere.................................. yds Cassimeres.................................. yds Damask....................................piece Flannel.......... yds Handkerchiefs. ...................................doz Linen, brown............ yds Lawns .....................................yds pcs Mosquito net..................................yds Muslin..... yds Nainsook...............................................yds Napkins.... .......................................doz Prints... ..........................................yds QUANTITY. 6 2 4 88 24 216 1 91 11 6 2 .......788 24 3 10 5 88 62 1 156 382 23 683 446 8 149 50 275 96 29 746 VALUE. $ 33 00 35 29 28 51 65 68 300 45 136 00 224 25 787 83 177 76 61 70 22 50 25 50 57 60 16 03 66 20 10 55 842 10 20 00 64 70 230 62

128 37 178 65 68 92 100 78 143 69 77 15 45 83 12 96 65 50 102 64

ARTICLES. Quilts..........................................doz Satin..........................................yds Silk..........................................yds Towels......................................doz Woolen dross goods........................yds Sundry assorted woolen goods..........yds pes Fancy Goods and Millinery. Buttons.....................................gro Bonnets.....................................doz Collars .......................................doz Corsets.......................................doz Embroidery.................................doz Fans..........................................doz Fancy feathers............................doz Fringes......................................yds Gloves, assorted............................doz Luce .........................................doz pes Mitts..........................................doz Parasols.....................................doz Phis..........................................pkgs doz Ribbons.......................................pcs Scarfs.......................................doz Sewing silk..................................doz lbs Suspenders................................doz Thread, cotton and linen.................doz gro pkgs Toys.............................................. Veil and veil shift's..........................yds Sundry fancy goods.............................. Fish dry and Salt Sundry assorted fish............................ Furniture and Upholstery. Feathers......................................lbs Floor cloth...............................yds QUANTITY. ½ 247 223 94 636 39 2 71 1 32 3 6 ½ 1 168 17 24 84 3 1 24 29 202 11 15 5 15 393 47 .......62 30 36 VALUE. $ 12 00 228 10 185 05 196 58 656 72 101 25 76 88 1 75 63 83 33 00 86 85 8 25 30 00 49 20 126 30 340 48 24 50 39 00 25 41 290 61 43 55 55 70 110 00 270 25 736 71 26 92 465 48 371 10 17 00 30 90

ARTICLES. Looking glasses.............................pcs Mattresses....................................pes Matting...................................rolls Pictures.....................................pes Picture frames............................doz Rugs..........................................doz Sundry assorted furniture..................... Groceries and Provisions. Chocolate....................................lbs Coffee........................................lbs Condensed milk..............................cs doz Currants.....................................lbs pkgs Extracts and essences......................doz Olive oil......................................cs doz Peas, canned.................................doz Pickles ............................................ Sardines..................................doz Sago..........................................lbs Sauces........................................doz Salt, coarse...................................lbs Sundry spices............................lbs doz bxs Sundry groceries and provisions............ Sundry Chinese groceries and provisions.. Guns, Gun Material and Powder. Caps............................................M Cartridges............................. M Shot....................................lbs Powder—Blasting powder.........kegs Gun powder.....................cs QUANTITY. 8 25 60 35 3 1 254 8,617 42 324 30 2 49 5 7 50 216 675 16 4,585 4 24 117 21 24 450 40 2 VALUE 8 22 30 245 00 349 50 86 00 21 00 10 50 756 23 62 41 1,079 54 1,000 45 9 15 102 52 56 00 105 83 48 90 251 58 15 54 57 75 36 65 134 55 231 98 973 41 27 70 143 07 33 50 96 87 23 20

ARTICLES. Hardware, Agricultural Imple-menta and Tools. Files and raspa...............................doz Glue..........................................lbs Hose............................................ft Knives, assorted .............................doz Pots and kettles............................doz lots Razors.........................................doz Twine ..........................................lbs bndle. Wrapping paper...........................bales Corks..........................................gro Sundry assorted hardware.................... Iron, Steel, Etc Iron............................................lbs Steel............................................Ibs Jewelry, Plate, Clocks, Etc. Clocks..........................................cs doz Plated ware....................................... Watches—Gold..............................No Silver............................No Watch materials................................. Cheap Jewelry................................ Assorted jewelry.............................. Matches. Matches.........................................cs Musical Imlruments, Guitars..........................................No Harmonieas...............................doz Pianos .......................................No, Sundry assorted musical instruments....... QUANTITY. 19 50 800 14 2 1 2 1,228 1 15 28 1,604 314 4 6 2 6 22 1 11 3 28 1 value. $ 64 46 17 50 238 00 150 85 46 55 21 87 455 34 45 00 14 00 500 65 72 30 45 31 418 80 599 70 217 30 31 75 70 67 430 39 69 25 31 25 21 00 100 00 24 15

ARTICLES. Naval Stores. Cordage....................................coils Tar..........................................bbls Assorted naval stores........................... Oils. Peanut..........................................cs Paints. Lead, white..................................lbs Lamp Black....................................cs Ochre............................................lbs Putty........................................lbs Linseed oil.................................galls cs Varnish....................................galls Zinc, white....................................lbs Sundry paints................................lbs gills Perfumery and Toilet Articles. Combs.........................................doz Hail oil.....................................doz Soap, toilet..................................doz bxs Sundry perfumery and toilet articles....... Saddlery, Carriages Materials. Axle grease..................................doz Baby carriages...............................No Carts.....................................No Carriage......................................No Sundry saddlery and materials............... Spirits. Whiskey....................................galls Assorted perfumery...................... galls doz QUANTITY. 12 23 150 10,658 5 600 50 25 80 400 797 21 35 25 42 12 51 1 5 1 25 5 17 Value. $ 107 26 141 25 9 00 525 00 680 00 51 00 44 91 36 99 174 68 122 00 36 00 96 23 45 75 47 35 145 35 126 50 67 24 19 50 410 00 325 00 215 32 76 00 93 95

ARTICLES. Shooks and Containers. Bags..........................................M Stationery and Books. Artists materials............................... Books, blank...............................doz Books, printed..............................vols Paper, writing.............................pkgs Pencils...................................grc Sundry stationery................................ Tea. Tea.............................................lbs Tin and Tinware. m Sundry tinware and materials.............. Tabacco and Cigars. Cigars........................................ M Tabacco........................................cs lbs Wines. Claret.......................................galls cs Sundry wines,.................... galls cs Sundry Merchandise. Candy......................................... lbs pkgs Pipes, tobacco...............................cs Sundry assorted merehandise................ Wreck "Hesperian" ....................... 6 QUANTITY. 240 8 394 40 ½ 9,773 20 4 200 155 2 96 9 3,098 2 4 VALUE $ 8.640 10 65 15 00 188 25 21 60 3 00 40 03 1,554 12 440 73 300 00 60 00 148 50 138 20 364 27 61 45 715 37 500 00

# Goods Paying Duty

# At Hilo.

ARTICLES. Ale and Beer. Beer..........................................doz bbls Building Materials. Cement.......................................bbls Window glasses............................bxs Clothing. Hats, Boots, Etc. Boots and shoes, assorted................pair lot Shirts, assorted..............................doz Shirts, under.................................doz Pants and trousers.........................doz Socks............................................doz Stockings.....................................doz Suits............................................doz cs Ladies' dresses..............................cs Mats, assorted...............................doz Oil clothing..................................doz cs Rubber clothing............................doz Sundry clothing.................................. Crockery and Glassware. Demijohns....................................doz Lamps.......................................doz Lamp chimneys..............................doz Lamp fixtures...............................doz Lanterns.....................................doz QUANTITY. 20 2 1 1 21 14 9 1 5 1 2 4 1 4 24 329 10 10 VALUE. $ 15 00 113 53 76 50 14 46 314 50 284 25 336 75 23 75 16 00 632 05 54 00 625 21 139 00 130 25 82 25 17 00 87 85 189 10 32 87 93 00

ARTICLES. Assorted crockery.............................. Assorted glassware.............................. Drugs. Sundry assorted drugs.......................... Dry Goods. Canvass.......................................yds Damask.........................................yds Handkerchiefs...............................doz Linen..........................................yds pcs Napkins.......................................doz Satin..........................................yds Table covers................................doz Towels........................................doz Velveteen.....................................pcs Woolen goods................................yds Fancy Goods and Millinery. Battons.......................................doz Corsets........................................doz Embroidery...................................pcs Fans...........................................doz Gold leaf...................................books Gloves, kid...................................doz Gloves, assorted............................doz Gauntlets...................................doz Pins............................................lot Ribbons......................................pcs Lace............................................pcs lot Ruehing........................................pcs Scarfs..........................................doz Umbrellas....................................doz Worsted........................................pcs Toys.............................................. Sundry fancy goods............................. QUANTITY. 16 160 4 43 2 1 13 9 ½ 10 1 10 48 1 45 16 2 7 35 1 1 290 291 1 3 21 5 10 VALUE. $ 390 79 132 74 1,316 67 11 21 46 35 25 50 8 55 3 68 22 80 13 50 3 90 25 80 15 21 10 00 53 17 8 38 82 71 20 75 10 00 85 62 19 00 4 00 14 87 304 95 276 88 9 00 107 83 71 00 10 90 745 27 561 73

ARTICLES. Furniture. Sundry assorted furniture..................... Groceries and Provisions Coffee...........................................lbs sks cs Cheese..........................................cs Condensed milk..............................cs Chocolate.....................................bx Extracts......................................doz cs Sundry assorted groceries and provisions.,. Gun Material and Powder. Gun findings.............................. Powder—Gun powder......................lbs kegs Hardware, Agricultural Implements and Tools. Sundry assorted hardware..........,...... Jewelry, Plate, Clocks, Etc. Watches, assorted..........................doz Clocks.......................... .....doz Watch materials.....................,......... Spectacles.....................................doz gro Musical Instruments. Accordeons................................doz Guuitars.....................................doz Harmonicas.................................doz lot Violin and guitar strings.................bxs QUANTITY. 4,824 7 31 1 155 1 9 3 100 1 5 2 3 1 6 VALUE. $ 557 30 683 00 11 00 1,186 30 2 52 31 50 162 84 172 22 41 30 57 30 197 05 30 60 29 50 26 00 51 25 11 25 41 93 7 75

ARTICLES. Paints. Linseed oil..................................galls Varnisb.....................................galls cs White load....................................lbs kegs Putty.........................................lbs bbls Sundry paints...................... lbs galls; tins Perfumery and Toilet Articles. Suudry perfumery and toilet articles....... Saddlery, Carriages & Materials. Axle grease................................cs Cart .............................................No Sundry saddlery and materials............... Slationery and BooKs. Artists' materials...........................pkg Alburns................................,.......doz Tea. Tea.............................................lbs bxs Oils. Neats. foot oil.................................cs Wines. Sundry wines.....,...........................cs galls Spirits. Alcohol.........................................cs Brandy....,...............................galls QUANTITY. 500 40 5 3,640 187 802 1 505 10 120 2 2 1 3 4 2 3 3 1 1 VALLE. $ 307 50 88 05 562 71 31 50 80 68 102 06 7 25 183 00 19 25 20 00 35 83 187 24 14 00 15 75 11 25 3 50

ARTICLES. Sundry Merchandise. Candy............................................lbs bxs lot Scientific instruments.......................... Sundry merchandise............................ QUANTITY 267 8 3 VALUE $ 418 88 53 38 341 27

# Goods Paying Duty

# At Mahukona.

ARTICLES. Clothing, Etc. Men's suits...................................doz Sundry clothing................................ Dry Goods. Blankets.................................No Assorted dry goods....,....................yds Fancy Goods and Millinery. Sundry fancy goods............................. Fish, Dry and Salt. Sundry fish.................................doz Furniture. Chairs...........................................doz QUANTITY. 1 3 17 1 VALUE $ 144 00 74 90 11 25 31 56 87 29 28 72 43 20

ARTICLES. Groceries and Provisions. Condensed milk................................cs Jama and jellies..............................doz Sundry groceries and provisions............. Hardware. Sundry hardware................................ Jewelry, Clocks, Etc. Clocks........................................doz Oils. Neats' foot oil..............................galls Paints. Varnish.....................................galls Sundry paints................................lbs Spirits. Brandy.......................................doz Sherry.........................................doz Wines. Claret.........................................doz Port wine.....................................doz Tea. Tea......................................lbs Sundry Merchandise. Billiard table..................................No Sundry merchandise............................ Quantity. 15 32 1 60 14 108 1 2 2 81 1 VALUE. $ 116 25 61 57 326 458 58 40 14 70 39 00 17 50 18 36 15 00 11 00 7 00 11 00 35 47 315 00 41 96

# Goods Free by Treaty

# At Honolulu.

ARTICLES. Animals and Birds. Animals—Bulls..............................No Cows...............................No Dogs..............................No Horses and mares..............No Hogs and pigs..................No Mules.............................No Stallions................... No Birds, Etc—Birds............................No Ducks..........................No Fowls ........................No coops Geese............................No Guinea fowls.................No coops Building Materials. Asphaltum.................................bbls Blinds........................................prs sets Bricks.......................M Cement....... bbls Doors..................................No pairs Lime........................................................bbls Plaster of Paris................................................bbls Sand... ...........tons Window sashes................................pairs windows No Sundry building materials.................. QUANTITY. 7 12 54 3.170 82 2 2 6 414 15 44 17 1 22 1,373 35 803 125 2.420 42 6,595 89 862 507 2,067 VALUE $ 725 00 1,320 00 35 00 11,752 00 23,102 92 12,095 00 450 00 30 00 6 00 771 13 101 00 77 00 104 00 2,468 52 8,174 00 202 50 4,435 59 9,587 71 206 75 892 47 4,067 53 2,125 58

ARTICLES. Clothing, Hats, BootS Etc. Boots, men's and boys'..................doz prs Boots and galters, women's...............doz prs Brogans....................................doz prs Gaiters, men's...............................doz prs Shoes, boys and children's...............doz prs Shoes, men's..................................doz prs Shoes, women's..............................doz prs Shoes, misses................................doz prs Slippers, mens...............................doz prs Clippers, women's..........................doz Shoes, etc.. assorted.........................doz prs cs Shoe brushes...............................doz Shoe findinngs..................................... Boys' clothing................................doz Children's clothing.......................doz pcs Coats..........................................doz Collars, men's, cotton......................doz Collars, men's, paper.......................M cs Cravats and ties............................doz Drawers....................................doz Jackets........................................pcs Jumpers and Overalls—Jumpers.......doz Overalls........doz Ladies' underclothing......................doz Shawls.......................................doz Shirts, over..................................doz Shirts, under................................doz Shirts, assorted.............................doz Skirts, ladies..................................doz 7 QUANTITY. 420 1,618 93 541 51 12 81 395 114 1,402 227 836 211 1,704 31 334 106 166 165 637 687 5,841 40 228 114 30 19 2 2 136 317 7 250 224 249 40 49 1,309 89 VALUE. $ 14,746 33 3,739 37 634 13 4,596 40 3,384 37 9,121 27 7,007 92 3,284 37 1,039 80 2,864 00 23,749 48 241 91 631 63 801 10 1,120 33 411 63 205 16 119 20 79 92 1,518 50 16 33 2,080 08 1,510 30 141 28 332 55 3,121 20 8,491 17 703 97

ARTICLES. Socks........................................doz Stockings....................................doz Suits..........................................doz Trowsers and pants........................doz prs Vests...........................................doz Sundry clothing................................. Dry Goods. Cottons—Batistes..........................yds Blankets..........................prs sing Cambric..........................yds pcs Cotton flannel...................yds Checks...........................yds Cotton, bleached...............yds pcs Cotton, brown and colored...yds Cotton wadding.................lbs doz bales Cretones...........................yds Damask...........................yds Denims............................yds pcs Diaper.............................pcs Drilling..........................yds Duck.............................yds pcs Ginghams........................yds Handkerchiefs.................doz Jeans.............................yds Lawn.............................yds Marseilles and pique........ yds Mosquito net....................yds Muslin.............................pcs Nainsook............ yds Prints............ yds Quilts and spreads.............doz pcs QUANTITY. 2,577 1,413 14 268 114 15 3,456 25 14 35,538 5 21,581 1,285 149,773 270,309 200 38 5 1,480 27 147,513 10 23 28,787 13,442 42 44,880 987 112 26,323 1,791 503 11 5,520 4 480 1,259,074 86 80 11 VALUE. $ 2,433 46 2,773 72 575 83 1,876 07 177 38 7,653 43 514 49 48 00 1,701 39 1,969 28 145 81 12,418 63 14,608 84 105 30 149 63 7 95 19,234 75 42 57 1,947 90 1,678 28 3,994 12 632 64 7 53 2,059 08 187 90 166 45 605 35 73 80 63,644 69 1,082 21

ARTICLES. Cottons—Silesias...........................yds Sheeting..........................yda Shirting..........................yds Stripes...........................yds pcs Tarletan.........................yds Ticking ..........................yds Towels............................doz Toweling........................yds Sundry assorted cottons......yds pcs doz Woolens—Blankets.........................prs pcs yds cs Bunting.........................yds Flannel..........................yds pcs Plaids...........................yds Serge............................yds Wool dress goods...........yds Sundry woolens..............yds pcs Mixtures—Cassimere.......................yds pcs Coburgs........................yds Canvas lining.................yds Chambray....................yds Sundry mixtures..............yds Fancy Goods and Millinery. Braid ..........................................doz gro pcs Crochet cotton...............................lbs Edging........................................yds Fringes.......................................yds Girdles and belts............................doz Gimp..........................................doz pcs Gloves, cotton................................doz Lace..........................................yds QUANTITY. 9,558 11,927 19,144 27,828 25 46 21,868 118 434 42,722 210 141 906 130 30 4 1,281 5,127 2 236 136 631 1,935 43 135 3 386 250 349 2,180 4 67 11 56 1,302 39 132 30 8 16 253 VALUE. $ 1,011 03 1,301 58 1,683 74 2,587 98 9 01 2,074 89 216 08 42 00 5,485 03 6,838 15 215 02 1,963 07 75 67 69 56 471 41 3,495 22 465 64 30 90 37 50 49 40 1,252 60 137 42 31 60 66 50 62 75 501 49 16 55 48 46

ARTICLES. Lace..........................................doz Ladies bags.................................doz Needlee—common............................M Sewing machine..................M Pins...........................................doz gro Pins, hair...................................doz gro Purges......................................doz Suspenders................................doz Tape .........................................doz pcs Thread.......................................lbs doz bxs Toys................................................ Hundry fancy goods..... Fish, Dry and Salt. Abalonc.................................... lbs Codfish......................................lbs pkgs Cuttle fish.................................lbs Herrings...................................pkgs Mackerel ........................,......kits cs Salmon .......................,.......bbls hf bbls tierces Salmon..,..,............................... kits cs Salmon, smoked............................lbs Shrimps.....................................lbs pkgs Sundry fish...................................lbs pkgs Flour. Buckwheat.................................lbs . pkgs Corn meal........................... ....lbs . pkgs Graham flour..............................lbs QUANTITY. 164 6 19 24 17 101 3 12 50 7 48 16 230 371 32 5,164 145,277 249 832 798 158 41 3,959 884 79 440 20 909 78,403 13 435,199 326 300 2 53,270 21 9,325 VALUE. $ 270 05 14 25 351 60 39 89 44 96 104 76 49 68 24 20 344 55 1,172 05 2,528 97 483 68 6,674 89 126 66 744 76 665 80 22,733 19 1,164 77 82 56 6,910 98 22,876 58 15 80 1,331 78

ARTICLES. Graham flour.............................qr sks hf sks Oat meal.......................................lbs pkgs Rye meal and Hour..........................lbs qr sks Sundry meals.................................lbs cs Wheat flour...............................qr sks hf sks bbls Fruits, Fresh, Apples.........................................bxs Apricots.......................bxs Cherrier......................................bxs Cranberries..............................bbls Grapes........................................bxs crates Lemons.......................................bxs Oranges.....................................bxs Pears.........................................bxs Peaches.......................................bxs Plums.......................................bxs Sundry fruits ..,........................bxs Furniture and Upholstery. Carpets........................................yds pkgs Curtains and shades......................doz sing prs sq ft Excelsior....................................lbs bales Mats, door....................................No Moulding........................................ft Picture frames...............................doz. sing Paper hangings..........................rolls Rugs.........................................No yds QUANTITY. 82 17 41,750 15 5,500 45 8,030 35 122,997 2,996 30 8,515 143 223 14 268 149 12 9 489 309 494 352 100 1 45 74 39 400 14,027 3 85 18,109 171 50 25,001 8 38 VALUE. 8 370 43 1,698 79 172 03 281 60 39,274 85 9.510 20 158 50 299 25 164 25 493 55 55 50 37 00 689 10 414 42 478 00 440 05 220 50 854 24 267 86 73 80 1,812 20 458 68 4,612 56 276 45

ARTICLES. Springs, furtniture..........................gro Assorted furniture................................ Grain and Feed. Barley.........................................lbs sks Barley meal..................................lbs sks Bran.........................:................lbs sks Corn—Whole.................................lbs sks Cracked..............................lbs sks Hay........................................bales Middlings.....................................lbs sks Oats............................................lbs sks Oil cake.......................................lbs sks Wheat...........................................lbs sks Sundry feed..................................Ibs sks Groceries and Provisions. Apples, dried..............,................lbs bxs Asparagus..................................doz lbs bxs Bacon.........................................lbs Beef-Salt..................................bbls hf bbls kegs Smoked and dried...................lbs bxs Beans-Baked...........................doz canned...........................doz Dry..................................lbs QUANTITY. 4,493,514 1.147 1,534,233 300 4,500,809 1,400 282.851 194 208,300 47 21,578 542,983 984, 909,851 335 306,801 75 458,481 163 44,508 853 20,365 34 92 167 21 54,668 5 109 62 90 1,670 2 130 112 320,192 VALUE. $ 214 15 20,882 14 56,043 58 18,910 22 35,553 56 7,127 37 35,182 97 7,504 10 20,803 91 4,241 39 6,745 09 1,360 67 1,181 93 232 12 7,304 51 2,221 18 253 69 247 80 146 30

ARTICLES. Beans—Pry...............................sks Bread..........................................lbs cs Butter...........................................lbs doz hf bbls rolls bxs Candles.......................................lbs bxs Caviar.........................................doz Celery.........................................doz buchs Cheese.......................................lbs doz sing OS Clams..........................................doz cs Corn—Canned ..............................doz cs Starch............................lbs cs Crackers.....................................tins Um es Cakes.........................................tins lbs cs Craked wheat ..............................lbs cs Currants....................................lbs Eggs......................................doz bxs Farina................................. ........lbs cs Figs............................................lbs bxs Fruits and Berries, Canned and Bottled— Apples................................doz cs Aprieots..............................doz cs Cherries............................doz Grapes................................doz Peaches...............................doz QUANTITY. 74 324,305 496 104,788 252 20 50 6 52,305 623 10 16 328 77,730 2 7 10 230 7 609 5 8,100 5 7,846 154,054 296 714 6,650 68 21,000 8 1,070 6,599 83 25 6 1,573 119 51 9 183 2 66 40 353 VALUE. $ 7,877 30 13,483 00 20,022 14 7,836 66 53 55 127 11 9,248 21 511 90 909 10 682 22 14,162 09 1,960 20 595 55 84 64 2,236 43 21 01 218 05 157 55 470 48 150 70 82 20

ARTICLES. Fruits and Berries, Canned and Bottled— Peaches................................cs Pears.................................doz cs Plums................................doz Pic and table fruits, assorted........doz cs Garlic..........................................lbs pkgs Haras...........................................lbs pkgs Hominy.......................................lbs Honey...................................... doz lbs cs Hops .........................................lbs cs Horse raddisk...............................doz lbs Jams and jellies.............................doz cs Lard..........................................lbs pkgs Lobsters.................................doz CS; Macaroni..................................pkgs Nuts—Almonds.............................lbs bxs Walnuts............................lbs Sundry nuts..........................lbs Olive oil..................................doz cs Onions.......................................lbs pkgs Orange and citron peel...................lbs Oysters—Canned..........................doz Dry...............................lbs Fresh.............................No cans Peas—Canned...............................doz cs Dry and split.,........................lbs sks QUANTITY. 30 336 38 66 1,078 90 18,991 27 133,452 16 1,050 335 498 23 5,453 3 10 315 753 43 181,143 39 3,042 23 1,811 3,222 1 4,360 2,551 49 40 1,098,036 238 100 3,226 22 747 5,550 2,274 722 11 13,803 9 VALUE. $ 917 75 866 11 133 90 2,469 74 1,111 94 18,758 96 38 50 786 69 640 28 63 72 1,706 36 19,617 94 6,385 411 1,585 09 429 27 370 90 278 35 235 20 5,573 90 31 00 4,471 25 303 65 1,742 30 1,062 16 569 60

ARTICLES. Peaches, dried...............................lbs Pears, dried................................. lbs Plums dried...

.......................... lbs bxs Pearl barky.................................lbs bx Pickles......................................doz kegs Pork..........................................bbls bf bbls kegs Potatoes.........................................lbs Preserved meats, etc.......................doz cs Sausages..............................lbs Prunes..........................................lbs bxs Raisins.....................................hf bxs qr bxs J8 bxs lbs pkgs Salmon—Canned...........................doz cs Fresh................................lbs No Salt—Coase.................................lbs tons Dairy....................................lbs pkgs Fine.................................bales Sago..........................................lbs Sardines......................................doz cs Saucces.......................................doz cs Soap, common...............................lbs bxs Soups..........................................doz Spices—Allspice............................doz lbs Cinnamon..........................doz cs 8 QUANTITY. 1,114 106 648 1 3,535 1 310 147 61 98 286 355 2,243,776 721 3,330 1,172 36,103 10,688 14 325 2,591 68 1,142 299 7,914 76 2,319 6 231,230 143 30,580 15 394 2,343 23 22 316 41 256,764 299 83 62 10 127 1 VALUE. $ 134 34 13 76 60 09 152 18 1,066 58 5,139 23 19,306 82 19,249 62 858 00 2,733 35 9,916 13 209 61 1,059 33 116 96 812 12 90 90 211 47 1,149 77 12,703 88 353 28 66 40 166 15

ARTICLES. Spices—Cloves.............................doz cs Ginger.............................doz Mace................................doz lbs Mustard............................doz lbs cs Pepper, black.....................doz lbs Pepper, red........................doz lbs Sage................................doz lbs Sundry spices................................doz lbs cs Starch...........................................lbs bxs Succotash.....................................doz cs Sugar, cube and refined.....................lbs bbls Syrup.........................................galls pkgs Tapioca.........................................lbs Tomatoes......................................doz cs Tongues, dry and pickled.............hf bbls kegs doz Vermicelli...................................pkgs Vinegar......................................galls bbls hf bbls kegs Yeast and baking powder..................doz gro bxs Sundry Chinese provisions..................... Sundry assorted groceries and provisions. QUANTITY. 24 1 14 6 5 102 60 3 178 244 26 10 38 42 56 20 4 11,398 237 41 1 512,091 1 1,084 30 1,025 657 38 5 14 3 420 15,478 14 12 7 71 102 1,064 VALUE. S 39 23 11 90 11 24 124 48 241 48 21 35 48 15 111 65 1,069 45 62 30 22,484 80 677 48 40 75 687 15 176 70 330 25 2,559 20 7,807 36 8,958 60 5,931 52

ARTICLES. Guns and Gun Materials. Guns—Rifles..................................No Muskets...............................No Various..............................No Pistols.........................................No Gun findings..................................... Hardware, Agricultural Imple-ments and Tools. Adzes..........................................doz Agate ironware................................... Augers and Bitts—Augers................doz Bitts.................doz sets Awls...........................................doz gro Axes..........................................doz cs Bath brick..................................box Bells—Large.................................No Small.................................doz Butts and hinges.............................doz prs Charcoal irons................................doz Chisels and gongea..........................doz sets Chains—Dog.................................doz Trace..............................prs Couplings and Bibbs—Bibbs.............doz Couplings.......doz sets Crucibles ....................................No pkgs Cultivator.....................................No Fencing wire................................lbs Files and rasps.............................doz Fillers and oilers............................doz Pish Lines and Nets—Fish lines...........cs Net................No Fry pans....................................doz Furnaces......................................No Galvanised ironware.......................doz QUANTITY. 90 40 40 130 1 8 216 12 10 10 102 8 1 2 15 720 23 36 42 3 2 24 51 23 22 18 1 1 35,159 1,142 52 1 1 8 6 6 VALUE. 8 2,306 04 822 68 450 82 20 40 2,412 43 606 00 33 70 1,175 63 1 20 270 75 682 37 198 50 158 11 3 45 36 00 480 90 84 32 10 00 1,475 30 1,735 66 135 66 137 54 24 20 14 94 20 95

ARTICLES. Gimlets ............. ..doz Hummers.....................................doz Hatchets......................................doz Hoes...........................................doz cs Horse and mule shoes....................kegs lbs Hose Pipes and Sprinklers—Pipes......doz Spnklers..doz Knives—Butcher........................ doz Carving.........................sets Pocket............................doz Knives and forks...............doz Knives, assorted................doz Locks.......................................doz Mallets........................................doz Nails—Boat..................................lbs Cut.....................................kegs Chopper................................lbs Finishing............................lbs Galvanized....... ................... kegs Horse shoe..........................lbs bxs Sundry nails........................lbs pkgs Nuts and Bolts—Bolts.....................No Nuts.......................lbs Ox bows........................................doz Ox yokes........................................No Picks and mattocks.........................doz Pipes, iron................................... ft Planes and Irons—Planes................doz Irons.................doz Plows.........................................No Plow fixtures.................................... Pots and kettles...........................doz Pumps...........,...........................No Razors..............................................doz Rivets—Copper............................lbs cs Iron................................lbs Rules............................... doz Sapolio.........................doz QUANTITY. 100 59 209 379 5 511 2,750 6 14 67 41 6 94 76 987 6 1,708 4,445 155 1,345 365 2,906 69 4,797 36 9,869 1,300 46 30 54 3,000 22 4 224 11 116 9 2,926 4 2,003 42 72 VALUE. $ 21 87 269 54 915 59 1,742 12 2,175 72 108 40 120 42 118 38 10 20 295 76 373 88 2,877 52 25 51 193 68 11,558 43 32 82 121 34 1,600 52 1,034 26 1,228 70 2,169 38 302 38 174 00 496 20 931 59 271 66 3,481 71 572 60 145 56 665 75 47 25 836 86 156 30 114 73 83 50

ARTICLES. Saws—Hand.................................doz Circular..............................No Cross cut.............................No Assorted.............................No Safes............................................No Scales—Platform..............................No Small.................................No Scissors and shears..........................doz Scrws.........................................gro Screw drivers...............................doz Shovels,.......................................doz Spades..........................................doz Spikes.........................................kegs Steels..........................................doz Stoves and ranges............................No Stove furniture................................... Stove polish..................................cs Squares.........................................doz Tacks, iron and tinned.....................doz lbs pkgs Tacks, copper................,.............lbs Tool handles.................................doz Traps, rat. etc............................... doz Twine. Wrapping & Seine—Wrapping..lbs Seine.........lbs Vises............................................No Washers.........................................lbs M Wire—Brass.................................. lbs Copper................................lbs-Iron ...........,......................lbs pkgs Wire cloth and netting......................ft lbs Wrapping paper..........................reams lbs pkgs Wrenches...............................—doz cs QUANTITY. 120 28 36 44 47 19 100 273 1,300 8 111 47 114 21 603 1 7 1,870 737 13 208 1,724 14 2,500 767 27 610 10 25 106 1,180 12 19,480 211 45 2,829 140 04 31 1 VALUE. $ 1,313 68 11,003 31 808 31 304 41 1,100 01 363 77 33 09 1,117 54 573 44 400 04 102 85 5,916 45 141 24 6 00 86 85 1,193 99 54 06 2,160 74 16 65 605 88 118 40 211 56 6 50 36 46 202 13 2,203 21 2,661 01 197 43

ARTICLES. Wooden Ware—Baskets..................doz nests pkgs Buckets and pails.....doz nests pkgs Brooms..................doz pkgs, Brushes, paint and whitewash......doz Washboards..................................doz Sundry hardware................................ Iron, Steely Etc. Copper—Bar................................lbs bars Sheet...............plates & sheets Bolts..............................lbs Pipe...............................lbs No Iron—Bar..................................bars bdls lbs Galvanized............................lbs bdls Hoop.................................bdls Pig..................................tons Plates.................................No Sheet...................................lbs sheets Steet........................lbs bars bdls QUANTITY. 18 43 2 3 10 2 1,339 13 225 92 14,000 8 83 202 32,933 1,784 1,730 268 379 686 2 40 80 483 617 100 4,798 175 15 VALUE. $ 213 93 126 50 3,522 57 989 58 134 42 32,491 92 1,719 84 4,134 70 30 30 12,921 09 4,043 18 56 59 111 20 1,555 40 1,911 22 859 86 1,440 18 Leather. Buckskins......................................No lbs Calfskins..................................doz Chamois leather.........................doz Gout and kid skins............................doz lbs ft 6 16 18 48 11 55 1,000 465 30 19 629 30 49 04 1,322 55

ARTICLES. Harness leather lbs Patent leather ft Sheep skins doz Solo leather lbs Sundry leather Battons ft Cedar lumber ft Clapboards ft Flooring pine ft Laths M bdls N. W. Lumber—Dressed ft pes Rough ft Assorted ft Pickets No Pine, Eastern and sugar ft pcs Planks—Ash ft Oak ft Hickory and walnut pcs ft Posts No Railroad ties No Rodwood—Dressed f t Rough ft Assorted ft M Shingles M Spars and piles No Sundry lumber ft flag pole Machinery. Babbit metal Ibs Belting ft Ibs pkgs Boilers, steam No Boiler tubes No Moulding sand tons QUANTITY. 10,507 285 514 29,659 20,271 10,611 5,436 22,518 246 810 1,523,776 3,847 6,046,197 1,118,356 50,084 13,586 193 5,867 l5,900 4 14,084 86,815 1,347,353 1,054,912 339,843 57 8,880 41 8,706 1 1,500 3,222 150 3 4 806 218 VALUE. $ 4,090 87 68 75 1,550 98 6,992 74 24,830 13 512 90 108 72 562 95 754 88 27,110 73 61,820 13 12,846 75 465 30 1,009 49 468 15 950 88 1,851 07 8,769 21 2,430 96 33,913 26 16,716 63 8,433 20 15,522 09 537 50 464 63 285 00 1,657 59 2,201 68 1,623 69 327 24

ARTICLES. Packing lbs Sewing machines No Steam engines No Steam pump. No Vacuum pan No Sundry machinery Matches. Matches gro tins pkgs Musical Instruments. Organs No Pianos No Sundry instruments Naval Stores. Anchors, boat No Boats No Blocks No doz Canvass yds bales Chain ft Cordage—Houseline lbs Manila and Sisal Rope— Manila lbs Sisal lbs Marline lbs Ratline Ibs Seizing Ibs Spunyarn Ibs Tow and whale line lbs Wire rope lbs Assorted cordago Ibs Needles, sail No Oakum bales Oars No Pitch .....bbls Rosin bbls lbs QUANTITY. 3,901 7 39 1 25 280 66 3 7 8 12 601 25 12,616 300 79 56, 225 666 187 412 455 302 54,467 1,400 167 405 54 50 1 1,133 VALUE. $ 1,346 11 6,317 85 3,295 00 27,214 50 1,800 00 106,437 86 10,761 48 234 50 3,007 88 160 79 17 46 2,664 00 1,190 13 3,230 98 122 40 12 64 12,374 23 95 09 22 44 69 48 56 20 46 91 128 84 3,971 29 19 99 651 72 847 76 205 25 355 87

ARTICLES. Sails No Sheathing metal Ibs Sheathing nails kegs hf bbls Twine, sail lbs Suudry naval stores Oils. Gasoline ... galls tanks Kerosene galls Lard oil.. galls cs Lubricating oils .... galls bbls lbs Naptha .galls Neats foot .galls Sperm...................................................................................................galls Whale...........................................................................................galls Sundry ... .....galls doz pkgs Paint Stuff. Turpentine galls Perfume Soap & Toilet Articles. Brushes, hair..............................................................doz Brushes, assorted doz Soap, toliet ..................doz lbs bxs Sundry articles ... . Railroad Materials. Sundry assorted material . 9 QUANTITY. 3 3 2,481 15 58 10 395 19,090 3 176,840 6,356 6 5, 382 20 235 11,110 30 7,150 5,818 8,242 325 2,680 48 2 3,477 647 56 VALUE. $ 459 00 372 15 180 00 413 60 97 17 1,654 77 5,942 25 25,690 03 4,335 72 3,646 45 1,666 50 19 50 5,805 00 2,908 00 657 87 1,043 19 235 03 8 77 2.686 15 39 50 1,884 45

ARTICLES. Saddlery, Carts and Materials. Axles Ibs sets pcs Bridles doz Bridle bits doz Bridle heads and reins doz Buckles doz gro Carts—Horse, etc No Hand No Enameled duck ..bolts Harness sets Horse blankets pcs Horse brushes ......doz Horse combs ...... doz Saddles—Ladies' ...............No Mexican and American No Saddle trees doz Springs, carriage prs sing Spurs doz Stirrups—Wood ..............................doz Assorted doz Wagons doz Wheelbarrows doz Whips—Assorted . doz Raw hides .. doz Sundry saddlery ........ Shooks and Containers. Bags, paper M pkgs Bungs...........................................................................No Shooks—Barrel..........................................sets Box...............................................sets Sundry containers, iron tanks, etc....... ... QUANTITY. 5,265 246 25 51 96 18 224 280 10 3 5 153 33 60 88 15 3 196 22 160 118 1,367 24 116 37 4 120 603 158 483 3 8,800 555 200 696 VALUE. $ 1,817 32 722 06 325 45 242 25 610 62 456 90 23 00 3,913 46 106 80 340 03 31 29 29 00 1,977 75 377 50 899 98 234 57 354 27 675 75 740 06 2,925 76 13,904 98 1,204 30 35 30 177 00 799 00 3,449 50

ARTICLES. Stationery and Books. Artists' materials Albums doz Books, blank Books, printed vols sets cs Bookbinders' materials Cardboard doz No Cards, blank doz M Cards, playing doz Envelopes M doz bxs Ink, writing doz gro Mucilage .. doz Newspapers and periodicals Paper, printing reams bdls Paper, writing reams pkgs Pens, Gold, Quill & Steel—Gold doz Assorted ...doz Pencils, lead doz gro Sheet and Book Music—Sheets No Books No Slates doz cs Tags and Labels—Tags M Labels M Types, plates and cuts Sundry stationery Tobacco and Cigars Cigars M pkgs Cigarettes M Snuff lbs doz QUANTITY. 9 12,008 14 30 8 4,200 45 8 1,438 692 64 41 109 30 51 1,670 176 1,300 160 7 546 11 144 110 200 36 1 112 22 446 6 2,262 200 4 VALUE. $ 762 52 148 00 3,844 62 10,800 52 331 65 291 33 109 94 774 16 1,495 19 412 22 131 25 7,114 03 5,611 36 3,456 06 630 80 566 83 304 31 79 27 352 29 19 24 8,128 57 9,504 50 9,197 99 102 74

ARTICLES. Tobacco .Ibs gro Sundry Merchandise. Bird seed Ibs pkgs Boxes and cases .... Charcoal...... sks Coal, hard tons Coke ........ sks Cotton waste ..lbs Cigarette paper Clocks, wooden ... No Plants and seeds Photographic material.. Pipes, tobacco doz Pipe stems ..... doz Satchels doz Scientific instruments... Trunks No nests Traveling bags.... .. doz Valises doz Wicks and wicking gro lbs Sundry articles QUANTITY. 186,120 28 2 100 555 20 4,312 475 41 81 8 100 215 290 269 42 620 140 VALUE. $65,976 06 131 48 4,573 45 30 00 5,227 01 9 00 384 58 2,110 26 1,428 35 1,962 54 145 62 894 49 8 50 704 75 695 11 3,409 37 1,353 25 298 36 328 01 4,307 02

# Goods Free by Treaty

# At Kahulul.

ARTICLES. Animals, Etc. COW .... No Horse No Hogs and pigs .. ...No Mules .. No Building Materials. Asphaltum. .. bbls lot Blinds prs Bricks M Doors No Lime ...........bbls Window sashes prs Clothing, Boots, Shoes, Etc. Boots, men's ..doz cs lot Brogans. ...prs doz cs Shoes—Men's ........................doz prs cs Boys' cs Women's doz Coats. No Drawers ......... .. doz QUANTITY. 1 1 339 6 5 1 25 10 65 1,550 25 4 1 170 36 10 1 96 4 4 9 1 29 VALUE. $ 200 00 175 00 4,597 46 900 00 77 44 60 25 75 00 157 50 2,165 00 235 00 1,574 00 780 37 355 00 24 00 199 00 3 75 169 75

ARTICLES. Jumpers and overalls doz Ladies' underclothing pcs Shirts—Under doz Assorted ...doz cs Socks and stockings doz Trowsers and pants doz Sundry clothing ... Dry Goods. Cotton—Blankets prs Cotton Flannel yds Cotton, bleached yds pcs Cotton, brown yds pcs Denims yds Drilling yds pcs Ginghams yds Handkerchiefs doz Jeans yds Lawn yds Mosquito net .....yds pcs Prints yds Quilts doz Silesias yds Ticking, yds Towels doz Sundry cottons... yds pcs Woolens—Blankets prs Flannel . .yds Water proof cloth yds Wool dress goods yds pcs Fancy Goods, Etc. Toys Sundry fancy goods QUANTITY. 97 12 14 67 1 97 107 36 635 15,892 3 11,183 3 4,610 699 3 1,182 111 857 845 237 16 25,287 2 221 639 22 486 3 141 277 196 291 2 VALUE. $ 630 44 20 00 97 00 682 01 182 15 684 00 97 51 36 00 92 40 1,470 45 884 70 672 17 163 08 113 38 108 20 124 01 103 06 107 00 1,625 32 33 25 37 22 87 00 30 66 124 25 1.690 05 159 03 137 50 72 63 226 41 189 86

ARTICLES. Fish, Dry and Salt. Abalone Ibs bbls Codfish Ibs Mackerel kits doz Salmon bbls hf bbls Salmon, kits No Shrimps lbs Sundry fish lbs pkgs Flour. Corn meal lbs Graham flour lbs Oatmeal Ibs Sundry meals. Ibs cs Wheat flour qr sks Fruits, Fresh. Furniture, Etc. Carpets yds pc Chairs doz Curtains and shades doz Mats.. doz Paper hangings rolls, pkg Rugs No Sundry furniture Grain and Feed. Barley lbs Barley meal lbs Bran lbs QUANTITY. 1,708 16 20,135 29 2 588 31 71 2,432 12,733 7 4,018 420 4,350 2,017 28 17,806 32 49 1 12 8 5 519 1 6 974,179 221,179 619,560 VALUE. $ 231 89 708 83 53 07 3,984 50 121 15 238 80 470 76 109 43 9 67 189 32 185 58 18,568 97 45 00 84 53 309 00 100 75 41 75 108 20 15 75 1,197 32 11,298 44 2,743 93 4,841 76

ARTICLES. Corn Ibs sks Hay Ibs bales Middlings Ibs Oats lbs sks Oil cake ..lbs Wheat .................lbs

Groceries and Provisions. Apples, dried lbs Asparagus doz Bacon lbs Beef—Salt lbs Canned doz Beans, dry lbs Bread lbs cs Butter lbs kegs Candles.. Ibs bxs Cheese ... Ibs Cakes lbs tins cs Crackers lbs tins Currants Ibs Fruits, pie and table, canned .doz Garlic Ibs Hams Ibs Honey doz cs Hops lbs CS Jams and jellies ........doz Lard ......................Ibs Lobsters doz Macaroni ......................bxs Nuts assorted .......................Ibs Olive oil..... ..........................doz cs QUANTITY. 2,260 43 946,231 199 62,318 283,214 250 8,220 6,239 31 1,612 21 245 38,839 24,391 20 14,599 2 10,100 60 7,044 564 40 32 27,539 594 143 242 965 9,014 15 21 748 10 43 20,540 408 122 604 14 3 VALUE. $ 57 07 7,031 77 646 00 3,919 08 122 07 225 89 382 38 63 50 222 68 299 50 641 70 1,108 77 1,286 59 3,242 62 1,034 30 951 05 130 29 1,697 45 12 03 477 65 53 63 1,296 51 104 05 104 50 93 25 2,164 08 740 65 133 18 62 70 31 25

ARTICLES. Onions lbs cs Oysters, canned doz Peaches. dried lbs Peas, canned doz Pickles doz Pork .. bbls hf bbls kegs Potatoes lbs cs Preserved meats doz lbs Prunes lbs cs Raisins qr bxs hf bxs Salmon, canned doz Salt, assorted lbs pkgs Sauces doz Soap, common lbs bxs Spices, pepper, black ...doz cs Starch. lbs Sugar, cube and refined. .. . lbs bxs bbls Syrup galls cs Tomatoes doz Vermicelli bxs Vinegar galls bbls hf bbls Yeast and baking powders..: cs gro Sundry Chinese provisions Sundry groceries and provisions Guns. Guns No QUANTITY. 20,041 11 288 600 18 17 25 42' 16 86,432 60 166 540 431 2 140 17 1,273 31,360 16 7 18,795 304 40 10 1,256 18,063 200 15 262 2 96 31 1,794 10 10 59 44 3

ARTICLES. Hardware, Tools, Etc. Axes ........... doz cs Butts and hinges............................doz Charcoal irons................................doz Files and rasps...............................doz Hatchets....................................doz Hoes...........................................doz Horse and mule shoes....................kegs Knives—Butchers'..........................doz Pocket.............................doz Assorted...........................doz Locks.........................................doz Nails—Horse shoe...........................lbs bxs Cut..................................kegs lot Nuts and bolts................................No Pipes, iron.....................................ft j cs Pots and kettles.............................No Saws........... doz Scissors and shears........................doz Screws..........................................gro Shovels........................................doz Stoves and ranges...........................No Stove furniture............................... Tool handles................................doz Twine, wrapping.............................lbg Wire cloth....................................ft lot Wrapping paper.........................reams bales Wooden Ware—Baskets................nests Brooms..................doz Brushes.................doz Sundry hardware.................... Iron and Steel. lron, bar.....................................bars bdls lbs QUANTITY 13 6 35 3 96 3 43 38 8 23 31 73 661 6 126 1 10,897 9,842 66 26 4 20 170 6 32 138 229 1 830 1 125 9 9 117 59 38 13 7,055 VALUE. $ 259 00 37 62 31 50 350 88 15 30 279 30 170 00 33 27 80 18 144 98 309 70 194 55 1,309 23 314 37 1,254 67 66 24 80 45 143 65 65 55 57 53 545 94 220 25 336 92 66 22 172 10 304 32 20 00 295 05 242 53 2,201 52 338 83

ARTICLES. Iron, sheet .......................sheets Steel............................ bars lbs Leather. Chamois leather.............................doz Harness leather..... .........................lbs rolls Sheep skins ................doz Sundry leather................................. Lumber. Laths ...............................M N. W. Lumber—Dressed....................ft Rough.....................ft Pickets.........................................No Posts...........................................No Redwood, assorted................. ft Railroad ties..................................No Shingles....................... M Machinery. Belting ...................... ft Boilers, steam................................No Packing............... lbs Steam engine, locomotive No Sewing machines ...........................No Sundry machinery............................... Matches. Matches ..............................gro Musical Instruments. Piano ......................................No Naval Stores. Block........................... No Canvas.............. yds Cordage, Manila rope......................lbs coils QUANTITY. 8 7 347 $ 80 00 51 01 6 423 2 9 37 50 276 15 54 00 330 88 VALUE. 80 00 3,448 82 6,058 20 45 63 200 00 4,434 78 74 24 560 00 40 185,067 700,254 5,070 200 216,331 256 350 350 1 266 1 2 201 00 3,150 00 39 47 5,519 26 67 00 20,830 19 50 15 00 375 00 1 9 00 177 11 1,359 88 1 851 10,253 5

ARTICLES. Oils. Gasoline ......... galls Kerosene.............................. galls Lard oil.....................................galls Lubricating oils, galls bbls Paint Stuff. Tarpentine ......,....................galls Perfume Soap. Soap, toilet ..doz bxs Railroad Materials. Assorted materials. ......................Saddlery, Etc. Bit, bridle .............. ..........doz Bridle heads and reins ..........doz Buckles ....... gro Harness ....................sets Horse blankets............................. .prs Saddles, American . Saddle trees ..............doz Stirrups....................... doz Spurs ... No Sundry saddlery.................. ......... Shooks and Containers. Bags—Cotton........................ M Paper,.,............. ..............M Sundry containers. QUANTITY. 220 16,850 1,113 875 2 20 11 5 9 4 52 2 17 39 29 2 103 3 1 72 10 3 VALUE. $ 66 00 4,470 00 791 59 1,308 98 10 00 33 85 1,661 75 111 41 82 13 80 85 568 51 51 50 325 00 25 25 39 50 18 00 135 00-414 84 984 93 180 00 11 06 53 00

ARTICLES. Stationery and Books. Albums................ ........No Books, blank .......................... Books, printed. ......... vols lot Envelopes.......................................M Ink............................. .doz Paper, writing .,.......... reams Pens ................ ......gro Slates, writing ..................doz Sundry stationery ..................... Tobacco, Cigars, Etc. Cigars ................ M Cigarettes..................................M Tobacco ...............................lbs Sundry Merchandise. Bird seed ............ .......lbs pkgs Boxes and cases................................. Coal, hard ........tons csks

Clocks, wooden ..........................cs Pipes, tobacco................................doz Trunks.........................................No Traveling bags................. ........doz Valises........ No Wicks..........gro lbs Private effects.................................... Sundry merchandise............. QUANTITY. 19 370 1 75 12 91 53 11 22 81 15,506 75 1 49 25 4 28 19 8 18 31 30 VALUE. $ 35 25 299 41 388 08 155 28 5 93 189 79 32 47 15 65 333 18 672 00 422 25 7,611 60 11 25 962 58 630 93 31 34 44 05 101 75 50 00 69 25 27 14 107 10 41 50

# Goods Free by Treaty

# At Hilo.

ARTICLES. Animals and Birds. Animals—Bulls..............................No Calves.......................No Cows.......................No Dog .... ..........................No Horses ........ No Hogs and pigs...................No Mules :.......................No Birds, Etc—Fowls................. No Building Materials. Doors.............................................No Lime ................. ..bbla Window sashes..............................prs pkgs Sundry,.......................................... Clothing, Boots, Etc. Boots.........................................doz prs Brogans ......................................doz Shoes, Ladies'................................prs Shoes, etc., assorted.......................doz pre ce Shoe findings........................... Drawers......................................doz Jumpers and overalls......................doz Ladies' underclothing.....................doz Shawls................................. doz QUANTITY, 1 20 14 1 15 195 87 60 45 300 70 2 6 48 5 48 7 39 51 7 11 2 14 VALUE. $ 90 00 450 00 1,117 50 7 00 1,830 00 1,300 00 13,614 50 50 00 103 75 454 00 221 20 97 50 222 00 85 00 51 00 2,184 14 2 00 29 75 83 05 12 75 151 10

ARTICLES. Shirts—Under..............................doz Assorted............................doz Stockings.....................................doz Trowsers and pants........................doz Dry Goods. Cottons—Cotton, brown...................yds Denims............................yds Drilling............................yds Handkerchiefs..................pcs lot Lawn...............................yds Prints...............................yds Quilts and spreads..............pcs Sheeting..........................yds Towels.............................doz Ticking............................yds Sundry assorted.................yds pcs Woolens—Blankets.........................prs pkgs Flannel ...........................yds pcs Serge...............................pc Fancy Goods, Etc. Purses..........................................doz Thread.........................................doz Sundry............................................ Fish, Dry and Salt. Baracouta...................................pkgs Codfish..........................................bxs pkgs Herrings......................................bbls pkgs Mackerel....................................kits pkg Salmon.......................................bbls kits pkgs QUANTITY. 13 32 136 29 4,706 875 36 6 1 40 9,239 5 2,592 50 520 4,430 8 2 5 245 1 1 2 360 40 10 459 18 82 4 5 96 5 90 VALUE. $ 85 51 270 25 291 96 188 38 358 75 132 21 7 20 16 13 8 00 780 77 53 00 716 07 91 47 52 08 498 18 185 50 146 72 10 41 27 00 121 00 97 39 668 10 942 19 159 95 29 56 1,164 45

ARTICLES. Skipjack ....................................lbs ..............................................pkgs Sundry fish................ bbls pkgs Flour. Wheat flour................................qr sks Sundry meals..............................pkgs Furniture, Etc. Chairs..........................................doz cs Curtains and shades........................doz Moulding.....................................pkg Picture frames................................doz Sundry furniture................................. Grain and Feed. Barley...........................................lbs sks Bran...........................................lbs sks Corn..................................... lbs sks Hay..........................................bales Middlings.....................................lbs sks Oats....................... lbs sks Oil cake........................................lbs Wheat.........................................lbs sks Sundry feed .................................lbs sks Groceries and 'Provisions. Bacon....................... cs Beans, dry...................................lbs pkgs Bread ....................................cs Butter ...........pkgs QUANTITY. 1,000 33 14 15 18.699 34 2 4 7 1 2 989,542 2,038 542,939 2.509 33.919 66 4,038 8,120 52 52,886 145 5,533 23,882 52 1,940 20 4 58,014 254 310 125 VALUE. $ 528 90 239 61 19,537 18 87 46 130 50 44 65 60 00 23 25 1,096 90 13,523 06 5,647 86 453 78 6,004 10 154 80 843 86 79 53 457 28 55 94 110 60 1,789 14 1,117 10 2,193 25

ARTICLES. Candles.......................................bxs Cheese.........................................................cs Corn, canned.............................................cs Crackers ..................................cs Fruits, pie and table, canned, etc.........cs Hams........................................pkgs Jams and jellies........................cs Lard............................................cs Lobster........................................cs Onions........................................pkgs Oysters, canned..............................cs Peas.........................................bxs Pork..........................................kegs Potatoes................ lbs pkgs Proserved meats..............-...............cs Raisins.........................................bxs Salt............................................sks Salmon, canned.......... cs Soap.............................................cs Spices ..........................................cs Sugar, refined..............................bxs kegs Vinegar.................................... galls bbls Sundry Provisions, Etc— Canned fruits & vegetables ...cs Paste..................................bxs Salt beef and pork...............pkgs Sundry assorted groceries, etc............... Guns. Guns—Muskets.............................No Rifles............. No Shot guns............................No Pistols, revolvers...................No Gun findings................................... Hardware, Tools, Etc. Axes............................. doz Butts and hinges.............................doz prs Chains, traee...............-.............doz 11 QUANTITY. 77 149 11 100 153 13 12 396 14 154 70 11 22 6l,734 393 316 7 192 182 133 9 45 22 903 42 121 22 30 20 2 3 30 4 12 12 2 VALUE. $ 189 52 1,175 07 32 90 259 80 577 47 414 44 53 25 2,762 27 107 00 402 13 349 80 33 20 232 63 992 45 1,264 60 17 50 55 50 616 02 543 55 55 70 375 91 387 51 370 20 149 08 480 00 2,846 74 30 00 34 00 46 50 97 50 7 18 56 00 17 52 13 00

ARTICLES. Files.............................. doz Hatchets ....... doz Hoes..........................................doz Horse shoes.................................kegs Knives, assorted............................doz Locks..........................................doz Nails—Cut ..........................kegs pkgs Horse shoe.........................kegs Nuts and bolts................................No Planes..........................................No Pipes, iron......................................ft bdls Safes............................................No Saws..........................................doz No Scale, platform...............................No Shovels......................................doz Spikes................... lbs Stoves...........................................No Tacks, iron..................................doz Tool handles..................................doz Twine, wrapping............................doz pkgs Wire, iron....................................coils Wrapping paper...........................bales Wooden Ware—Paint brushes..........doz Brooms................pkgs Sundry hardware............................... Iron and Steel. Iron—Bar..................................bars Sheet..............................sheets Iron and steel.................pkgs Steel..................................bars Leather. Goat skins................................. doz Harness leather............... lbs Sole leather.................... roll Sheep skins ....................doz Sundry leather................... QUANTITY. 54 10 12 43 37 22 170 117 2 610 8 401 10 2 11 5 1 10 800 10 88 33 42 1 22 3 8 5 8 3 39 7 1 242 1 2 VALUE. $ 64 86 76 25 56 40 215 75 138 77 165 74 962 70 49 50 21 05 8 60 75 87 600 00 183 05 176 25 67 50 47 75 227 90 37 91 59 20 21 48 589 12 19 50 32 60 65 60 1,330 65 15 90 24 12 166 52 19 00 21 62 82 28 44 20 15 00 196 61

ARTICLES. Lumber. Battens..........................................ft Knees, ship...................................No Laths............................................M Oak plank.......................................ft pcs Pickets........................................ft Pine, sugar..................................ft Posts............................................No N.W. Lumber—Dressed....................ft Rough.......................ft Redwood, assorted.............................ft pcs M Siding ...........................................ft Shingles.......................................M Machinery. Steam engine..................................No Sewing machine.............................No Sundry machinery............................... Musical Instruments. Piano............................................No Naval Stores. Boats............................................No Buoy ..........................................No Oakum....................................bales Oars...............................................prs Pitch..........................................bbls Rope............................................lbs Scow.............................................No Tar ..........................................bbls Sundry .................................... Oils. Kerosene ...................................galls Lard oil.....................................galls bbls QUANTITY. 1,125 12 10 730 9 4,758 11,618 2,800 140,446 1,326,228 17,253 255 105 4,012 481 1 1 1 3 1 4 3 2 3,355 1 2 1,760 204 2 VALUE. $ 24 00 43 20 40 00 139 80 69 87 164 12 223 75 3,285 60 18,208 66 675 62 114 34 1,341 97 2,002 00 25 00 785 82 330 00 340 00 160 00 18 00 8 82 8 00 528 50 462 00 21 00 96 25 474 35 202 93

ARTICLES. Lubricating oils...........................galls Sperm .............galls Sundry............... Paint Stuff. Turpentine...............................cs Perfume Soap, Etc. Soap, toilet................ doz bxs lbs Saddlery, Etc. Bridles ................. doz Bridle bits........... doz Buckles............................gro Harness, mule, etc........sets pkgs Saddles, American........ No cs Saddle, ladies ...................No Saddle trees ....... doz Stirrups.. .......... doz Spurs....................... doz Whips....... doz pkgs Sundry................... Stationery and Books. Albums..........No Books—Blank.......................doz Printed. ...vols lots Envelopes.................M Ink............ bxs Mucilage......................doz Paper, writing..........................reams Pens........bxs Pencils.....................bxs Slates.........................doz Sundry stationery......... QUANTITY. 30 50 20 3 80 40 10 14 4 72 4 4 1 1 6 8 4 8 1 13 9 207 6 8 7 9 33 8 5 12 VALUE. $ 37 50 62 50 8 00 100 00' 453 63 169 5O 61 63 7 00 985 54 138 50 25 00 61 50 14 50 18 25 47 25 657 61 8 00 19 83 448 29 19 00 13 35 13 50 184 50 7 25 30 55 15 69 1,335 72

ARTICLES. Tobacco and Cigars. Tobacco.....................................bxs Cigars.......................................M Sundry Merchandise. Boxes, empty.............................. Bone meal................sks Coal, hard................................tons Firewood...................................lot Pipes, tobacco...............................doz Tents.............................. No Trunks.....................................nests Sundry merchandise............... QUANTITY 2 2 1,469 8 1 27 2 12 VALUE. $ 6 18 202 00 33 98 2,187 60 103 93 14 00 73 13 88 40 100 75 227 32

# Goods Free by Treaty

# At Mahukona.

ARTICLES. Clothing, Etc. Shoes, assorted..................prs Drawers.................................doz Sundry clothing................................. Dry Goods. Sundry cottons..... yds Fish, Dry and Salt. Codfish ..................... lbs Mackerel....................................bbl Salmon ............ ...................bbls QUANTITY. 2 11 357 580 1 15 VALUE. 8 7 15 67 38 3 75 42 54 29 35 15 00 105 00

ARTICLES. Flour. Corn meal............ lbs Oat meal.............................. lbs Wheat flour...................................bbls Fruit, Fresh. Apples..........................................bxs Grain and Feed. Barley.........................................lbs Bran.........................................lbs Wheat..................................... lbs Groceries, Etc. Apples, dried.................................lbs Beef, salt.....................................kegs Bread ....... lbs Butter..........................................lbs Hams...........................................lbs Honey.................doz Hops.................. lbs Lard...................... ..lbs Lobsters.......................................doz Onions......................... lbs Pork............................................bbl Preserved meats.............................doz Vinegar........................................bbls Hardware, Etc. Files.........................................doz Hammers.....................................doz Locks.................. doz Sundry hardware ....................... Leather. Harness leather .....................Ibs QUANTITY. 300 300 175 20 99,968 16,072 4,000 103 3 1,173 396 370 3 60 475 40 775 1 15 1 12 2 5 209 VALUE. $ 6 75 10 50 805 00 40 00 1,387 06 148 67 58 00 3 61 15 75 45 96 102 70 57 35 17 50 7 20 50 25 86 00 7 75 21 00 74 96 11 70 8 60 11 25 34 80 49 43 62 70

ARTICLES Lumber. N. W. Lumber, assorted.....................ft Redwood lumber, assorted...................ft Posts............................................M Shingles.........................................M Saddlery. Whips..........................................doz Stationery. Sundry stationery.................................. Tobacco. Tobacco..........................................lbs Sundry Merchandise. Boxes................................................ Plants..........................................bxs. QUANTITY. 187,629 20,223 4 300 14 80 VALUE. $ 3,221 32 549 76 380 00 472 50 27 00 6 00 38 40 11 55 47 43

# Goods Entered in Bond

# At Honolulu.

ARTICLES. Ale, Porter, Beer and Cider. Ale, European...........................doz qts doz pts hhds bbls hf bbls QUANTITY. 450 980 19 1 10 VALUE. $ 2,491 57

ARTICLES. Ale, American..........................doz pts Beer, lager, etc...........................doz qts doz pts hf bbls Cider.............................................cs Porter......................................doz qts doz pts Building Materials. Cement .................................cks Clothing, Hats, Boots, Etc. Shoes, assorted...............................prs Boys' clothing.............................suits Children's clothing.............................. Collars, men's.................................doz Coats............................................No Drawers........................................doz Ladies' underclothing.......................doz Oil clothing................................suits Shawls.........................................doz Shirts, assorted..............................doz Skirts............................................doz Stockings, etc.................................doz Suits .........................................doz Trowsers and pants..........................prs Sundry clothing................................... Caps............................................doz Hats, cloth, wool, etc.......................doz Hats, ladies'..................................doz Hats and caps, assorted...................doz Crockery and Glassware. Bottles and vials...........................gro Glasses or tumblers.........................doz Glasses, wine.................................doz Nappies ....................doz Sundry crockery .......................... Drugs, Medicines, Etc. Sundry drugs and medicines .......... QUANTITY. 175 9,726 10,235 110 76 230 560 1,000 418 20 9 4 1 13 18 17 312 3 26 4 937 3 18 156 78 10 10 100 25 VALUE. $ 253 75 29,235 10 159 75 1,161 72 1,800 36 230 58 153 50 299 28 11 25 12 00 24 00 108 00 45 00 256 06 2,670 85 48 50 162 23 550 50 437 50 190 93 14 50 268 25 963 31 668 92 33 50 32 50 29 57 13 80 111 74 56 99

ARTICLES. Dry Goods. Cottons—Cotton bleachcd.................yds Mosquito net.....................yds Prints.............................yds' Sundry cottons.................pcs Linens—Handkerchiefs.....................doz Napkins...........................doz Toweling..........................yds Table covers......................doz Sundry linens....................pcs doz Silks—Handkerchiefs.......................doz pcs Silks.............. yds Satin.................................yds Velvet ..............................yds Woolens—Flannel..........................yds Mixtures—Sundry mixtures............yds pcs Fancy Goods and Millinery. Beads........................................bchs

Bonnets ................................doz Braid........................................pcs Buttons.....................................gro Collars, ladies'................................doz Corsets............... doz Edging.........................................pcs Embroidery.................................pcs Fans..........................................doz Fancy feathers..............................doz bchs Flowers, etc, artificial.....................doz bchs Fichues.......................................doz Fringes.......................... pcs Gloves—Kid................... doz Silk............. doz Assorted ..........................doz Insertions.....................................pcs Lace..........................................doz pcs Mitts..........................................doz QUANTITY. 2,656 1,000 3'048 90 5 124 435 15 2 40 10 100 79 243 104 21 99 4 8 11 22 128 25 6 45 92 86 23 36 18 34 12 13 8 5 3 13 50 110 11 VALUE. $ 151 94 168 26 148 06 I8O 00 18 92 242 67 89 71 485 86 69 27 408 01 25 56 104 60 147 97 26 81 36 51 8 00 58 88 33 90 192 23 50 20 95 25 130 70 174 39 130 19 500 92 221 78 103 75 87 50 82 32 34 50 8 25 26 20 594 40 43 50

ARTICLES Needles.....................................pkgs Pins...........................................doz Ribbons.......................................pcs Ruching......................................doz pcs Scarfs.........................................doz Trimmings.....................................doz pcs Veils and veil stuffs.........................pcs yds Sundry fancy goods............................. Fish, Dry and Salt. Sundry fish...................................lbs Flour. Sundry meals.................................lbs Furniture, Etc. Floor cloth...................................roll Pictures........................................bx Sundry furniture................................. Groceries and Provisions. Beef, salt....................................kegs Bread...........................................lbs Coffee...........................................Ibs Condensed milk.............................doz cs Crackers......................... Ibs Cakes..............tins Fruits, canned...............................doz Olive oil................................doz pts Onions.......................................... Potatoes.......................lbs Preserved meats............ doz Rice....................... lbs Sardines......................................doz Soap..........................................bxs Sugar..........................................lbs QUANTITY. 4 30 627 32 88 39 8 3 2 74 182 312 1 1 25 668 555 80 7 20 48 12 400 1908 61,026 220 5 124,495 44 450 1,290 VALUE. $ 2 00 52 03 644 15 120 00 189 32 25 69 36 79 1,124 09 25 00 12 32 100 00 50 00 23 52 121 75 23 38 73 68 152 03 4 00 36 12 24 40 609 38 58 69 696 40 613 65 2,751 90 50 43 806 51 33 86

ARTICLES. Sundry groceries, etc ................... Gun Materials. Cartridges.......................................M Hardware, Etc. Knives, assorted.............................doz Wooden Ware—Brooms..................doz Corks....................gro Sundry hardware................................ Jewelry, Etc. Silverware......................................... Watches.......................................No Sundry jewelry................................... Matches. Matches.......................................gro Naval Stores. Anchors.........................................No Chain............................................No Sundry naval stores............................. Oil. Peanut, China.................................cs Paints. Sundry paints.................................cs Perfumey and Toilet Articles. Combs............................ doz Sundry............................................ Shooks and Containers. Bags, cloth......................................M QUANTITY. 21 150 47 15 1 250 15 3 150 10 3 161 VALUE. $ 401 39 242 00 198 47 132 64 3 00 16 02 6 00 33 00 164 00 121 76 185 22 374 14 23 74 530 00 180 85 3 00 62 97 8,550 07

ARTICLES. Sundry containers................................ Spirits. Alcohol...........................-...........bbls hf bbls demij cs Absinthe .................................cs Bitters and cordials..........................cs Brandy..........................................cs cks qr cks hhds bbls octaves China wines ......... bxs Florida water..................................cs Gin................................. cs cks qr cks hhds bbls qr pipes octaves Painkiller.................................cs Port wine......................................cs qr ck Rum............................... .......cs bbls cask Sherry........... cs qr cks octaves Vermouth .................... cs Whiskey............. cs bbls hf bbls cks hf cks kegs QUANTITY. 186 36 600 15 10 151 9,294 25 91 6 6 3 5,948 5 7,768 35 12 7 10 30 2 20 152 1 65 50 1 57 2 3 35 2,775 20 78 12 5 11 VALUE. $ 66 36 4,921 15 67 57 1,486 51 30,116 70 9,746 70 15 00 12,386 87 600 00 811 27 1,172 11 576 67 183 76 26,455 27

ARTICLES. Stationery and Books. Sundry stationery................................ Tea. Tea................... lbs Tobacco and Cigars. Cigars..........................................M Tobacco.......................................lbs pkgs Wines. California Wines—Angelica................cs Muscat..................cs Port.....................cs cask bbls White....................cs Zinfandel ..........cs cks qr cks bbl hf bbl kegs European and Other Wines— Champagne ....... cs Claret..................................cs cask hf cks hf bbls Sundry wines .............cs bbls hf bbls hhds kegs Sundry Merchandise. Boxes and cases ................................ Candy.......................... lbs gro QUANTITY. 436 2,969 8,963 41 12 275 90 1 3 10 190 4 6 1 1 8 398 51 1 25 20 729 20 22 2 15 250 10 VALUE. $ 167 00 105 40 38,938 86 1,988 04 47 50 1,129 00 648 81 30 00 1,115 74 7,103 87 739 34 3,969 31 178 33 94 20

ARTICLES. Copra...........................................lbs QAUNTITY. 11,200 VALUE. $ 150 00 Pipes, tobacco................................gro 15 5 06 Sundry assorted merchandise...............1................ 2,121 59

# Bonded at Kahului.

ARTICLES. QUANTITY. VALUE. Tobacco..........................................cs 3 $ 30 00 Cigars............................................M 10 100 00

# Goods Free.

# Hawaiian Islands.

ARTICLES. Animals and Birds. Bull....................................No COW....................................No Dogs...................................No Horses and mules...................No Mongoose..............................No Parrots......................No Pig.....................................No Pony....................................No Bags returned.............No Boats...............................No QUANTITY. 1 1 3 22 217 8 6 1 30,000 2 VALUE. $ 250 00 250 00 45 00 3,200 00 2,000 00 4 00 90 00 178 00 1,128 00 962 99

ARTICLES. Bono meal and fertilizer.....................lbs sks Books.........................................pkgs Books, printed in Hawaiian.............pkgs Building Materials. Building stone..........................cs pcs Sewer pipe.............................pcs Tiles.................................pkgs Water pipes..........................pcs bdls Cargo returned............................pkgs Carriage .......................................No Chemicals and apparatus................pkgs Cigars .......................................cs Clothing, sundry................................. Coal and coke.........................tons Copper.......................................sheets Curios........................................pkgs Decorations.................................pkgs Dry Goods................................pkgs Fish, dry and salt........................pkgs Fire Apparatus. Hand grenades......................doz cs Truck, complete.....................No Trumpets.............................No Packages.............................No Furniture ..................................pkgs Grain and Feed. Bran..................................sks Hay...................................sks Oats ..................................sks Groceries. Sauce.......................tubs Soap...................................bxs QUANTITY. 1,752,289 2,984 28 8 201 2 1,100 18 152 8 8 1 42 1 28,858 25 2 4 28 153 150 30 1 3 19 35 917 585 23 300 25 VALUE. $26,245 73 4,323 19 2,676 11 1,280 75 4,130 14 593 90 469 36 1,242 90 118 00 352 50 2,759 27 150 00 114 28 86,427 72 180 82 151 30 1,152 50 650 12 275 00 1,802 60 413 50 138 40 3,948 60 1,719 00 532 95 869 40 27 91 1,140 00 125 00

ARTICLES. Iron. Pig....................................tons Plate.................................tons Jewelry. Watch, gold..........................No Bracelets..............................pr Machinery. Pump..................................No Sugar mill model....................No Packages.............................No Metal, yellow and sheathing...............cs lbs Merchandise, sundry........................... Military goods............................pkgs Musical Instruments. Piano...................................No Packages ............No Personal effects.............................pkgs Plants and Seeds ............pkgs Postal Stamps, Envelopes. &c..........pkgs Powder ..............................kegs Provisions, sundry.......................... Rice.........................................................bags Scientific Instruments.....................pkge Shows, Circus................................No Spirits—Gin.................................csk Sake.............................tubs Spirits............................doz Wine...........................cases Stationery, sundry.................................... Tanning Material................................bales Telephone Instruments and material.pkgs QUANTITY. 115 19 1 1 1 1 8 16 4,439 27 1 2 522 54 7 50 1,020 1 2 1¼ 100 1½ 5 3 481 VALUE. $ 2,227 11 928 52 24 35 48 70 349 80 1,500 00 500 00 1,046 64 310 73 5,203 27 7,453 41 253 00 356 00 15,129 17 628 49 345 13 271 00 660 00 4,590 00 492 25 12,205 00 52 44 1,200 00 40 00 100 00 775 10 45 35 5,514 52

High School of Otago (Boys').

Report Presented to the High School Board of Governors,

By The Rector.

1886. Dunedin J. Wilkie & Co., Printers and Stationers, Princes Street.

# Report.

To Colin Macan Drew, Esq., *Secretary to the Board*.

Sir,

I have the honour to report to the Chairman and to the Board that during the year 1886 the total number of boys enrolled has been 252, as against 288 in the year preceding.

The actual number of boys in School—as shewn by the register on the day of my assuming my duties—was

223 (17th March, 1886).

A comparison will show the state of the School in 1885 and 1886:—

Hence it will be seen that while there was a falling off in numbers during 1885, and a further falling off between the end of 1885 and the beginning of 1886, the numbers have remained stationary during 1886.

Of the numbers on the roll 115 boys belong to the Upper School, and 107 to the Lower School. Since March the entries have, for the most part, been of boys of 10 or 11 years of age, in whose favour one very important reform of work has already been carried out, and others are now under consideration.

During the year two boys—David Thomson and Noel Lees—departed this life. Lees died very suddenly on the School premises, and Thomson after a very brief illness. The former was too young to indicate promise of his future career; the latter, however, being of the VI. Form, had already evinced signs of considerable mathematical power, and bade fair to become a very useful man.

Soon after my taking office, certain changes of the staff, which had been determined upon prior to my arrival in the Colony, were carried out. Mr. E. Hewat, M.A., retired from the profession to commence the Study of Medicine; Mr. A. WÜst being under a temporary engagement with the Board also retired; and Mr. John White was re-appointed to an Assistant Mastership in the Lower School. Mr. John Allardyce, M.A., who had been recently promoted to the position of Arithmetical Master, having accepted the position of Rector of the Port Chalmers District High School, a vacancy was created, which was subsequently filled up by the appointment of Mr. John Macpherson as Arithmetic Master, with additional duties as Master of the Lower School. Mr. Wm. Butler Williams, B.A., is now Master of Modern Languages, and a very considerable improvement in the German and the French of the School has displayed itself.

As regards myself as a teacher, I have taken charge of the VI. Form in Latin and French, and share with the English Master the English work of that Form. I also take charge of the Lowest Division in the Lower Latin School, and assist the Latin Master in the work of the Upper V. Form. I assist the Mathematical Master in the teaching of Mechanics, to which subject I have always devoted considerable time and attention.

Examinations have been held twice during the current year—once prior to the Mid-Winter holidays, and once just before the submission of this Report. In either case, all the forms and conditions of public examination have been rigidly enforced; papers have been printed, and the results posted in each case, while the necessity for clear expression, orderly arrangement, and good writing has been insisted upon. I consider the result highly satisfactory, and, as in every case, the papers done by the boys have, after revision, been returned to me, I am willing to submit them freely to the inspection of any impartial person. Professor Sale and Mr. Frederick Chapman have been kind enough to afford assistance in the examination of the Latin and the French of the VI. Form, with results that I am happy to submit for the consideration of the Board.

The School Prospectus having for some time past been inaccurate, a record of current arrangements has been revised and issued afresh. There are some details in it which, it is hoped, will give a just account of what is going on in the School, and also of what springs from the School life. The new departure in it is the clause showing our willingness to endeavour to impart a liberal education by the strict Study of Modern Subjects. Whether this attempt will succeed is, of course, highly matter of expectation. In Great Britain, the attempt to create a Modern School in which Latin should not be studied has largely failed. In a circular sent out to every teacher of rank in England, Ireland, and Scotland in the year 1885 by myself as Chairman of a Committee appointed by the Convocation of the University of London for that purpose, the answer in response to a question demanding expression of an opinion as regards the retention or omission of Latin form obligatory School subjects, was overwhelmingly in favour of the retention of Latin; and among thew armest advocates of the retention of Latin were to be found many leading scientific men.

It is perhaps felt that the conditions of this Colony are not those of Great Britain, and that, therefore, success may attend an attempt here which has not succeeded in a wider area of experiment, where the prizes of life are higher, the inducements to study more varied, and the means of attaining excellence in any study more at command. It may be so. The attempt may be crowned with success. We shall use every means at our command to make it a success. The subjects shall be studied with as much severity as they can bear, and the same amount of work shall so far as possible be exacted. But I am not able to admit that any modern language can replace Latin or Greek in the curriculum of a liberal education. Setting aside Greek from the discussion, I doubt whether, with the same economy of time and labour, French and German can fully replace Latin. In the hands of a competent teacher, Latin becomes to all higher boys a lesson in Archaeology and in Art, in Rhetoric, in Logic, in Style, in Taste, in Thought, in Accuracy, in Memory, in Science, and most important of all—in the learner's own Mother Tougue. There is no evidence at hand to shew that the men who are to teach Modern Languages will teach them better, or more faithfully, than the men who are now teaching Latin. The scientific value of a great mother language, such as Latin, has been much enhanced since the spread of clear philological notions. As a science of observation, which demands for its prosecution neither laboratory nor philosophical instruments, philology is almost unrivalled for School work : with the passing away of Latin there passes away the key of twenty European languages. I speak as a man who, having had some experience of the teaching of Modern as well as of Ancient Languages, am earnestly in sympathy with any attempt to quicken thought, or to equip the young for the battle and burden of life.

I wish to record my hearty appreciation of the loyalty of the staff generally to myself. I have not attempted to change the main lines of the School in any detail, but sundry minor arrangements have been made which have depended for their efficiency on their being fully and freely accepted. The monitorial system already in existence at my arrival has been further developed with great advantage to the School; the tone of the boys is good, the discipline is efficiently maintained, the punctuality and attendance have much improved, and I have every reason to be satisfied with the industry and energy displayed by the School at large. There is, however, a certain lack in the management of their own affairs by the boys which I shall hope soon to see removed; and I shall be glad to notice a larger influence enjoyed by the VI. Form as representing the best work and products of the School. Of improvement in this direction I discern very clear signs in the vigorous life of the School Magazine. There are few school magazines so remarkable for energy and character as the High School Magazine; and as this publication is managed entirely by the boys for the boys, its existence speaks encouragingly both for the future of the School, and for the future of the boys immediately engaged in the work.

The rifle corps is now fully established; it numbers 70 members, of whom 41 are uniformed and equipped, while it is under contract for 20 more uniforms to be supplied. The funds available enable the corps to pay for all the uniforms supplied; while those contracted for, it is hoped, will be paid for as soon as required next year.

During the year some important additions to the School plant have been made. The walls are furnished with maps, to which only a few further additions will be needed. Messrs. Adams and Barr have presented two very useful diagrams, which are in the Science School. The Drawing School has been furnished with a full set of models in plaster. The Central Hall is decorated with a series of drawings illustrative of the History of Architecture. We are indebted to Mr. W. M. Hodgkins for some very curious illustrations of the Art of Penmanship. A small, but very useful, reference library has been established in the VI. Form Room, of which the boys freely avail themselves. Many minor additions to secure comfort and facilitate tidiness in the rooms have also been made. I am very thankful indeed to notice the generosity with which, considering the circumstances, the appeals made to friends outside the School have been met. The names of donors to the Prize Fund are given on the Prize List, while those of donors to the Cadets' Maintenance Fund have been published both in the School Magazine and also on the notice boards in the School building; and I am confident that the thanks of the School to them for their goodness are very genuine.

Some special notice should be taken of the Drawing.

An examination has been recently held of selected Pupils in the Upper and Lower Schools with results that are submitted. I consider them highly satisfactory, considering the time given to this subject. Not more than four hours are devoted weekly to Drawing, and it is found necessary to send two classes simultaneously to be taught. I do not think Mr. Hutton can work harder than he does; and I consider it highly creditable that such results as these produced have been attained at all. Most of the boys competing would, I believe, have won Second Class Certificates at South Kensington, and I am sure there is room for wider work in this direction.

I now add the list of names of present or former pupils of the School who have won distinction in various ways during the year past:—

# I.—Direct From School.

- Begg, A. (1st), Junior Scholarship, University of New Zealand
- Moss, J. (2nd) Junior Scholarship, University of New Zealand
- Thomson, J. B., Matriculation Examination
- Harrison J. B., Matriculation Examination
- Waters J. B., Matriculation Examination
- Scott J. B., Matriculation Examination
- Wilson J. B., Matriculation Examination
- Stuart, W. J. B., Matriculation Examination
- Hogg, R. J. B., Matriculation Examination
- Torrance J. B., Matriculation Examination
- Atkinson J. B., Matriculation Examination

# Senior Provincial Scholarship.

- Gibson, F.
- Ritchie.

# Normal Scholarship.

- Landreth, R.

# University of New Zealand.

- B.A. I. A. Asher
- P. Levi

# B.A. (First Examination).

- F. B. Allen
- J. R. Montgomery
- W. Mill

# Prel. Medical Examination.

- L. E. Hardy
- J. W. Longford
- W. D. Elliott
- F. Armstrong

# University of Otago.

# College Examinations.

# Mental Science.

- First class.—1st, John Montgomery

# Mathematics

# Advanced Class.

- First class.—F. B. Allen (prize).

# Junior Class.

- First class.—J. R. Montgomery.
- Second class.—II. Church, J. H. Moir.

# Anatomy.

# Senior Division.

- Second class.—G. Copland, W. Dermer, E. J. Roberts.

# Junior Division,

- Second class.—J. H. Reid, E. H. Alexander, W. F. Bauchop.

# Physiology.

- First class.—G. Copland (prize), W. Dernier.

# English Language and Literature.

- Second class.—J. R. Montgomery, Mill, and Allen.
- Third class.—Haggitt.

# Political Economy.

- First class.—Baume (prize).
- Third class.—Haggitt.

# School of Mines.

# General Geology.

- Second class.—Adolf Hamann.

# Metallurgy Senior.

- Second class.—Adolf Hamann.

# Assaying.

- Second class.—Adolf Hamann.

# Physics.

- Second class.—Adolf Hamann.

# General Biology.

- Second class.—Alexander.

# Botany.

- Second class.—Torrance.

# Practical Biology.

- Second class.—Torrance, Alexander.

# Medical Jurisprudence.

- W. D. Milne, 88 per cent. (prize); F. E. Baume, 80 per cent., first-class certificate.

# Jurisprudence.

- Second class.—F. E. Baume, first.

# Latin.

# Junior.

- Second class.—A. Begg and J. Moss.

# Senior.

- Second class.—R. Donald.

# German.

# Senior.

- First class.—R. Donald.
- Second class.—L. Hardy.

# Mechanics.

- First class (in order of merit).—Percy G. Morgan, Adam Begg, J. Moss.

# Physics.

- Second class.—Adolf Hamann, P. G. Morgan, Robert Donald, J. Moss.

# Chemistry.

# Lectures.

- Seniors (in order of merit.—G. A. Copland, Dermer, J. Reid.

- Juniors (in order of merit).—Frank B. Allen, W. Mill, A. Begg.
- Solutions of Chemical Problems.—F. B. Allen.

# Practical Chemistry.

- Juniors (in order of merit).—David H. Black, W. Mill, James Reid.
- Seniors (in order of merit).—J. A. Burt; Church, W. Mill, and A. Begg, equal.

It will please friends of the School to notice the length of this list, to which I can heartily invite attention, as being the result of good work in which my valued colleagues co-operated, but in which I can claim no share.

I remain, Sir,
Your very obedient Servant,

Henry Belcher, M.A., LL.D., &c.,
Rector.

# Prize Winner 1886.

Dux of the Upper School Governor's Gold Medal Scott, John Askew
Dux of the Lower School Governor's Silver Medal Gibson. John
Special Prizes awarded in Lower School for Arithmetic.
Special Prize awarded in Lower School for General Proficiency.

# Secondary Education.

# The System of two Famous Schools in Britain.

THE Committee of Conference on Secondary Education in North Otago concurred in the petition, now granted, for Parliamentary inquiry "into the whole matter of secondary education in North Otago as affected by the disposal of the Waitaki endowment." The end in view of the movement represented by them is, "that secondary education should be placed within easy reach of both sexes and all classes" in the locality. The plan suggested for that purpose by the Otago Board of Education is, that in place of the existing Waitaki School and Oamaru Grammar School there should be one school serving the common purpose of both. In illustration of that suggestion, the Convener of Committee gave in the following statement to its meeting on Saturday last.

James Macgregor, Convener.

OAMARU,

26th July, 1886.

I communicate the following information as to the working constitution of two famous schools, because it is of extraordinary interest and value in connection with our present inquiries. They both originated in endowment : Dollar Academy, from a London Merchant, a.d. 1818; and Madras College, St. Andrew's, from a dignitary of the English Church, a.d. 1831. They both are governed by trustees, under direction of Parliament. And they both have achieved a world-wide reputation by successsful achievement of the true purpose of our Waitaki endowment, to put "secondary education within easy reach of both sexes and all classes." First, the education which they give is so excellent that they are numerously attended by pupils, from various parts of the world, whose parents go to reside in the locality for the sake of it, or who are placed as boarders within reach of it. Second, the fees are so moderate as to make it easily accessible to every class, and there is ample provision for gratuitous education of those who need it and deserve it. And third, girls are provided for on the same footing as boys.

It may be added that they show *what may be clone with our Waitaki building*, instead of starving the education of the people for the purpose of maintaining this white elephant because so much of the endowment has already been wasted on the purchase of an elephant. In Dollar and St. Andrews the school building is simply for school work. Pupils from a a distance are allowed to take as much "wholesome walking exercise" in going to and from school as they may find expedient. Those for whom this way of attendance is not open are placed as boarders, generally in private establishments, which are conducted in some cases by masters of the school, in others by retired clergymen or others who may choose to undertake the care of such au establishment. The Dunedin High School has itself two establishments of this sort, each under the care of a resident master, one for boys and one for girls. The Waitaki house might be so employed for boarded pupils of a North Otago High School at Oamaru, to which those not caring for "wholesome walking exercise" could be easily conveyed by one or more omnibuses kept for the purpose : Mahomet thus coming to the mountain, instead of the mountain going to Mahomet.

My information, first obtained from a distinguished Otagonian alumnus of each of the schools, Mr Morrison, one of the masters of Dunedin High School, and Robert Gilkison, Esq., of Stewart, Holmes, and Denniston, Dunedin, is now completed by authoritative documents received this week : namely, the full and clear Prospectus of Dollar Academy for 1877-78, and the Scheme, now under consideration of St. Andrews educationists, pioposed by the Endowed Schools (Scotland) Commission of Parliament. The two schools, originating in educations enthusiasm, have been always conductec and watched as educational experiments of great interest. The Dollar Prospectus exhibits the matured results of a vigilant experience extending over sixty years. And the scheme for Madras College shews what finishing touches of improvement are now suggested to educational science for a constitution which—independent in origin—is coincident with that of Dollar in effect. It is striking to observe the completeness of substantial coincidence of both with what bad occurred to some of us in North Otago as the right solution of the educational problem here. And very striking is the contrast presented by both to the state of things here apologised for by some educational theorisers,—a great endowment more than exhausted in supporting a head master with tutor and assistant, at an additional yearly cost to parents of ten guineas per pupil, in a school placed miles away from the local centre of population, and there so fatally misplaced as to be inaccessible to country boys who cannot go and come on horseback, while it makes no provision whatever for girls !

1. It is *a curiously interesting coincidence*, with contrast, that the St. Andrews endowment originally had to deal with the fact of a burgh school previously existing there; and dealt with it, not like the existing Waitaki constitution, but, as is now suggested, by "incorporating" the burgh school in the constitution of the new school. The Dollar endowment found a clear field there in respect of secondary education, and has practically absorbed (beneficently) the primary education of the parish. The Infant School is in Dollar Academy a distinct department. For Madras College the Commissioners propose that the primary education should so far be given off by the erection of a new common school under the Education Act. But they both alike have, within the substance of their abiding constitution, a Junior and a Senior division of the course. In Dollar the Junior ends with what is equivalent to the fourth standard of the Scoitish code, while in St. Andrews the Senior begins with what is equivalent to the sixth standard; the distinctively secondary instruction, thus appearing to begin in the Academy at one stage earlier than in Madras College. It will be remembered that in our existing Waitaki School, as also in Dunedin High School, pupils are received at nine years of age; while in New Zealand as in Old Scotland, they can hardly be ripe for the distinctively secondary instruction until, say, from the 11th to the 13th year; although the primary instruction may be conducted from the outset with a view to the secondary, and thus be different in type from that received in the common schools, even if the subjects be the same. Inconvenient crowding of a High School, through intrusion of pupils not intending to go on with the higher education, is checked at St. Andrew's by a fee, as it can be at Oamaru.

2. *Teaching Staff and Curriculum*—Really effective teaching is impossible without an adequate *number* of teachers. In Dollar there are ten masters, two assistants, and a number of persons giving instruction in special subjects. There, however, the number of pupils is so large, requiring that some of equal standing should be distributed in two or more classes, that two or more teachers may be employed where one would have sufficed if the number of pupils had been smaller. Perhaps, too, with their affluence of means, they do not, so much as they might, economise their teaching power by sending one teacher from class to class at different hours; correspondingly, for instance, to what we presume is the practice in Dollar, and is expressly prescribed in the St. Andrew's scheme, that ordinarily the instruction of the male and female pupils shall be in different rooms. Still, for any moderately-attended school a certain number of teachers is indispensible for effective teaching on account of the number of subjects which have to enter into a genuine good education of that type; were it only because Jack of all trades is master of none, and the cleverest tradesman alive cannot well go on with two or three barrowfuls of "notions" at one time. The central subjects are—classics, mathematics and physics, arithmetic, English (with) history and geography, French and German, drawing (ornamental, mechanical, and engineering), writing (plain and ornamental, book-keeping, mapping), and science. The St. Andrews scheme

covers pretty much the same ground. So indeed must any plan of genuine good education of the type now in question. Here, again, for economy of teaching force, something may be further done through more of massing together of natively kindred subjects; so that, *e.g.*, one master shall undertake arithmetic along with mathematics and physics, and another, the subjects placed under the head of drawing along with writing and those placed under it. But here, too, there is a limit, beyond which really effective teaching is a physical impossibility. The matter was carefully considered in 1873, at an inquiry by Parliamentary Commission regarding the Otago High School (of Dunedin) as it then was. Educational experts gave their opinions, with illustrative schemes, upon the question, What, with the utmost economy compatible with real efficiency, is the amount of staff required for such a school? The question is vital and fundamental in the present case. I have seen no reason to believe that the apologists for the existing Waitaki state of things have ever so much as thought of the question as thus stated.

3. *As to terms of admission*—The Madras college scheme provides for certain extramural bursaries and university scholarships. It also prescribes that a certain number of those needing it shall be admitted to gratuitous education by competitive examination (a pass entrance examination for all is common to the two schools). Otherwise there is a fee, of which the to-be-prescribed amount is not specified; but my information from Mr Morrison is, "Fees, varying in various classes, extremely moderate : from about 2s 6d (per quarter) for writing, up to, say, 12s for classics." In Dollar, the parishioner ("old identity") is in this relation distinguished from the householder ("new chum")of under three years' residence; and both, from boarders and day scholars from other parishes ("wholesome walking exercise"). The rate of fee is further graded according to degrees of wealth. For a parishioner with less than less a year of income there is no fee. If he have between that and L75 a year he pays, for "elementary branches," 10s 6d a year; and for classics, mathematics, modern languages, or drawing, 2s each (!). If he have more than L75, he pays, for "elementary branches," 153 a year; "general fee," L1 1a; for French, 10s; for German, 10s; for drawing, L1 1s. The L50 householder pays as the L75 parishioner, and the L75 householder as the boarders and the day scholars from other parishes. These pay at the highest rate, which over all comes to about L7 7s a year; but for the Junior School in this degree, L2 10s.

While there is a normal course of study prescribed for the school as a whole, in both schools there is permitted a large discretion for selection of subjects in the case of individual pupils. The constitution seems to be the ideally good one for a case like that of North Otago. With the existing Waitaki constitution, the above advantages to the community are manifestly and hopelessly unattainable for all time. On the other hand, it can be shown from careful calculation of ways and means, that the advantages can be easily realised through amendment of the constitution such as has been suggested by the Education Board, on a changed site as called for by the School Committees and County Council of Waitaki, as well as an overwhelming majority of householders in town and country voting by plebiscite. Allowing for coat of new building, even though the white elephant should bring nothing, the net existing means remaining will suffice for a full staff of teachers, provision for girls on the same footing as for boys, free education of those who need it and succeed in competitive examination, with a saving to others of much more than half of the ten guinea fee, and a saving to the education fund of some L200 a year laid out on secondary instruction in the Grammar School. The education obtainable in this way in Dollar and St. Andrews is famed for its excellence over the world. Are there any for whom it is not good enough here? Who are they] What are they? Why should they live at the expense of the community by absorbing the benefits of a national endowment of secondary education in the locality?

Circulars of Information of the Bureau of Education.

No. 3-1885.

A Review of the Reports of the British Royal Commissioners on Technical Instruction, with Notes, by the Late Charles O. Thompson, A. M., Ph. D., President of Rose Polytechnic Institute, Terre Haute, Indiana.

*Government Printing Office*. Washington: 1885.

4560—No. 3 415-416

# Contents.

# Appendix.



# Letter.

DEPARTMENT OF THE INTERIOR, BUREAU OF EDUCATION, *Washington, D.C.*,

*September* 5, 1885.

SIR: The following paper, hereby recommended for publication, is a most valuable contribution to the literature of technical instruction in Europe, by the late Charles O. Thompson, a. m., ph. d., the accomplished president of Rose Polytechnic Institute, Terre Haute, Ind. The interest in the paper will be increased when it is known that it is the last con attribution by this pioneer in technical instruction towards the solution of the educational problems in which he had become an acknowledged authority.

The paper takes the form of a review of the reports of the British Royal Commissioners on Technical Education. Dr. Thompson, on his second visit to Europe, made careful studies in many places where the Commission prosecuted their investigations most in detail. All information that he desired, whether from persons or institutions, was fully and freely furnished, a courtesy that he attributed in large measure to letters of introduction from this Office. On his return, he expressed a desire to place at the disposal of the Office such portion of the material he had gathered as might be suitable for its use. Being anxious to secure to American educators as far as possible the benefits of the investigations made by the British Commission, before mentioned, and having found its report too lengthy for republication, I suggested to Dr. Thompson that he should prepare a review of that report, with the addition of his own notes upon the leading points brought into view, respecting technical education in the several countries included in the work of the Commission.

Dr. Thompson's method and character as an educator are especially worthy of study. He was born at East Windsor, Conn., reared in a cultured and devout family, prepared for college by Paul H. Chadbourne, and graduated at Dartmouth, after four years of study, in 1856. Upon leaving college he became principal of the academy in Peacham, Vt., a position that he held until 1864, saving a short time when he was engaged as an engineer in the State of New York. Subsequently, he accepted the position of principal of the Arlington High School, Massachusetts.

During these years of active work as a teacher, he was ever on the alert to find the best in principles and methods; he studied their relation to administration, and he went beyond this in his comforts to comprehend the relation of the administration of education in states, cities, and institutions to the entire drift of human affairs. The Baconian methods had produced their effect in multiplying inventions. The trades and commerce were fairly under the influence of the new applications of steam and electricity. Society was going through a transition well-high approaching a revolution. Apprenticeship was rapidly disappearing, and home manufactures were giving place to large mills and manufactories, and yet the schools in which the young were to be specially fitted for their career in the new order of industries were in a large measure limited to the old in methods and principles. Here and there attention was given to the physical sciences, but their application to the arts and industries and the manual skill which these required were ignored in our systems of education. At this juncture the school at Worcester was founded by the benefactions of Boynton, Washburn, Salisbury, and others. These gentlemen, in council with Messrs. Hoar, Sweetser, and their associates, developed a carefully considered plan in which, without dependence for organization or direction upon the common school or university, young men were to be furnished an education in a separate school in which shop practice was to be an essential part. For the conduct of the new institution there was needed a man of well balanced mind, equally versed in the classics and the sciences, and prepared to accord to each its proper part in the training of the young. The choice fell upon Dr. Thompson. After eight months' study in Europe, he entered upon his duties as principal of the Worcester Free Institute. Under his direction the school became a marked success, and his views and counsel were widely sought. He participated prominently in the movement to introduce drawing into the public schools of Massachusetts, and so into the schools throughout the country.

After fourteen years of labor, marked with special success, in Worcester, He took his second trip to Europe, and immediately upon his return engaged himself in his new field of activity as president of the Rose Polytechnic Institute, Terre Haute. He died March 17, 1885, deeply mourned by a wide circle of family and educational associates, and worthily lamented wherever known.

Very respectfully, your obedient servant,

John Eaton,
*Commissioner*.
To the honorable SECRETARY OF THE INTERIOR.
Publication approved.
H. L. Muldrow,

*Acting Secretary*.

# Technical Instruction in Europe.

## Scope of the Review.

On the 25th of August, 1881, a commission was appointed by Queen Victoria "to inquire into the instruction of the industrial classes of certain foreign countries in technical and other subjects, and into the influence of such instruction on manufacturing and other industries at home and abroad." The persons named as members of the commission were Bernhard Samuelson, F. R. S., Prof. Henry E. Roscoe, Philip Magnus, director and secretary of the City and Guilds of London Institute, John Slagg, esq., Swire Smith, esq., and William Woodall, esq. Mr. Gilbert R. Redgrave was made secretary.

Their first or preliminary report appeared early in 1882 and was in substance republished in Circular No. 6, 1882, of the Bureau of Education. This report was confined to instruction in France.

The second report is now issuing in five thick octavos.

Eyre and Spottiswoode, London. Price, 3*s*. 6*d*. per vol.

Two of these, containing the observations and the judgment of the commission, have already been published; the remaining three volumes, soon to appear, will consist for the most part of evidence and statistical tables, for which British reports are so justly celebrated.

The second volume contains (1) the report of Mr. H. M. Jenkins, F. G. s., secretary of the Royal Agricultural Society of England, who acted as subcommissioner for the express purpose of investigating the condition of education in agriculture in North Germany, France, Denmark, Belgium, Holland, and the United Kingdom. (2) A report on technical education in the United States and Canada, by Mr. William Mather, mechanical engineer of Salford, Manchester, a volunteer commissioner. (3) Notes on technical instruction in the United States, by the commissioners. This volume, with the exception of the notes, being devoted to agriculture, is to be reviewed apart.

The first volume presents the observations of the commissioners upon the technical schools of Europe, with their conclusions, and is the important book of the five. These most industrious gentlemen visited and examined schools and educational institutions in sixty-three cities and towns of France, Switzerland, Germany, Austria, Belgium, Holland, and Italy, and by a subcommittee investigated the teaching of home industries in the Black Forest, Thüringen, and the Tyrol. In Great Britain and Ireland they inspected the state of technical instruction in some twenty-five cities.

Their attention was naturally concentrated upon three forms of tech neology: (1) the training of engineers and mechanics; (2) art education with reference to the industrial arts; (3) the training of workmen for textile manufactures.

The conclusions and recommendations of the commissioners, which are of the greatest value, have been published in the Report of the Commissioner of Education for 1882-'83, page cclxviii, and may be found in the appendix (F) of this circular.

It is proposed in this paper to extract from the mass of evidence presented by the commissioners the information it furnishes about the training of mechanical engineers and mechanics; *i.e.*, to endeavor to smelt this mass of ore and extract the metal.

On the important topic of workshop instruction the author will add his own notes, made in 1882, on the organization of the Imperial Institutes of Technology at St. Petersburg and at Moscow, Russia, because the British commissioners, for very good reasons, failed to visit these important institutions. He will also add such other notes as may be useful in amplifying the information drawn from the report.

## Classification of European Technological Schools.

All the European schools in which engineers or artisans are trained may be reduced to the following groups:

I. Polytechnic or technical high schools, in which the principles and practice of engineering are taught, sometimes with the aid of a workshop, but generally without it. The graduates aspire to be managing engineers of mines, railroads, manufacturing establishments, &c., each according to his special preparation.

II. Intermediate technical schools, subdivided into (1) general technical schools, (2) weaving schools, (3) industrial art schools. The general technical schools may be classified into *(a)* higher elementary technical schools, *(b)* secondary technical schools, *(c)* building and mining schools. The graduates of these schools expect to become foremen in shops and works, with the possibility of attaining to a manager's position.

III. Apprenticeship schools, for the training of skilled workmen.

IV. Evening schools, available for artisans. These are attended by men who during the day follow their craft. The Fortbildungsschulen, or continuation schools, belong in this category.

V. Trade and professional schools for women.

This classification may be still further simplified in relation to mechanical engineers, foremen, and artisans, and all schools devoted to their service will fall under one of the following heads: (1) polytechnic schools, with or without workshops; (2) secondary technical schools; (3) apprenticeship schools; (4) trade schools.

It is convenient to speak of these in order, and it is better to point out the actual organization, management, and results of one or two typical schools of each class than to rely upon a general description of the whole to convey to the reader a clear impression of technical education in Europe.

For admission, the Polytechnics require sometimes more than the equivalent of an American college course, as the École Polytechnique; sometimes, the equivalent of a full course at the Realschule, as at the German Polytechnics; sometimes, the best that the preparatory schools can give, as at the Imperial Institute of Technology at St. Petersburg. The range and severity of the requirements for admission gradually diminish till in the apprenticeship schools only the rudimeuts of knowledge are demanded.

The question whether the course at the Gymnasium or that at the Realschule is better as a preparation for the Polytechnic is now much discussed in Germany. It involves the great question of the value of the classical (Gymnasium) course as mental gymnastic as compared with the mathematical and scientific (Realschule) course.

Professor Hofmann is in favor of the Gymnasium training rather than that of the Realschule, but admits that the superiority of the classical men may be due in part to the fact that they are drawn from a class who, for several generations, have enjoyed superior culture. Dr. Victor Meyer, of Zürich, and many others of equal eminence, agree with Professor Hofmann; Professor Lunge, of Zürich, Professor Wisleceuus, of Würzburg, and others as able, oppose him. The question must be left open for discussion.

The continuation schools (Fortbildungsschulen) are an admirable device for enabling artisans who by misfortune have missed any essential of an elementary education to recover their losses by attending classes for three hours a day, usually in the evening.

## Isolation of Schools for Technical Training.

Whether technical education should be put under the wing of the university or be provided for in separate establishments is a question upon which great diversity of opinion exists.

Hofmann of Berlin, Victor Meyer of Zürich, Kühne of Heidelberg, and Piccard of the Bernoullianum at Basle are in favor of incorporating polytechnic and university training; Lunge of Zürich, Wislecenus of Würzburg, and others equally eminent oppose it. Quincke of Heidelberg holds that the function of the Polytechnic is to facilitate the transition from pure science to practice by means of lectures and laboratory work, but admits that the number of scientifically trained men sent out from the polytechnic schools of Germany has been in excess of the number of high class industrial positions open to them, so that polytechnic graduates have been compelled to take subordinate positions. He is, however, in favor of amalgamation.

But, conflicting as these opinions seem, the commissioners found the fact to be that in every country visited separate institutions have been established for technology and for pure training. Institutions devoted to the pursuit of knowledge for its own sake, and those devoted to its applications to industrial operations, do not as a matter of practical experience thrive equally well in the same atmosphere; the points of view are radically different in the two cases. At this moment there are in process of erection the magnificent Technological High School of Berlin, separate from the University, and the University of Strasburg—which it is purposed to make one of the grandest of German universities—in which no provision is made for a faculty of engineering and where the requirements of students in their future careers and the commercial aspects of problems are not considered at all.

## Preference for Practically Trained Men.

As regards the kind of training that will best fit a youth to become the head of an industrial concern, opinions differ widely; but as to the value of the education given in the German polytechnics as a part of the training of engineers, most competent authorities on the Coutinentappear to agree.

It will be found that in every one of the old polytechnics, the notion prevails that if the brain be thoroughly trained, the hands will take care of themselves. This is the *old view* of higher technology.

To give an idea of what the old polytechnic offers to students a complete exhibit of the work of the Dresden school is given in the appendix (C). This school is largely visited by American students of mechanical engineering, largely on account of the great fame of Dr. Zeuner, the director. An idea of the cost of maintaining the German polytechnics may be obtained from the appendix, section A, and a general view of education in Saxony from section B.

But it is a fact of the utmost importance that in the polytechnics of Germany, while there is accommodation for 6,000 students, the total attendance is little more than 2,000, and the annual cost to the State of each student exclusive of interest on the capital is $500. This state of things is only partially accounted for by the explanation which is sometimes offered that when these schools were built Germany consisted of several independent states which are now included in the Empire. Reference has already been made to the evidence that the increasing demand for men whose training has been largely practical, to fill stations of trust and responsibility, has lessened the demand for those of high but purely theoretical scientific attainments.

The commissioners found in Germany an excess of one thousand well-trained polytechnic graduates over the demand; and they were informed that the manager of a large engineering works had been so importuned by these young men for employment that he put up a notice in his window, "No polytechnic student need apply." The Baron von Eybesfeld, Austrian minister of instruction, told the writer that the most serious problem in education in that country is to reduce the number of theoretical engineers who, after their long course of study, found themselves not wanted, and to increase the number of men in whose training theory and practice had been so combined that they could meet the great demand Tor those who can put theory and practice together.

A study of the hour plans of the technical schools of all grades shows that the essentials of the highest polytechnic are the essentials of the lowest trade-school and of all between, but shortened or modified to meet the varying wants and capacities of each grade.

Everywhere drawing, mathematics, and physical science are taught; nearly everywhere language.

In the highest polytechnics, with the notable exceptions of St. Petersburg and Moscow, no handicraft appears on the hour plan; in the lowest trade-schools, the craft and drawing usurp nearly all the time.

There is a constant and apparently irresistible tendency in all the lower schools to pass up into the higher by imperceptible advances. For example, at Chemnitz what used to be the Gewerbeschule has ranked since 1879 as a polytechnic school. But so true is it that a school of the higher education never loses or departs from the cast it receives in the first ten years of its existence, that the old polytechnics, modeled largely after the Ecole Polytechnique of Paris, have so steadily held to the theoretical training of engineers that the times have swept past them. The efforts now making in Austria to remedy this evil are more to the point than any others in Europe, but they are directed towards the artisan rather than the engineer. We will return to this subject later.

## The Russian System.

The *new idea* which appears here and there among the technical schools is to incorporate shop work with the essential parts of the old courses. This has been done in three ways: (1) by mixing shop work with the duties of each week, as at Moscow;

There is force in the claim of those who advocate this plan, that the shopwork should be done prior to the age of 21; that is, at a period when, on account of the sharpness of the acquisitive powers, students are best able to profit by it.

(2) by consolidating the shopwork in a year following the school course, as at St. Petersburg; (3) by requiring a certain amount of shopwork as a condition of admission to the school work, as at the Royal Foremen School of Chemnitz.

The Russians alone among European nations are entitled to the credit of attempting to reform the technical training of engineers and mechanics by mixing workshop instruction with other elements of the polytechnic course. Their success is remarkable. It adds great force to Russian examples and precedents to know why the polytechnic schools there are of such rare excellence. The popular impression of Russia does her great injustice. The educated Russians are highly educated and accomplished people. Part of this intelligence is due to the intermixture of the German population, which began soon after the death of Catherine and has continued to the present time; but the general truth remains.

Now, when they began about fifty years ago to attend to the development of their internal resources in a scientific manner, they started in the most sensible way, by sending commissioners to study the systems of technological education of Western Europe. These men win- nowed Europe for ideas. These ideas they carried to Russia and expanded into schools which surpass in completeness of equipment and affluence of resources any in the ether countries of Europe, with the possible exception of the École Polytechnique at Paris. Russian wealth gave German ideas of education great expansion and development.

Russia is the lee shore upon which the choicest educational pebbles may be gathered. In studying Russia one sees all European technological education epitomized; and the whole plan of the new education in Russia may be seen in the two schools of technology at St. Petersburg and Moscow. In each school is an ample, well equipped manufacturing machine shop where the students see good work done by skilled mechanics and are taught to do such work themselves; the course of study is otherwise substantially the same as in the German polytechnics. In each shop a definite number of hours of work are required of every student, with this difference in the plan, that at Moscow, the shop work is *mixed with the duties of every week* of the six-year course; at St. Petersburg it is consolidated into a fifth year, after all the school work of the four-year course has been finished. At Moscow no week passes without shop work; at St. Petersburg no shop work is done till the beginning of the fifth year, which year is wholly devoted to drawing and shop work. The two schools differ also in this, that at St. Petersburg all the students are externs, at Moscow about one-third are boarders.

The requirements for admission at St. Petersburg are more exacting than at Moscow, but the course is a year shorter; so that graduates of the two schools stand on about the same level, aspire to and compete for the same positions, viz, foremen, superintendents, engineers, &c., and achieve success in kindred fields. Substantially all the graduates of each school find satisfactory employment. This is specially true of the mechanics, who compose more than two-thirds of the entire number of graduates, on account of the greater demand for their services. At St. Petersburg the same fifth year of practical training is required of chemists, and the most ample provision is made for them.

There is nothing in Europe comparable to it, outside the military schools, except the provisions for Practice in the Mining School at Freiberg, Saxony.

For this there is no counterpart at Moscow.

Civil engineers in Russia are all trained in the Government school which correspends to the Écolo des Ponts et Chaussées at Paris.

The chemists are taught the most important forms of applied chemistry as found in Russian industries. In the immense laboratories of applied chemistry, and under the control of the professor of chemistry, are a distillery, with a capacity of 1,000 gallons of alcohol a day; a dye-house, where the dyer—the best one in St. Petersburg—handles 100 pounds a day of woollen, cotton, and silk goods; a soda works, which yields 1,000 pounds of soda ash per diem; and a number of iron works, consisting of blast furnace, puddling ovens, Bessemer plant, and foundry, where several tons of iron a day are handled.

Every student who would graduate in chemistry at the end of the fifth year must take charge of these miniature factories in turn, with the foreman at his elbow, buy raw material, subject each step in the manufacturing treatment to test conditions, and account to the professor for everything.

The mechanics enter a shop, where they learn pattern making in the wood room, casting in the foundry, forging in the smithy, and iron working in the machine shop. A large collection of examples of students' work from this school in the museum of the Rose Polytechnic shows that they attain marvellous proficiency in each department.

The following facts concerning the Imperial Institute of Technology at St. Petersburg have never before been published, and serve to give a complete view of its interior working:

*Area of floor space occupied by the students, 388,000 square feet.*

*Allotment of time spent with the professors, in hours, per week : First year: Free drawing, 4; linear drawing, 9; mathematics, 8; languages, 2; physics. 3; chemistry, 3; religion, 2; total, 31. Second year: Linear drawing, 4; mathematics, 12; language, 2; physics, 3; chemistry, 2; architecture, 5; total, 28. Third year: (a) Mechanics' section: Linear drawing, 8; mathematics, 11; mechanical technology, 5; total, 24. (b) Chemists' section : Linear drawing, 3; mathematics, 4; botany, 2; laboratory, 3; chemical technology, 13; total, 25. Fourth year: Mechanics' section : Linear drawing, 6; mathematics, 2; mechanical technology, 14; total, 22. Chemists' section: Linear drawing, 4; mechanical technology, 6; chemical technology, 13; total, 23.*

*The time required in preparation for these exercises, added to the totals just given, raises the weekly service of each student to an average of something more than 50 hours.*

*Fifth year: No recitations or lectures; linear drawing, 6; shop work for mechanics' section and laboratory work for chemists', 48; total, 54.*

*Weeks in school year, first four years : First semester, 10; second semester, 12; examination, 8; total, 36. Weeks in fifth year, 50.*

*Hence the mechanics spend 2,700 hours in shop work on consecutive days, and the chemists the same amount of time in the manufacturing laboratories.*

*Staff: Professors, 12; chaplain, 1; shop director, 1; lectors, 30; total, 44.*

*Number of students: First year, average, 125; fifth year, average, 90, or 72 per cent, of first year. Whole number at mid-year examination, 550. Average age of students at entrance, 17½ years.*

*Annual expenditure, in rubles :*

*Instructors 102,531 Laborers 15,496 Servants 8,000 126,027 Laboratory: Assistants 5,050 Laborers 1,840 Materials 9,376 16,266 Gas, fuel, and repairs 26,538 Hoard of indigent students 49,000 Workshop tools, and* *machinery 9, 364 Library 2,140*

*Readiugroom 2,465 Museum 1,200 Miscellaneous 3,000 236,000*

*Annual tuition: First four years, 30 rubles; fifth year, 40 rubles. In addition to these fees each student pays annually for two years a laboratory fee of 40 rubles.*

This view of the Polytechnic at St. Petersburg may fairly enough conclude with the statement of the important fact that the new bridge over the Neva, the finest in Russia, was built under the superintendence of the Polytechnic engineers, and every piece of iron used in the structure was tested in the physical laboratory of the institution. This result, contrasted with the condition of the country forty years ago, when English, German, and American engineers were called upon to do Russian engineering, tends to confirm the judgment already given of the value of Russian technological education.

At Moscow the school training is substantially the same as at St. Petersburg, drawing being made a little more prominent; but the shop work is managed very differently. Great prominence is given to the manufacturing element in it. The first room into which the writer was shown, about 40 feet square, was occupied by drawing tables, where expert mechanics connected with the school were engaged in making projects and solving mechanical problems for different manufacturers in and about Moscow. This work results in orders from the manufacturers for machinery, which are filled in the workshops of the school. The sales of machinery in 1881 and 1882 amounted to 60,000 rubles annually, and this amount has increased since that time.

In the management of the workshop practice for the students there are one or two remarkable features. For the first three years, of 32 weeks each, the boys work 14 hours a week, or 1,344 hours; for the last three years, 10½ hours a week, or 1,008 hours. For convenience and for economy in the use of shop room and materials, wood work, forging, filing, &c., are taught during the first three years in separate rooms, the boys passing from one to another in turn. By this means that portion of the time in each boy's training during which he cannot produce much salable work is spent where he will waste as little as possible and advance to the producing stage of his apprenticeship as fast as possible. But during the last three years the apprentices mingle with a hundred workmen in the manufacturing business of the shop. The doors are always open, and the younger students have free access to the large shop in "off hours," so that the atmosphere of business envelops them all. But this isolation of the preliminary training is not complete. The writer saw in the smithy six forges for regular workmen standing opposite three tor the students, and a steam hammer in this room was in almost constant use by the journeymen. In the foundry there are two connecting rooms; in one, which is quite small, the students were work- ing on small moulds, while in the larger, students and journeymen together were handling large castings.

To give zest to the rather tedious work of the first three years the boys hear lectures on practical topics, such as the best cutting angle of files, the set of saw teeth, &c., which may not make them any better mechanics, yet tends to improve their general intelligence.

The only point in the place that strikes an American as arbitrary is that each squad of the younger boys must stay in each room of the elementary workshop a certain number of sessions, whatever its rate of advancement. Those who master the prescribed work are assigned better and better work of the same kind in the different rooms, and those who fall below the standard have no opportunity to " make up."

The following table sets forth the facts of the organization of the two schools in a convenient form:

The kind of work done in these schools is generally the same; but there is rather more variety at Moscow. In the store-room of that school may be seen a great variety of machinists' tools, lathes, small hydraulic engines for watering lawns, hangers, face plates, drilling machines, &c. In 1882 an engine of thirty horse power was in process of manufacture, and the whole work, including the casting of the flywheel, was done on the premises.

There is a marked advantage in the consolidation of the shop work at St. Petersburg; but in weighing the two plans it is necessary to remember that the Government demands the diploma of the institute as a passport to the much coveted positions that lie in its gilt, and the fifth year is indispensable to obtain the diploma. The practical difficulty of retaining the students after such a course as the school gives in the first four years, under different conditions, becomes at once apparent.

An American who would study technological education can use a part of his time to no better advantage than in becoming familiar with these two Russian schools. All the officers speak French and most of them German.

## Secondary Instruction at Chemnitz.

There is no polytechnic or technical high school where shop work is required as a preliminary condition of admission, but the Royal Foremen School at Chemnitz, of the secondary order, affords a good example of how this plan may be pursued. As this school forms part of an elaborate system for the complete technical training of the boys of a town which is wholly devoted to manufacturing, and as this system includes all the points in such training below the polytechnic, it will serve our purpose to state the outlines of this system.

See "Technical Education in a Saxon Town." H. M. Felkin, London. C. Kegan &. Co., 1 Paternoster Square. Also report of commissioners.

Chemnitz is a Saxon town of 90,000 inhabitants who are principally employed in the following establishments, viz: forty-six machine shops for machine building, 10 loom works, 3 hosiery frame factories, and 82 cotton, woollen, and silk mills. The manufacture of hosiery and gloves is the leading industry. The only locomotive works in Saxony, Hartmaun's, is in Chemnitz, and employs about 2,000 men. The town is sometimes called the Manchester of Germany.

General education is assiduously cultivated and is of the most thorough sort; in fact, it is the strong foundation upon which technical schools securely rest. What a good common school education in Germany means is so well understood as to require no further comment. In 1878 the amount expended in municipal schools—that is," common schools"—was $161,045; the number of teachers, 243; and the number of pupils, boys and girls, 11,400.

In addition to this, continuation schools are maintained in the evening, three hours each, for those who, through misfortune of any kind, have failed to secure the essential advantages of the public instruction. There were 993 of these Fortbildung scholars in Chemnitz in 1878.

Section B in the appendix gives statistical information concerning Saxon education.

Technical education in Chemnitz is conducted partly by the state and partly by corporations. The state has a group of schools, which are all in the new buildings on the Schiller Platz, completed in 1877. Here are 130 rooms with an aggregate area of 95,000 square feet, 652 students in attendance, and 52 instructors. The annual expense of maintenance in 1883 was 846,200, or $70.86 per student. The buildings cost $439,715. The same buildings and accommodations in Worcester, Mass., a city of about the same size and sort, would cost at least $700,000.

The state technical schools are the Higher Technical School, with 153 students; the Royal Building School, with 170 students; the Royal Foremen School, with 230 students; the Royal Drawing School, with 111 students; or a total, less 12 twice reckoned, of 652 students.

Section D in the appendix shows the course of study in the Higher Technical School, which is now classed as a polytechnic. Most of the pupils stay till they have a certificate. They enter at 16 or 17 and leave at 21. Their military duty has to be then performed, after which, at the age of 22 or 23, they enter active life.

In connection with this school it is convenient, though a little out of place, to describe the method of preparing men for the building trades.

Pupils in the architectural course have an opportunity during the third year of attending the following classes in the Foremen School, viz: instruction in building mills for corn, sawing, powder, &c.; spinning and weaving; paper making; tool building; brewery mechanics; water works; fire extinguishing apparatus. They may also attend the modelling classes in the Royal Drawing School. The object of the architectural division is to educate men for ordinary builders. This object is kept clearly in view and gives special value to this school as a good place for artisans, because the Architects' Academy at Dresden provides a purely academic course, and the Chemnitz school must not clash with it.

The course at Dresden is of six years, and a young man is 25 or 20 years old before he can graduate there; add the year of military service and he becomes 26 or 27 before he begins his practical life. But when he is through he is competent to be an architect of monumental works and of buildings of artistic excellence. A student may pass, if he wishes, from Chemnitz to the second year at Dresden.

At the Royal Building School, which has a two-year course, those who can only learn the essentials of building receive a very good training and become expert and intelligent carpenters.

The Royal Foremen School proposes to give to future machinists, millers, dyers, tanners, &c, as well as to young men who intend to be foremen and managers in weaving and spinning mills, machine building establishments, &c., the opportunity of obtaining the theoretical knowledge required in their future careers. The instruction is comprised in three continuous courses" each of half a year; and in this short time the pupils can acquire, of course, only what is absolutely necessary in their respective occupations. The instruction is given in two main divisions, the mechanical and the chemical. The students must have reached the age of 10 years on entering, and acquired the ability to read, write, and use the fundamental rules of arithmetic readily. And a very important, and indeed the controlling, condition of admission is that a student must have worked at least two years at his calling before entering. The practical working of the plan is this: a boy leaves the public school at 14; goes to some machine building establishment, for instance; attends in the evening a Fortbildungsschule (Continuation School); shows good parts; and at 10 finds himself in the Foremen School.

The following table shows the hours per week devoted to studies in each division of the Foremen School:

[A: Mechanical division. Michaelmas to Easter. B: Chemical division. Michaelmas to Easter. C:

Mechanical division. Easter to Michaelmas. Half year.

First course. Second course. Third course. A&C B A&C B A&C B Arithmetic 7 6 Geometry 5 4 Physics 4 8 4 2 2 Geometrical drawing Freehand drawing German language 4 4 2 4 4 4 2 4 4 2 2 2 General chemistry 12 Mathematics and mechanics Machinery in general 8 2 4 6 Mechanical technology 4 4 Machine drawing 8 8 Surveying 4 Technical chemistry Laboratory work, chemistry Mineralogy 6 12 4 6 20 Bookkeeping 2 2 Architectural drawing 4

In addition, all students in the second and third courses may attend the special classes of the Technical High School.

The Royal Drawing School is an evening adjunct to the Chemnitz system, for teaching art in its various branches; and is attended by pupils drawn from all classes in the city.

To obtain a complete view of the extraordinary educational capital of Chemnitz, it is necessary to notice the Higher Weaving School (which occupies a building which costs $20,000 and is equipped with machinery for teaching every kind of machine weaving), the Agricultural School, the School for Hand Weavers, the Tailors' School, and the Trade Fort-bildungs School, all maintained largely at private or corporation expense. There are also several special schools for girls. In short, for completeness in its provision for thorough preliminary training for every form of industry by which the inhabitants live, no town in Europe can surpass Chemnitz.

## French Schools.

This view of the Continental methods of training foremen would not be complete without an allusion to the French École des Arts et. Métiers at Châlons-sur-Marne. There are others of the same type in France, at Aix, Angers, and Lille, each having a fixed geographical limit. In each substantially the same plan is followed; but it will conduce to clearness to confine the description to that at Chalons-sur-Marne. The number of students is 285, all boarders; one-half are tree, each of the other half pays $120 a year. The age of the students on entering is 16. The total annual budget is about $83,000, largely paid, of course, by the state. This makes the annual cost per pupil, including board, about $290. The school appliances, which are of an antiquated form, are being supplanted by machinery in accordance with modern demands, requiring an expenditure of $28,000 before the complete substitution can be accomplished.

The pupils daily spend 6 hours in school and 6¾ in the workshop; the school day is therefore 12¾ hours long, the weekly tale of hours 76½. Tools and machines made in the workshops by the students are sold each year and produce about $6,500.

The director of the excellent Ambachts school at Amsterdam says: "Experience shows that his being engaged on a bona fide piece of workmanship serves as a powerful stimulant to a pupil."

The pupils are admitted on the results of the examinations, a preliminary competitive examination in French, arithmetic, geometry, drawing, and manual work, and another at the school in other elementary branches and in general aptitude. Many of the large public schools have special preparatory classes for this school.

The 100 boys who enter each year are separated into two divisions of 50 each, one section going to a fitting shop, the other to a pattern shop; after six months they exchange places. The same plan is pursued in the smithy and foundry.

In the fitting shop, which is divided into three sections, one of which corresponds with each year of training, there is a large plant, viz, an engine and boiler, which each student manages in turn for a week, a tool store, and abundant machinery. In the first year the students make squares, compasses, vises, &c.; in the second, detached portions of machinery and small machines; in the third they are employed in the production of machines for actual use in the institution or for sale.

The foundry contains three cupolas, one for heavy castings, say of thirty hundred-weight. The smithy has eight forges, at each of which two students work, taking turns as smith and striker. The pattern shop has places for 100 students, and is thoroughly furnished. In all the shops, besides the regular foremen, instructors, several mechanics are employed. The "fitter's shop" is preferred by the students, and in the third year 69 of them are found there, against 10 in the foundry, 7 in the smithy, and 8 in the pattern shop.

The discipline is of the most rigorous character; the students wear uniform, and are closely confined to the school, which they leave only at rare intervals under the charge of an instructor. To this militarylike severity of discipline much of the success of the graduates is justly attributed.

It is fair to say that opinions differ in France respecting the merits of the students trained at these schools, though no one questions their great serviceableness. The complaint is that the graduates fail to appreciate the value of time and of materials as elements in practical work, and have a tendency to minute and artificial finish. It is found that they require some preparation by experience in actual business before they are competent to take full charge of work. This is quite natural.

The commissioners ascertained, however, that nearly all the graduates of this school obtain positions in remunerative and honorable callings, being employed as draughtsmen in manufactories, chiefs of drawing offices, and directors of works and managers of shops.

A few become teachers of engineering, as M. Bocquet of la Villette; many have positions on railways; a very few remain workmen, or simply foremen. They generally enter works as workmen, but owing to their technical training rapidly rise to the position of foremen. The conclusion of the commissioners is no doubt justified that "in affording an education in which theory is not carried too far and is duly combined with laboratory practice and in some cases with workshop instruction, and in which, moreover, the scientific teaching is made to bear upon the principal manufactures of the districts, these higher technical schools [a grade below the German Polytechnics and the École Centrale of Paris] provide the kind of education that is best adapted to the various grades of managers of works."

This being the case, it is gratifying to know that these schools are increasing in number and influence in every European country. In the matter of attempting to provide some substitute for the extinct apprenticeship system, France clearly takes the lead. There are two distinct plaus now in vogue: one to introduce manual instruction into the ordinary elementary schools; the other, to erect apprenticeship schools, sometimes called superior elementary schools.

The primary communal school of the Rue Tournefort was for a long time the only school in France in which trade-teaching was combined with other elementary education; now it has many imitators. It was started on its present footing in 1873. The school hours are from 8 in the morning to 6 in the evening, a free hour at noon and a halt holiday on Thursday; and on Sundays the pupils from 9 to 12 and from 1 to 4 hear instructive or amusing lectures. The weekly tale of hours, excluding Sunday and the half holiday on Thursday, is 49. The number of hours spent in the shop is 18. Deducting this number from 49, we have 31, the time spent in school in the United States by primary and secondary pupils being about 30. It appears, then, that the French add the shop work to the time spent in what may be called literary work. In the lowest class the children are six years old and receive three lessons a week, of one hour each, in handicraft. From ten years old and until graduation they have 18 hours in the shop. There are 300 children in this school, and they are generally able to earn on graduating, at the age of 13-15, about one dollar a week.

The studies of the school are drawing, modelling, mouldiug, and carving; arithmetic and geometry; geography and history; physics; anatomy, physiology, and hygiene; French reading and writing; and civil government, technology, and morals. The duties of the workshop are lathe and forge work, joinery, and a little higher machine work.

The reports of the inspectors tending to cast some suspicion on the quality of the literary work of this school, the authorities of the city of Paris, in their further experiments in the introduction of manual training into ordinary primary schools, have confined themselves to teaching more advanced drawing from models

In all the primary schools of Paris it is noteworthy that drawing is taught from models and casts rather than from flat examples and copies.

and the use of ordinary tools for working wood and iron, without attempting to teach special trades. There are about fifty schools where these experiments are in progress. It is already apparent that the shop work tends to concentrate along the lines of dominant French industries, and the effort to avoid teaching trades will not be very successful.

These schools must not be confounded with another sort, viz, the municipal apprenticeship schools, from which they are quite distinct, in respect to the age of the pupils, the course of study, and the end in view. The most famous of these is that in the Boulevard dela Villette, which has been in operation since December 8, 1872.

It is a day school designed to fit boys to be good artisans, and proves its success by pointing to the large number of its graduates who have been successful in the fields for which the school prepared them.

M. Greard, in his report on primary education, calls attention to the fact that of 74 graduates 69 have remained "loyal" to the profession taught them at the schools.

No pretence is made that the shopwork serves any educational purpose other than to teach the boys to use tools and machines. The hours are from 7 A. M. to 7 P. M., 6 days a week for three years, allowing two hours a day for meals and recreation. The boys enter at 14. During the first two years they work four hours in the school and six in the shops. In the third year, two in the school and eight in the shops. In the first year they are taught the nature and conversion of material; in the second, they pass to actual construction. In the first year the work is uniform for all; in the second, a trade must be chosen and followed.

In 188l-'82 there were 250 pupils; 107 in the first year, 81 in the second, and 62 in the third. The number of absentees did not equal 7 per cent, of the whole, and was mainly confined to the entering class. A considerable number leave at the end of the first year for many causes, usually because they are unfit for the work. Those who leave at the end of the second year generally find remunerative employment.

The annual cost of maintenance is about $15,000, or a little less than $60 per pupil. The trades taught at this school are shown in the fol- lowing exbibit of the number of boys engaged in each for the last two years of the course:

The following schedule will show how the time of the boys is spent in the Paris Municipal Apprenticeship School:

Day. Years. 7 to 8. 8 to 9. 9 to 10. 10 to 11. 11 to 12. 1 Study. French. Sketches. Study. English. Monday 2 " Mathematics. Study. English. Physics. 3 " Mechanics. Chemistry. Workshops. 1 " Technology. Study. Sketches. Geography. Tuesday 2 " History. French. Study. Mathematics. 3 " Sketches and drawing. Workshops. 1 " History. French. Study. Mathematics. Wednesday 2 " French. Study. Sketches and drawing. 3 " Technology. Mathematics. Workshops. 1 " Physics. French. Study. English. Thursday 2 " Geography. Study. English. Chemistry. 3 " Sketches and drawing. Workshops. 1 " Chemistry. Drawing. Study. Mathematics. Friday 2 " Technology. Study. Sketches and drawing. 3 " Study. Mathematics. Workshops. 1 " Study. Mathematics. Study. Descriptive geometry. Saturday 2 " Mechanics. Study. Descriptive Mathematics. geometry. 3 " Physics. Common law. Workshops.12 to 1, lunclr and recreation. Throughout the course 1 to 3½ workahops. 3½ to 4, meal and recreation. 4 to 7, workshops. From 10 minutes to 10 until 5 minutes past 10 there is a quarter of an hour's recreation for all the boys.

In addition to the municipal apprenticeship schools there are two other sorts substantially of the same kind that are largely attended, viz: (1) apprenticeship schools, sustained by great corporations for the benefit of children of their employés, of which a good example is that of Messrs. Chaix & Co., printers; (2) those conducted under the superintendence of the Christain Brothers by a charitable association whose schools in the Rue de Vaugirard, at Issy, and at Igny, contain more than 2,400 pupils.

The schools already mentioned do not in any case confine themselves to a single trade. The Government sustains many simple apprenticeship schools, the main effect of each being to foster some trade, as the watchmaking school at Cluses and the school of porcelain decoration at Sèvres.

There is a large number of these schools in Europe, some supported by the State and some by a corporation. To this category must be referred the many Fachschulen, as at Iserlohn, for industrial art applied to metal-work; one of the most interesting schools in Europe for jewellers and goldsmiths, at Vienna; and one for drawing, modelling, and decoration, including house painting, at Cologne. There are one hundred of these Fachschulen in Austria alone. In the Cologne school there are two sessions a year, the winter session being the better attended, because the young men go to practical work during the summer months.

There is also a large number of weaving, dyeing, and industrial-art schools which fall a little outside the scope of this paper.

In all these institutions, while the craft is foremost, great attention is paid to drawing, modelling, the elementary mathematics, and the elements of the physical sciences; while, as far as possible, evening schools are everywhere maintained, to remedy the deficiencies of the day schools or day scholars.

## The "cottage Industries" of Germany and Austria.

It remains to allude to the researches made by a subcommission, consisting of Messrs. Magnus and Woodall, among the schools for fostering what are called "cottage industries." These are most numerous in the Black Forest and in the South Austrian provinces. In the little villages such industries as clockmaking, straw plaiting, wood carving, &c., which formerly flourished and afforded a comfortable living to the peasants, are now on the decline; the various manufactures have passed into the control of the proprietors of small factories, who employ fewer men to do the same amount of work. The effort at reform consists in establishing trade schools where modelling and drawing hold an important place and in which the young people can learn new and attractive desigus for their home-made wares, thus securing their sale. They also acquire the power of expressing their own ideas in designs, and so obtain control of their own inventions.

The same idea is brought out in the pottery business, where the excellent instruction given at the Government Art School at Carlsruhe has done much to provide improved models for the potters.

Perhaps there is no more interesting work now doing in technical education in Europe than that under the direction of Dr. Exner, one of the Austrian inspectors of schools. The zeal of the Austrian Goveminent in assisting local effort in the matter of workshop instruction is remarkable, and the results are very satisfactory. The schools thus fostered may be arranged in two categories, viz: (1) those in which a sound theoretical instruction is imparted, of which there are few; (2) those where the greater part of the time is spent in the shops, and the school work consists mainly of drawing.

The first kind do not differ essentially from other Fachschulen, except in being more largely schools and less workshops. The second are full of promise for Austrian industries.

In carrying out this new policy the great Gewerbe-Museum at Vienna

The object of the Museum is to collect examples of the best products in every trade for purpose of instruction.
has been organized and put in charge of Dr. Exner, a strikingly competent and efficient man. He has started two totally distinct sorts of schools. The first sort is substantially a half-time school, in which boys from the higher common schools work half the day and study the other half, receiving instruction according to the poly technic plan as far as the time permits. The course being two years, these boys do not receive as much instruction as the polytechnic students, but they have the immense advantage of practical power in the shop, which secures them a living and adds to their value. Every stroke of work in the shops is done with reference to the sale of the articles, and no fact was mentioned oftener, or with more evident satisfaction by Dr. Exner in proof of the real excellence of the school than that they sold in the first year a thousand gulden worth of their work. It is intended to multiply these schools so that they shall provide a great variety of mechanical practice (the two now in operation being devoted wholly to wood working) and to extend the course to four years. The second line along which the Austrians are moving is in cultivating the cottage industries.

There is in Austria a marked tendency of the population to concentrate itself in large cities. The population of Vienna has grown from 800,000 to 1,200,000 within ten or twelve years, and other cities show a great increase. As this has occurred without a corresponding increase in the total population, the inference is that the growth of the cities is depopulating the villages. Inquiry into the causes of this movement has brought out the fact that the peasants of these villages have lost the market for their baskets and other wares because their Swiss and French neighbors, who have had abundant schools of industry, have devised new and more attractive forms for the same wares. The peasants of Austria were unable to compete because, through their ignorance of design, they were confined to the old and unsalable forms, and, with the fatuous haste so often seen, crowd the cities in the vain hope of bettering their lof. Dr. Exner, under the general direction of the wise and acute minister of public instruction, has started many trade-schools, especially schools for basket-weaving which is by far the most important of these household industries. Half of the day is devoted to learning new and better ways of basket-weaving, and half to drawing and modelling in clay; the result being that the pupils learn how to do the things that are now in demand and are clothed with power to design whatever forms the future may suggest. Anybody may attend these schools who chooses to come to Vienna; for there only can a museum of examples be gathered sufficiently ample to enable the minister to multiply the schools so as to provide lor other industries as well as basket-weaving. The hope is that the more intelligent young peasants will attend these schools and carry back to their villages the new ideas; this being done, a check will be put upon the tendency of people to leave the villages, because they can again be prosperous and happy where they are.

A valuable comment upon the relative merit of these two plans is made by Signor Tamanini, who founded the school at Tione for woodworking. The school is now at Riva. He says that he is opposed to the creation of simple workshops without the provision of theoretical instruction; that he has been thoroughly conversant with both kinds and nothing really lasting can be accomplished unless school and shop training go hand in hand. Experience alone can determine this. Dr. Exner cites facts of the most convincing character to show that the immediate effect of the mere trade schools has been precisely what was hoped and expected, namely, to revive drooping industries and to make new ones.

For instance, it was found that the people of Southern Tyrol were consuming olive-wood for fuel, while their neighbors in Italy were manufacturing from it numerous useful articles. A Fachschule was established at Arco about eight years ago, with shops for wood-turning and inlaying. The result is that the former master of the school, Signor C. Emert, is now proprietor of a factory where thirty work people are employed, and the olive-wood work of Arco is in great demand all over the world. Signor Emert informed the commissioners that he had an order from Boston, Mass., for 1,500 blocks of olive-wood.

In conclusion, it is well to remark that of all technical schools in Europe, those which have most powerfully affected manufactures are the ones devoted to industrial art; but none have been more prosperous or more fruitful in results than those devoted to the welfare of mechanics.

Under section E of the appendix some facts are given which cannot be easily obtained in Europe, which tend to show that the progress of technical education in the United States has not withdrawn any force from the old classical education, but has rather tended to stimulate public interest in all kinds of education.

# Appendix.

### *A.-Table showing expense of maintaining the German Polytechnic Schools for* 1883, *in United States currency*.

### B.—*Summary of all the schools in Saxony under the Minister for Education and*

## *Cultus, in December*, 1878.

Number of schools or institutions. Number of pupils and scholars. number of classes. Number of teachers. Amount of teachers' salaries. Total amount of expenses of schools. Amount of state aid. 1 University (Leipsic) 1 3.172 165 $113,815 $291,251 $169,584 2 Polytechnic (Dresden) 1 672 43 39,087 66,156 56,662 3 Gymnasiums 13 4,063 147 284 218,179 326,249 95,574 4 Realschulen of Class I, 12 3,525 151 239 197,170 191,750 42,498 5 Realschulen of Class II 20 2,884 131 215 108,700 158,170 39,214 6 Seminaries 18 2,600 114 269 156,235 239,158 211,516 7 Institute for Drawing, Gymnas- tic, Teachers 1 14 4 1,858 3,580 2,491 8 Higher Girls' School (sanctioned) 2 754 27 35 18.950 27,220 9 Amount of pension granted to teach- ers of higher schools 22,888 (a) 10 Higher (secondary) private schools. 4 645 30 63 ? ? ? 11 Fortbildungsschulen 1,866 68,604 2,621 6,820 12 Public elementary schools 2,134 451,324 9,668 16,820 b2,961,923 b3,436,963 324,278 13 School at Bodenbach 1 69 2 14 Special seminary schools 17 1,919 69 15 Deaf and dumb institutions 17 2 1,919 301 69 25 39 18,758 44,548 35,364 16 Private elementary schools 99 7,575 ? 17 Private Fortbildungsschulen 10 1,251 ? 596 18 Private teachers and governesses in houses 88 ? 4,201 549, 372 12,985 8, 860 3,834,675 4,807,933 977,181 a. Included in 11-13. b Excluding the salaries and expenses of the Deaf and Dumb Institute, but including the pen to teachers in the higher and elementary schools from the State.

## C.—*Plan of studies in the Polytechnic School at Dresden, Saxony*.

Nearly every lecture offered in this plan will he given to a division consisting of but one student; and any one will be given to a division of three. In fact, however, divisions as small as three seldom occur, and almost the entire list of exercises is annually given. Many American students attend the lectures, especially Dr. Zeuner's in Mechanics and Professor Hempel's in in Chemistry.

NOTE.—The daily sessions are from 8 A. M. to 8 P. M.

### Mechanical Department.

### First Course : for Mechanical Engineers.

### Second Course: for Factory Engineers.

### Engineering Department.

### First Course : for Building Engineers.

### Second Course: for Civil Engineers.

Work in locating (in September of the years expressed by uneven numbers, practical geodetical work takes place. Those students can undertake this work who have heard the lectures upon locating and the first course upon geodesy and have taken part in practical geodesy.)

### Architectural Department.

### Chemical Department.

## D.-Table showing number of hours per week in the course of instruction in the Technical High School, or Polgtcchnicum, at Chemnitz.

[A-The division of mechanics; B-The division of chemists; C-The division of architects.]

### First Course: Three Half Years.

Summer (first half). TVinter (sec-ond half). Summer (third half). German language 3 3 3 4 3 Descriptive geometry A 4 A A Mathematics Physics B c 8 4 C 8 4 C 7 4 General chemistry 4 4 2 Freehand drawing 4 A 4 Art of building and architectural drawing B 6 A, B 6 Preparatory exercise in architectural drawing 4 Instruction in building materials c 2 Freehand drawing 4 4 Art of building and architectural drawing C 4 C 4 Construction of buildings 4 6 Descriptive geometry A, C 4 Colored drawings of machines and geometrical bodies A 4 Practical geometry ½ day. General chemistry 4 Practical chemical work in laboratory B 8 The following subject though not obligatory, are taught in the three divison: Geography 3 3 History U V 3 Mercantile arithmetic . 2

French English 3 3 3 3 3 3 3 3

## Second Course : Two Half Years.

"Winter (first half year). Summer (first half year). German language and literary history A 2 A 2 Physics B 2 B 2 Chemical technology C 2 C 2 Mathematics A 8 A 8 4 Descriptive geometry C 4 C Mechanics 4 4 Machine drawing A 6 A 6 Practical geometry . 2 a4 Technological chemistry (inorganic) '2 2 Analytical chemistry 2 2 Practical chemistry (working in laboratory) 16 16 Mineralogy B 4 B Mechanics 2 4 Machine drawing (parts of machines and models) Mechanics of the construction of buildings 2 2 4 b2 Ait of building 2 Designing plans of buildings 8 2 10 Freehand drawing C C 2 Styles of architecture (columns, &c) 2 History of architecture 2 Railways, roads, and waterworks (aqueduct construction) 2 Practical geometry ½ day. 3 The following subjects are non-obligato in the three sections: History 3 Bookkeeping and correspondence 2 2 French 3 3 English 3 3 a Art of machine building. b Science of mechanics.

## Third Course: Two Half Years.

First half (hours per week). Second half (hours per week). For all pupils, A, B, and C: German language 2 2 Mechanical technology 4 4 For A and B: Political economy 4 4 Metallurgy 2 For A alone: Mathematics continued to analytical geometry 4 4 Mechanics 2 4 4 4 4 Construction of machines and plans of parts and the whole 12 12 For B alone: Physics 2 2 4 Technological chemistry (organic) Practical chemistry, work in laboratory 16 16

First half (hours per week). Second half (hours per week). Machine drawing 2 4 Macninery in general 4 2 For C alone: "Propaidentik" of political economy 2 History of sculpture and painting 1 Legal bulding regulation 1 Heating and ventilation 2 Freeland drawing 2 Decorative ornamentation 4 Prepartion of estimates 2 Designing plans of buildings 14 Non-obligatory subjects: French 2 2 English 2 2

## E.—*Statistics showing the number of students receiving a classical education*.

The catalogues of nine colleges in the United States, viz, Yale, Harvard, Williams, Amherst, Dartmouth, Bowdoin, Trinity, Lafayette, and Princeton, show that the average number in the senior classes between 1870-1876 was 63; between 1877-1882, 72. This reckoning excludes students in the scientific courses.

Between 1870 and 1882 the number of institutions in which a high classical education is offered increased amain; and the reports of the Commissioner of Education show that there were in 1872, 13,836 male students in these courses; in 1882, 16,504.

## F.—*Conclumn of the Royal Commissioner*.

The invaluable Report of the Royal (English) Commissioners on Technical Instruction comes in while my report is in press, and it seems best to substitute the conclusions of the commissioners for other subjects. They are as follows:

## Progress of Manufacture Abroad.

It will have been seen from the preceding pages of this report that we have attached considerable relative importance to that portion of our commission which directed us to inquire into the condition of industry in foreign countries; and it is our duty to state that, although the display of continental manufactures at the Paris International Exhibition in 1878 had led us to expect great progress, we were not prepared for so remarkable a development of their natural resources, nor for such perfection in their industrial establishments as we actually found in France, in Germany, in Belgium, and in Switzerland. Much machinery of all kinds is now produced abroad equal in finish and in efficiency to that of this country, and we found it in numerous instances applied to manufactures with as great skill and intelligence as with us.

In some branches of industry, more especially in those requiring an intimate acquaintance with organic chemistry, as, for instance, in the preparation of artificial colors from coal tar, Germany has unquestionably taken the lead.

The introduction by Solvay, of Brussels, of the ammonia process for the manufacture of soda and the German application of strontia in sugar refining constitute new departures in those arts. In the economical production of coke we are now only slowly following in the footsteps of our continental neighbors, while the experiments which have been carried on for nearly a quarter of a century in France for recovering the tar and ammonia in this process have only quite recently engaged our attention.

The ventilation of deep mines by means of exhausting fans was brought to perfection in Belgium earlierthan with us, and although our methods of sinking shafts served for many years as models for other countries, improvements thereon were made abroad which we are now adopting with advantage.

The abundant water power in Switzerland and in other mountainous districts is utilized for motive purposes by means of turbines perfect in design and execution.

The construction of the dynamo-machine by Gramme gave the first impulse to the general use of electricity for lighting and to the various new applications of that force which appear likely to exercise so great an influence upon the industry of the world; and in all these applications at least as much activity is exhibited on the continent as with us.

In the construction of roofs and bridges, more especially in Germany, accurate mathematical knowledge has been usefully applied to the attainment of the necessary stability with the least consumption of materials.

Certain printed cottons of the highest class, produced at Mulhouse from Parisian designs, are not excelled, and rarely equalled, in this or in any other country, although the distance between our general productions in this department and those of Alsace is no longer so great as it was ten or twenty years ago. The soft, all-wool fabrics of Rheims and Roubaix are scarcely equalled as yet on the average by those of Bradford, especially as respects the dyeing.

Silk dyeing and finishing is still as much the specialty of Lyons as is the production of the beautiful silk fabrics on its hand looms, for which it has so long been preeminent.

The export from Verviers to Scotland of woollen yarns, carded and spun by machinery made in England, from South American wool formerly purchased in Liverpool and London, but for which Antwerp is now becoming the chief market, is an instance of an intelligent, careful, and persevering attention to details having established a special trade which the cheaper labor of the Belgian factories now assists in preserving.

The ribbon trade of Basle, that in velvets and silks of every kind at Crefeld and in mixed fabrics at Chemnitz, arc examples of recently established or transformed industries which have rarely been excelled in boldness of enterprise and in success by anything of the same kind accomplished in our own country. And it may not be improper to mention here that in whatever degree the technical instruction of our continental rivals may have trained them for competition with ourselves in their own, in neutral, and to some extent in our home markets, much of their success is due to more painstaking, more pliancy, and greater thrift; and also to the general cultivation, the knowledge of modern languages, and of economic geography usually possessed by continental manufacturers.

## New Departures at Home.

But great as has been the progress of foreign countries and keen as is their rivalry with us in many important branches, we have no hesitation in stating our conviction, which we believe to be shared by continental manufacturers themselves, that, taking the state of the arts of construction and the staple manufactures as a whole, our people still maintain their position at the head of the industrial world. Not only has nearly every important machine and process employed in manufactures been either invented or perfected in this country in the past, but it is not too much to say that most of the prominent new industrial departures of modern times are due to the inventive power and practical skill of our countrymen. Among these are the great invention of Bessemer for the production of steel in enormous quantities, by which alone, or with its modification by Thomas and Gilchrist, enabling the commonest description of iron to be used for the purpose, steel is now obtained at one-tenth of the price of twenty years ago; the Weldon, Hargreaves, and Deacon processes, which have revolutionized the alkali trade; the manufacture of aniline colors by Perkin; the new processes in the production of silk fabrics by Lister; the numerous applications of water pressure to industrial purposes by Armstrong; the Nasmyth steam hammer; the compound steam engine as a source of great economy of fuel; and the practical application of electricity to laud and submarine telegraphy by Cooke, Wheatstone, Thomson, and others.

Machinery made in this country is more extensively exported than at any former period. The best machines constructed abroad are, in the main, and with the exceptions which we have named, made, with slight, if any, modifications, after English models. A large proportion of the power looms exhibited and used in the continental weaving schools lias been imported from this country. In the manufacture of iron and steel we stand preeminent, and we are practically the naval architects of the world. Our technical journals, such as those of the Institutes of Civil and Mechanical Engineers and of the lron and Steel Institute, are industriously searched and their contents assimilated abroad.

In those textile manufactures in which other nations have hitherto excelled us, as in soft, all-wool goods, we are gaining ground. We saw at Bradford merinos manufactured and finished in this country which would bear comparison in texture and in color with the best of those of the French looms and dye houses, and in the delicate fabrics of Nottingham and Macclesfield (thanks, in great measure, to their local schools of art) we no longer rely on France for designs.

In art manufactures proper, notably in porcelain, earthenware, and glass, as also in decorative furniture, our productions are of conspicuous excellence. It is possible that this may be due in a certain degree to the employment, in some branches, of skilled workers trained in foreign countries, and we cannot do otherwise than acknowledge the preeminence, in the main, of our French neighbors in design as applied to decorative work or disregard the efforts which they are making to maintain that preeminence, and those made in Belgium and Italy to emulate them.

## Origin of Modern Industrial System.

The beginnings of the modern industrial system are due, in the main, as we have indicated, to Great Britain. Before factories founded on the inventions of Watt, of Arkwright, and Crompton had time to take root abroad, and while our own commerce and manufactures increased from year to year, the great wars of the early part of this century absorbed the energies and dissipated the capital of continental Europe.

For many years after the peace we retained almost exclusive possession of the improved machinery employed in the cotton, woollen, and linen manufactures. By various acts of the last century, which were not repealed till 1825, it was made penal to enlist English artisans for employment abroad; the export of spinning machinery to foreign countries was prohibited until the early years of Your Majesty's reign. Thus, when less than half a century ago continental countries began to construct railways and to erect modern mills and mechanical workshops, they found themselves face to face with a full grown industrial organization in this country, which was almost sealed book to those who could not obtain access to our factories.

## Foreign Technical Schools.

To meet this state of things abroad, foreign countries established technical schools zerland and the polytechnic schools of Germany and Swit-becoming teachers and men of science to England to prepare themselves for Technical high schools exist in nearly every continental state and are the recognized channel for the instruction of those who are inteuded to become the technical director of the instruction of those who are inteuded to become the tech-however been and Many of the technical chemists have, however, been and are being trained in the German universities. Your commissioners believe that the success which has attended the foundation of extensive manufacturing establishment, engineering shpos, and other works on the continent could not have been achieved to its full extent in the face of many retarding influences, had it not been for the system of high technical instruction in these schools, for the facilities for carrying on original scientific investigation, and for the general appreciation of the value of that instruction and of original research which is felt in those countries.

With the exception of the Ecole Centrale of Paris, all these schools have been created and are maintained almost entirely at the expense of the several states, the fees of the students being so low as to constitute only a very small proportion of the total income. The buildings are palatial, the laboratories and museums are costly and extensive, and the staff of professors, who are well paid according to the continental standard, is so numerous as to admit of the utmost subdivision of the subjects taught. In Germany, as we have stated in a previous part of our report, the attendance at some of the polytechnic schools has lately fallen off, chiefly because the supply of technically trained persons is in excess of the present demand: certainly not because it is held that the training of the school can be dispensed with. The numerous young Germans and Swiss who are glad to find employment in our own manufactories have almost without exception been educated in one or other of the continental polytechnic schools.

Your commissioners cannot repeat too often that they have been impressed with the general intelligence and technical knowledge of the masters and managers of industrial establishments on the continent. They have found that these persons as a rule possess a sound knowledge of the sciences upon which their industry depends. They are familiar with every new scientific discovery of importance and appreciate its applicability to their special industry. They adopt not only the inventions and improvements made in their own country, but also those of the world at large, thanks to their knowledge of foreign languages and of the conditions of manufacture prevalent elsewhere.

The creation abroad of technical schools for boys intending to become foremen is of much more recent date than that of the polytechnic schools. To this statement the foundation during the First Empire of the three French Écoles des Arts et Metiers, at Chalons, Aix, and Angers, is only an apparent exception, because they simply vegetated until their reorganization within the last twenty-five or thirty years. Mining schools were, however, established in Prussia in the last century and in Franco about 1817. Among the examples of schools for foremen are those of Winterthur in Switzerland, Chemnitz in Saxony, and Komotau in the Austrian dominions, principally for engineers, and the École des Mines at St. Étienne, the latter more especially for mining and metallurgy. The theoretical instruction in these schools is similar in character but inferior in degree to that of the great polytechnic schools. On the other hand considerable attention is devoted in these schools to practical instruction in laboratories and workshops, which is not the case in the polytechnic schools. In Prussia, as will be seen from the ministerial report found in the appendix, a beginning has been made in the establishment of such secondary technical schools, but, in the words of the report, "its execution will be tedious and costly." In Bavaria the Industrie-Schulen, which are technical schools of a grade inferior to the polytechnic school, give both theoretical and practical instruction, the latter in some cases highly specialized, in preparation either for direct entrance on an industrial career or for further study in the polytechnic school. In France technical schools of a somewhat lower type are being established all over the country. The one at Rheims, previously described, is an excellent example of these schools. The boys from the Rheims school either enter the École des Arts et Métiers at Châlons or go into manufactories or into business, in each case with a fair knowledge of theory and manipulation, as mechanics or as chemists.

It is important to bear in mind that the French schools of the type of that at Rheims, though virtually advanced schools, now rank as superior elementary schools, to which the pupils are consequently entitled to claim admission without the payment of any fees.

Up to the present time, however, although a few foremen have received some theoretical instruction in schools of this kind, foreign foremen have not generally been technically instructed, but, as in England, are men who, by dint of steadiness, intelligence, and aptitude for command and organization, have raised themselves from the position of ordinary workmen.

The continental weaving schools may, on the whole, so far as their influence on trade is concerned, be ranked in the first and second categories; that is to say, they are attended by those who propose to become merchants, manufacturers, managers, or foremen. They are held in the highest estimation by some of the most intelligent and successful continental manufacturers; of this there can be no better proof than the erection, in substitution for the one already existing, of the splendid new weaving schools at Crefeld, probably the most flourishing centre of the general silk trade, at the joint expense of the state, the locality, and the commercial body. Weaving schools for workmen, like the evening and Sunday school of Chemnitz, which must not be confounded with the superior weaving school of that town, are poorly attended, and can have had no sensible influence on the progress of textile manufactures. But there are in many places lectures on weaving and pattern designing largely attended by workmen.

The French and German schools for miners, and the one which has been quite recently founded in Westphalia for workers in iron and steel, differ from the preceding schools for foremen inasmuch as they are reserved for the theoretical instruction of men who, having already worked practically at their trades, have distinguished themselves by superior intelligence and good conduct. Most of the German schools of this kind are founded or maintained by the manufacturers, and will, we feel confident, repay the trades which have had 'the foresight and public spirit to create them, by training young men to become foremen and leading hands, willing and able to carry out with intelligence the instructions of their superior officers.

## Societies as Teaching Bodies.

For the technical education of workmen, outside of the workshop, the resources of continental countries have hitherto been and are still very much more limited than has been supposed in this country to be the case. In several of the more important industrial centres of the continent there exist societies such as the Sociétés industrielles of Mulhouse, Rheims, Amiens, &c.; the Société d'enseignement professionnel du Rhône, which has its headquarters at Lyons and the Niederosterreichischer Gewerbe-Verein of Austria, one of the chief objects of which is the development of technical education among workmen and other persons engaged in industry, by means of lectures and by the establishment of schools and museums of technology. These associations are supported mainly by the merchants and manufacturers of the district to which their operations are restricted. In many cases they are founded and supported or are greatly assisted by chambers of commerce. These bodies abroad being incorporated, and having in France considerable taxing powers over their members, are generally wealthier and more influential than those in our own country. In addition to these sources of income the associations receive help from the municipality and sometimes from the state. In Mulhouse, besides promoting education, the society sees to the material wellbeing of the workmen by erecting on a large scale laborers' dwellings (la cité ouvrière) and by organizing savings banks and other economic arrangements, undertaking in this respect on a smaller scale what is done in this country by self sustaining associations like building and cooperative societies of the workpeople themselves. The society in Lyons has established numerous evening classes for elementary and technical instruction, which are attended chiefly by workpeople; and the South Austrian Trade Society, which has its central office in Vienna, has organized several technical day and evening schools for operatives of every grade, which are now under state control and receive subventions from the government. But although these societies, under different names and with varied objects, are very numerous, their sphere of action is limited, and the facilities they oiler for evening instruction in science and technology are inferior to those which are at the disposal of our own workmen. No organization like that of the Science and Art Department or of the City and Guilds Institute exists in any continental country, and the absence of such organizations has been lamented by many competent persons with whom we came in contact abroad.

## Education of Artisans Abroad.

In two every respects, however, the education of a certain proportion of persons employed in industry abroad is superior to that of English workmen: first, as regards the systematic instruction in drawing given to adult artisans, more especially in France, Belgium, and Italy; and, secondly, as to the general diffusion of elementary education in Switzerland and Germany. In some parts of these latter countries great attention is paid to drawing in the elementary school. In France, too (where elementary education has hitherto by no means been so general as in the two former countries), in the case of those workmen who have had the benefit of regular elementary school training, more attention has been paid to elementary drawing than is the case in this country. There are also in all large towns in France, and to a more limited extent in other countries, numerous evening "conferences" and "cours" on almost every subject of interest in art, asience, and literature which workmen have the opportunity of attending, as they are entirely gratuitous. Among these the most remarkable are the lectures given by eminent men at the Conservatoire des Arts et Métiers of Paris. Most of these are of the nature of lectures rather than of practical instruction. There are, however, in many places excellent and numerously attended evening and Sunday technical classes, more especially in Belgium and Austria, and there can be no doubt that the instruction thus given is already exerting a considerable influence on the capacity and intelligence of the workmen, and that this influence will be increasingly felt in the future.

In the evening schools of North Germany (Forthildungsschulen) the studies of the ordinary elementary school are continued, the further instruction being confined mainly to book-keeping and rudimentary mathematics, with some notions of natural philosophy. In the evening schools of the same class in South Germany the instruction given is of a more technical character than in the North.

For instruction in drawing, as applied mainly to decorative work in Franco, and to both constructive and decorative work in Belgium, the opportunities are excellent. The crowded schools of drawing, modelling, carving, and painting, maintained at the expense of the municipalities of Paris, Lyons, Brussels, and other cities—absolutely gratuitous and open to all comers, well lighted, furnished with the best models, and Under the care of teachers full of enthusiasm—stimulate those manufactures and crafts in which the line arts play a prominent part to a degree winch is without parallel in this country. Instruction in art applied to industry and decoration is now pursued with energy in South Germany and in several of the northern Italian towns, and the influence of this instruction on the employment of the people is becoming very conspicuous in those countries. The government schools of applied art in France, under the decree of 1881, of which the Limoges Decorative Arts School is the earliest example, and which, like the abovementioned schools, are gratuitous, should be mentioned in this connection. * * *

## Home Industries.

Home and village industries have been in some cases initiated, in others improved and extended, in districts when, from the poverty of the population and the scarcity of capital, special aids were essential, notably in Baden, Bavaria, and the Tyrol. In the schools established and maintained for this purpose, wood carving and inlaying, lock making, filagree work, basket making, and other simple trades for which there were local material and aptitude, have been taught with considerable success. In some cases these industries have been so firmly and permanently established as to render unnecessary the further maintenance of the special schools. In the primary schools of the Black Forest, straw plaiting is taught to the girls. Discriminating regard is paid to the capabilities of each sex. In " women's work" schools on the Reutlingen model and in the professional schools for girls which have been established in Frame and the Netherlands, instruction is successfully given qualifying girls for many useful occupations, though these are scarcely of the kind usually understood under the term of manufactures.

## Report of the United States.

The report of Mr. William Mather to your commissioners on his six months' tour throughout the United States of America and Canada for the purpose of studying the schools and factories of I hat continent deserves the most careful perusal. It will be seen that Mr. Mather assigns greater influence on American manufactures to the general education of the American people derived from their common schools than to their technical schools, the importance of which latter, however, in the training of civil engineers has been experienced for some years, though it has only more recently become recognized by those who are engaged in mechanical engineering and in metallurgical and manufacturing establishments of various kinds. This recognition is, however, now becoming universal. A decided preference is being given in the United States for the positions of managers and heads of departments to persons who have received a scientific training in a technical school, and the plan is followed in these schools of combining instruction in "application" with instruction in pure science. Although the conditions of American industry-differ in many respects from our own, there can be no doubt that we may derive great advantage from a careful study of what is being done in the way of technical instruction in the United States, as, together with the elementary education of Canada, it is so graphically described by Mr. Mather. We may add that the accuracy of his statements and conclusions is generally confirmed by the accounts of technical instruction in America which we have received from other competent judges.

## Need of Technical Instruction.

Not many years have passed since the time when it would still have been a matter for argument whether, in order to maintain the high position which this country has attained in the industrial arts, it is incumbent upon us to take care that our managers, our foremen, and our workmen should, in the degrees compatible with their circumstances, combine theoretical instruction with their acknowledged practical skill. No argument of this kind is needed at the present day. In nearly all the great industrial centres, in the metropolis, in Glasgow, in Manchester, Liverpool, Oldham, Leeds, Bradford Huddersfield, Keighley, Sheffield, Nottingham, Birmingham, The Potteries; and elsewhere, more or Less nourishing schools of science and art, of various grades, together with numerous art and science classes, exist, and their influence may be traced in the productions of the localities in which they are placed.

## Special Schools Established by Manufacturers.

The schools established by Sir W. Armstrong at Elswick, by the London and North-western Railway Company at Crewe, and those of Messrs. Mather and Platt of Sal-ford, in connection with their engineering works, testily to the importance attached by employers to the theoretical training of young mechanics. The efforts of Messrs. Denny, the eminent shipbuilders of Dumbarton, for encouraging the instruction of their apprentices and for rewarding their workmen for meritorious improvements in details applicable to their work, are proofs of this appreciation. The evidence of Mr. Richardson, of Oldham, and of Mr. Mather, of Salford, is emphatic as to their experience of its economical value.

Without more particularly referring to the valuable work in the past accomplished by the numerous mechanics' institutes spread over the country, many of them of long standing, we may point out that they are now largely remodelling their constitutions in order to bring up their teaching to the level of modern requirements as regards technical instruction. The example of the Manchester Mechanics' Institute may be studied in this connection.

Moreover, as evidencing the desire of the artisans themselves to obtain facilities for instruction both in science and art, we must not omit to mention the classes established and maintained by some of the leading cooperative societies. The Equitable Pioneers' Society of Rochdale has led the way in this, as in so many other social movements. It is much to be wished that the various trades' unions would also consider whether it is not incumbent on them to promote the technical education of their members.

The manufacturers of Nottingham speak with no uncertain voice of the important influence of the local school of art on the lace manufacture of that town. Without the Lambeth school, the art productions of Messrs. Doulton could scarcely have come into existence. The linen manufacturers of Belfast are becoming alive to the necessity of technical instruction if competition on equal terms with foreign nations in the more artistic productions is to be rendered possible. The new generation of engineers and manufacturers of Glasgow has been trained in the technical schools of that city. The City and Guilds of London Institute owes its existence to the conviction of the liverymen that technical instruction is a necessary condition of the welfare of our great industries.

## Teaching of Natural Science.

Natural science is finding its way surely though slowly into the curriculum of our older English universities and of our secondary schools. It is becoming a prominent feature in the upper divisions of the elementary board schools in our large towns. There are scarcely any important metallurgical works in the kingdom without a chemical laboratory in which the raw materials and products are daily subjected to careful analysis by trained chemists. The attainments of the young men who have been trained in the Royal Naval College at Greenwich recommend the in for remunerative employment by our great shipbuilding firms.

## Best Modes of Advancing Technical Instruction.

In our relations with public bodies and individuals in this country during the progress oi our inquiry, the greatest anxiety has been manifested to obtain our advice as to the mode in which technical instruction can be best advanced, and we have to acknowledge the readiness of the Education and Science and Art Departments to receive aim act upon suggestions in matters of detail from individual members of the commission which it would have been pedantic to delay until the completion of our task. Among the suggestions which have thus been made was that of an exhibition of the school work of all nations, which His Royal Highness the Prince of Wales has consented to add to the health exhibition of 1884. This exhibition will be an appropriate illustration of the account of foreign schools contained in the previous parts this report. Your commissions, during their continental visits, received from the authorities of technical school numbers assurances of their cordial support ani icoopeiation in such a display.

Thus, there is no necessity to "preach to the converted," and we may confine our-selves to such considerations as bear upon the improvement and more general diflu- sion of technical education at home in accordance with the conditions and needs of our industrial population.

In dealing with the question of technical instruction in this country we would, at the outset, state our opinion that it is not desirable; that we should introduce the practice of foreign countries into England without considerable modifies ion. As to the higher education, namely that for those intended to become proprietors or managers of industrial works, we should not wish that every one of them should continue his theoretical studies till the ago of twenty-two or twenty-three years in a polytechnic school, and so lose the advantage of practical instruction In our workshops (which are really the best technical schools in the world) during the years from eighteen or nineteen to twenty-one or twenty-two, when be is best able to profit by it.

We have, also, in the science classes under the Science and An Department (to the intelligent and able administration of which it is our duly to hear testimony) a system of instruction for the great body of our foremen and workmen, susceptible certainly of improvement, but which in its main outlines it is not desirable to disturb.

Moreover, in considering by whom the cost of the further development of technical instruction should be borne, we must not forget that, if it be true that in foreign countries almost the entire cost of the highest general and technical instruction is borne by the state, on the other hand, the higher elementary and secondary instruction in science falls on the localities to a much greater extent than with us; while, as to the ordinary elementary schools, the cost in Germany and Switzerland is almost exclusively borne by the localities; and this was also the case in France and Belgium until the people of those countries became impatient of the lamentable absence of primary instruction on the part of vast numbers of the rural and in some instances of the town population, an evil which large state subventions alone could cure within any reasonable period of time. With the exception of France, there is no European country of the first rank that has an imperial budget for education comparable in amount with our own. In the United Kingdom at least one-half of the cost of elementary education is defrayed out of imperial funds, and the instruction of artisans in science and art is almost entirely borne by the state. Hence it will ho necessary to look, in the main, to local resources for any large addition to the funds required for the further development of technical instruction in this country.

In determining what is the best preparation for the industrial career of those who may expect to occupy the highest positions, it is necessary to differentiate between capitalists, who will take the general as distinguished from the technical direction of large establishments, and those at the head of small undertakings, or the persons more especially charged with the technical details of either. For the education of the former, ample time is available and they have the choice between several of our modernized grammar schools, to be followed by attendance at the various colleges in which science teaching is made an essential feature, or the great public schools and universities, provided that, in these latter, science and modern languages should take a more prominent place. Either of these methods may furnish an appropriate education for those persons to whom such general cultivation as will prepare them to deal with questions of administration is of greater value than an intimate acquaintance with technical details. It is different in regard to the smaller manufacturers and to the practical managers of works. In their case, sound knowledge of scientific principles has to be combined with the practical training of the factory, and therefore the time which can be appropriated to the former, that is, to theoretical instruction, will generally be more limited.

How this combination is to be carried out will vary with the trade and with the circumstances of the individual. In those cases in which theoretical knowledge and scientific training are of preeminent importance, as in the case of the manufacturer of tine chemicals, or in that of the metallurgical chemist, or the electrical engineer, the higher technical education may with advantage be extended to the age of twenty-one or twenty-two. In the cases, however, of those who are to be, for example, managers of chemical works in which complex machinery is used, or managers of rolling mills, or mechanical engineers, where early and prolonged workshop experience is all-important, the theoretical training should be completed at not later than nineteen years of age, when the works must be entered and the scientific education carried further by private study or by such other means as do not interfere with the practical work of their callings. Many colleges of the class to which we have referred have already arranged their courses to meet these requirements, and some of them, as will appear from our reports of visits, have workshops for the purpose of familiarizing the students with the use of machine and hand tools.

It is to be regretted that nearly all of these very useful institutions Buffer more or less from the want of adequate funds to enable them to provide for such a staff of professors as is necessary for the proper subdivision of the various subjects taught, and for the equipment of museums, apparatus, and laboratories of the various kinds essential to the practical instruction of the student. In this respect the provision in this country compares most unfavorably with that in the universities and polytechnic schools of the continent, even in spite of recent munificent benefactions like those of the late Mr Charles Beyer of Manchester, the late Sir Josiah Mason of Birmingham, of the Baxter family at Dundee, the late Mr. Harris of Preston, the liberal gifts of Mr. Crawford to the Queen's College at Cork, and others. In speaking of benefactions, we do not overlook the noble endowment of Sir Joseph Whit worth for the encouragement of engineering by affording to able and promising young men especially of the class of artisans, the means of obtaining theoretical combined with practical training, the former in Institutions of the kind we have referred to.

## Secondary Schools as a Preparation for Technical Schools.

The best preparation for technical study is a good modern secondary school of the types of the Manchester Grammar School, the Bedford Modern School, and the Allan Glen's Institution at Glasgow. Unfortunately, our middle classes arc at a great disadvantage, compared with these of the continent, for want of a sufficient number of such schools. The transfer of the functions of the endowed schools commissioners to the charity commissioners has not had the effect of increasing the rate of progress in the reorganization of our secondary schools. We consider it to be essential that steps should be taken to insure that this work shall be carried on with greater vigor in the future than it has been hitherto. We learn that there are still endowments available for education, amounting to upwards of 200,000l, per annum, which have not been dealt with by the commissioners. In the schemes for the new schools the subjects of science and modern languages should form a very prominent part : and it would be desirable in some of these schools, especially in Large towns (where classical schools are not wanting), in order to provide for the fuller teaching of these subjects, more particularly of mathematics, that the classical languages should be altogether excluded from the schemes of instruction. But the existing endowments are very unevenly distributed over the country; in many of the large manufacturing centres no resources of the kind exist; private enterprise is clearly inadequate to do all that is required in establishing such schools, and we must look to some public measure to supply this, the greatest detect of our educational system. It is to be desired that, in the proposed reorganization of local government, power should be given to important local bodies, like the proposed county hoards and the municipal corporations, to originate and support secondary and technical schools in conformity with the public opinion for the time being of their constituents.

Intelligent youths of the artisan classes should have easy access to secondary and technical schools by numerous scholarships, and the more promising students of them again to the higher technical colleges.

## Science Teaching in the Elementary School.

For the great mass of our working population, who must necessarily begin to earn their livelihood at an early age and from whom our foremen will be mostly selected, it is essential that instruction in the rudiments of the sciences bearing upon industry should form a part of the curriculum of the elementary schools, and that instruction in drawing, and more especially in drawing with rule and compass, of a character likely to be useful to them in their future occupations as workmen and artisans, should receive far greater attention than it does at present. The importance of the first of these subjects has so far been acknowledge by the education department that in all infant schools lessons on objects and the more commonly occurring phenomena of nature have been made obligatory. This System of instruction, if property illustrated by the exhibition of the object itself, or of diagrams or models of the same, or by the simplest kinds of experiments, is an excellent foundation for the subsequent teaching of elementary science.

When, however, the child enters the elementary school the teaching of science practically ceases until it reaches the upper division, inasmuch as the arrangement of the class subjects in the lower division is found in practice to exclude science from that division; only two subjects being allowed, of which "English" must be one and "geography" may be another, this latter being generally preferred to the alternative is a branch of elementary science." It appears to us that geography, if properly taught is a branch of elementary science which need not be separated from science generally, and can well be taught along with the other branches of science by means of the object lessons which are described in the code. Thus there would be only two class subjects instead of three, and in this way the connecting link which is now wanting between science as taught in the infant school and in the higher division of the elementary school would be supplied.

## Higher Elementary Schools.

We could hardly overstate our appreciation of the value of the pian of giving instruction in natural science by special teachers, as carried out in the board schools of Liv- erpool and Birmingham, where the employment of a well qualified science demonstrator insures the sound character of the instruction, while the repetition of the lesson by the schoolmaster enables him to improve himself in the methods of science teaching. This should, however, be supplemented by the establishment of higher elementary schools like those of Sheffield and Manchester, into which the more advanced pupils of the primary schools may be drafted, especially if the parents of those children should be able to keep them at school up to the age of fourteen or fifteen unassisted, or if they are unable to do so, assisted by scholarships taking the place of the wages which they would otherwise earn. In these latter schools it is possible to provide efficient laboratories in which practical work is performed by the pupils, while this cannot adequately be done for the ordinary primary schools. Youths having the advantage of such instruction will be well prepared to avail themselves at a later period of the classes of the Science and Art Department and of the technical classes under the auspices of the City and Guilds Institute, which are now so numerous, and many of which are under excellent teachers.

The evidence given before us leaves no doubt that the directors of both these institutions use every effort in their power to secure sound and practical teaching in these classes, so far as that can be effected by assistance in training the teachers and by careful testing, in their examinations, of the results of the instruction given. In regard to the first, much is to be hoped for from the increasing number of teachers who are now able to take advantage of the high scientific instruction given in the Normal School of Science at South Kensington, as well as from the pecuniary assistance offered by the Science and Art department to science teachers desirous of attending the courses and laboratories of various provincial colleges, while for teachers of technology a great step in advance will be made when the Central Institution of the City Guilds is in operation. As to the latter—that is to say, the thoroughness of the instruction given in the classes—more close and frequent inspection than at present is much to be desired, a higher payment for the more advanced grades of several subjects should be made than is now the case, and practical laboratory work in the higher grades in science should be more genrally demanded.

An important point to which the attention of the inspectors should be more, particularly directed is to ascertain that proper apparatus and appliances are provided for practical work in these classes.

## Art Schools for Aktisans.

With reference to the subject of drawing, we cannot too often call attention to the extraordinary efforts which are being made abroad for instruction in art, more especially as applied to industrial and decorative purposes, and to the important influence of this instruction in furnishing employment for artisans on the continent. Without depreciating what has been done in this direction by the schools and classes under the auspices of the Science and Art Department in this country, and while fully alive to the importance of the organization which tends to the diffusion of art instruction over a wide area, your commissioners cannot conceal from themselves the fact that their influence on industrial art in this country is far from being so great as that of similar schools abroad, This is due, no doubt, to some extent to the want of proper and sufficient preparation on the part of the students, owing to the inadequate instruction they have received in drawing in the elementary schools.

## Drawing and Modelling.

Your commissioners are aware that the number of children who are supposed to learn drawing in elementary schools is considerable, but it is small compared with the total number in attendance, and ii is, we have reason to believe, diminishing. We have ascertained by inspection that the instruction is in far too many cases of little value. Instead of a mass of inferior drawings being sent up once a year to South Kensington for examination there, it is necessary that the instruction in drawing in elementary schools should be as carefully supervised on the spot by the Whitehall inspectors as is that in other branches of primary education. In nearly all the places abroad which your commissioners have visited they have found that drawing is an obligatory subject of instruction in the primary school and that it is regarded as of equal importance with writing. The number of hours which the children devote to lessons in drawing abroad is frequently as many as three per week, whereas in England the subject is not only no1 obligatory, but In about three-fourths of our elementary schools no instruction whatever is given in this subject, and in those schools in which drawing is taught the time devoted to it rarely exceeds one hour per week, and even that not always regularly. This want of attention, together with the absence of competent teachers, proper models and methods, and adequate inspection, fully accounts for the inferiority to which we have referred. The training of teachers for the Irish national schools includes special instruction in drawing, and a "rant for drawing is made to primary schools in Ireland by the commissioners of national education. The drawing in some of the schools of the Christian Brothers and in some of those under the hoard of intermediate education is good.

Your commissioners are of opinion that sound instruction in the rudiments of drawing should be incorporated with writing in all primary schools, both fur girls and boys, by which, also, according to the experience of competent authorities, the willing would be much improved. Something in this direction has already been done in many good infant schools, where children of the age of six draw triangles, squares, oblongs, &c, on their slates. This exercise is repeated on the day of inspection, and is taken into account in estimating the value attached to "appropriate occupations."

We have observed with satisfaction the recent circular (Art Form, No. 1194) of August, 1883, prescribing the new exercise of drawing to scale. We believe the principle therein laid down to be excellent, and we trust that the school managers and teachers will avail themselves of the advantages offered to them in this alteration in the first grade work. The permission recently accorded to teachers to give instruction in drawing and modelling to the children of the elementary schools out of the ordinary school hours is also likely to prove very advantageous.

We are of opinion that more attention than has hitherto been devoted to it should be directed to the subject of modelling in the elementary school. We notice that by a recent addition to the art directory small classes in modelling may now claim a local examination; we believe this to be a most salutary regulation. Modelling is an exercise of great importance to the future workman, and its rudiments can well be taken up, as in continental schools, at the earliest age.

Assuming such preparation in the infant and elementary school as we have here suggested, tho progress of subsequent instruction in art classes would be immeasurably more rapid. Whether the attendance in any given locality will ever be so great in this country, where the instruction has to be paid for, as in France, Belgium, and elsewhere, where it is gratuitous, is a matter for grave doubt. However this may he, there are two points in connection with tho instruction in art schools and classes as bearing on industrial pursuits which require careful attention. The first is one which we are glad to perceive is now fully appreciated by the Science and Art Department, viz, the advantage of substituting practice in rapid but cornet execution in place of tho method of stippling, which was formerly not sufficiently discouraged in art schools and classes; greater attention also than hitherto should be given to modelling. The second point relates to industrial designing. This, for a variety of reasons, the chief of which are the want of sufficient knowledge of manufactures on tho part of art teachers and the absence of sympathy evinced by tho proprietors' of industrial works, has, with some notable exceptions, not received sufficient attention in our art schools and classes. In fact, there has been a great departure in this respect from the intention with which the "schools of design" were originally founded, viz, "the practical application of (a knowledge of) ornamental art to the improvement of manufactures." Large grants of public money for teaching art to artisans in such classes can scarcely be justified on any other ground than its industrial utility.

## Applied Art Work.

On the subject of the teaching of industrial design, we are of opinion that the Science and Art Department may with advantage depart from their principle, as at first laid down, of granting encouragement to design only so far as to award grants for specimens of applied art-workmanship in the materials themselves, as a test of the applicability of the design and as a reward for success in overcoming the technical difficulties of the manufacture.

It seems scarcely fair that well executed artwork by a student, say a richly chased piece of silver plate, Should obtain only the same recompense as the design for the same pbject on paper. We are aware that special vigilance would in this case be required in order to prevent the use of such rewards for trade or for other than educational purposes.

It appears from the evidence, with which we include a remarkable letter from M. Willms, the emiuent designer of Birmingham, that it would be well if persons practically acquainted with the application of design to industrial manufactures were more extensively consulted in the award of prizes for industrial design. We are aware that this is now done in some measure, but, however emiuent may be the gentlemen whom the department has been in the habit of consulting, it is unlikely, it is unlikely that the small number of these should be sufficently familiar with the vast varieties of applications to have the special knowledge requiste for judges in the large number of trades in which design forms an important element.

## Industrial Art Museums.

Among the most important means of stimulating industrial art education and of apreading a knowledge and appreciation of art throughout the country is the foun- dation of local museums of applied art of such a character as is Lest adapted to advance the industries of the districts in which they are situated.

Stimulated by the advice and influence of the director of the South Kensington Museum, and with the liberal aid of private benefactors, such collections have been provided in the local art museums at Sheffield, Derby, York, and elsewhere. In Manchester also, steps have been taken to found an industrial museum, and the corporation has acquired the famous Hock collection of textile fabrics for this purpose. The Mancbesters Birmingham, Stoke, and other galleries are open on Sundays, and are visited by increasing numbers of orderly working people. It is very desirable that similar facilities should be provided for the inspection of our metropolitan museums and collections. We are of opinion that the connection between these museums and the local schools of art should be of an intimate character. Indeed, in this respect pinch may he learned from foreign countries, where many such museums exist and exert great influence on manufactures. Further, we must express strong approval, in winch we merely repeat the opinion offered by competent witnesses both at home and abroad, of the system of circulating among the local museums collections of works of art from the national collection at South Kensington. The value and utility of these collections are greatly enhanced by suitable manuals and guide books well illustrated and sold at a cheap rate; these serve to explain to visitors of the artisan classes the features most worthy of notice.

While we fully admit the force of the contention that the contributions of the state to the foundation and maintenance of museums will be of the greatest service to the country at large, if applied mainly to central institutions like those of the metropolis, of Edinburgh, and of Dublin, we highly approve of the grants to provincial museums of reproductions, either gratuitously or at a very low price. Those grants may even, in the ease of typical museums situated in some of the chief industrial centres, be extended with advantage to original examples of art and of manufactures calculated to increase the know ledge and improve the taste of those (more especially of the artisans) engaged therein.

## Governmknt Building Grants.

Your commissioners believe that the grants now made in aid of the buildings for local schools of science and art and for industrial museums in connection with them, limited as they are to a maximum of 5001. for art schools and the same sum for science schools, coupled also with the requirements that they shall be given only for buildings under the free libraries act or in connection with schools of art require revision, and tend rather to discourage local effort than otherwise, inasmuch as they give an erroneous impression of what is really required in order that suitable buildings may be provided.

Your commissioners highly approve of the recent foundation of scholarships to promising students in the science classes of the Science and Art Department, enabling them to continue their education at various higher schools. The limitation of the available funds appears to have rendered necessary in consequence of this step the abolition of (he Queen's prizes, given for success in the elementary stages, and the substitution of honorary certificates in place of them. We find there is an opinion prevalent that these certificates will not afford sufficient stimulus to certain students. It is to be hoped, however, that a small addition to the customary local prize funds will be readily subscribed to supply this deficiency.

But all these institutions and measures will not alone accomplish the object aimed at. Tor this the localities must rely far more than has been the case hitherto on their own exertions. Teachers should know that they laborunder the eye of those who are interested in the work being thoroughly and conscientiously done. The organization and efficiency of the science schools at Oldham and Keighley are conspicuous examples of what may he done in regard to the scientific and technical instruction of artisans, where local employers take an active and intelligent interest in the work. The Old-ham School of Science and Art may, so far as science teaching is concerned, be regarded as the type and example of what evening schools should be; and the existence of similar efficient and flourishing schools in all our industrial towns would greatly contribute to confirm our industrial position. The remuneration of teachers should not depend to so great an extent as at present on the grants from headquarters. School boards should be authorized to establish and conduct science and art classes for artisans, and where no school boards exist power should be given to the local governing bodies to establish or support such schools. If the teaching is not entirely gratuitous (and the regularity of attendance in the art classes in the French and Belgian cities and in the science classes in Liege, Seraing, and elsewhere shows that it is a prejudice to suppose that people only appreciate what they pay for), the fees ought to he on the lowest possible scale.

## Teaching and Apliances.

Your commissioners have had before them deputations of representative working men who have expressed their views on the wants of the working classes will, respect to the teaching of science and art, and who have stated that the assistance afforded by the department is not sufficiently directed towards the requirements of their several trades. We believe that many workmen are disposed to attach too little value to the importance of acquiring a knowledge of the principles of science because they do not see their application. We are of the opinion that whenever it is possible persons engaged in the trade taught and having scientific knowledge should give instruction to workmen, and we have ascertained that a large number of such teachers are registered under the examination scheme of the City and Guilds of London Institute. We visited classes of this character at the Polytechnic Institution in Regent street, at the Manchester Technical School, the Lyceum at Oldham, and at other places, some of which were excellent.

The city guilds are trying a most important experiment in their practical classes. If empiricism be avoided, a great point will be gained by the attraction to working men and women of a mode of instruction in which the direct application of scientific principles is the means by which a knowledge of those principles is conveyed to their minds. As to this point, we refer to the almost unanimous expression of opinion contained in the letters of eminent manufacturers in reply to our circular asking their advice as to the best means of promoting technical instruction.

We cannot dismiss this branch of the subject without calling attention to the educational value of the museums of natural objects now found in many of the modern elementary schools of the continent. Probably the best examples of such collections are those of the Normal School of Brussels and of the elementary schools of Zurich. Collections of natural objects, pictures, and diagrams are of the greatest assist nice for illustrating object lessons in rudimentary science to children of the earliest years.

Many persons who have paid attention to the working of free libraries in our large towns are of opinion that the benefit of these might be extended to elementary schools by placing at the disposal of such schools books of a character calculated to interest children of school age. Among these books some suitable technical works, especially illustrated ones, might be included. These school libraries would be of the nature of the branch libraries which are now attached to many of the free libraries of our large towns.

Your commissioners, after having had the opportunity of further considering the value of manual work as a part of primary instruction and after having seen such work introduced into elementary schools of various grades in other countries besides France, are able now to express a stronger opinion in its favor than at the time of their first report. They do this with greater confidence because, in consequence partly of the suggestion contained in that report, the experiment of introducing manual work into primary schools has been successfully effected by at least two school boards in this country, viz, those of Manchester and Sheffield.

## Manual Work.

Your commissioners have had the opportunity of inspecting the manual work of the pupils, both at the Manchester board schools and at the central school in Sheffield, and they are satisfied that such work is very beneficial as a part of the preliminary education of boys in this country who are to be subsequently engaged in industrial pursuits, even though it should not as however it probably will do, actually shorten the period of their apprenticeship.

Your commissioners see no reason why, since grants are made on needlework in girls schools, they should not be made on manual work in boys' schools. This instruction may be given so as not to interfere with the ordinary work of the school. It has been proved that this can be done, the boys being most eager to return for handicraft teaching after school hours.

Whenever more attention shall be given to drawing, and especially to mechanical and geometrical drawing, in the ordinary and the higher elementary schools, it will be proper and desirable that the work executed in the shops attached to these schools should be made from drawings prepared by the children themselves.

## Attendance at Elementary Schools.

We need scarcely say that the sucess, not only of technical, but of the ordinary elementary instruction of our working population depends upon the regular attendance of the children at school and upon their remaning there sufficiently long to insure that the knowledge acquired shall leave some lasting impression on their minds. As will have appeared from other parts of this report, the children of the work people of Germany and Switzerland, with few exceptions, remain at school till the ago of fourteen years, and in some of the German States arc required to continue their elementary instruction two years longer in evening and Sunday schools, if their examination at fourteen has not been satisfactory. The wages of the parents in these countries are generally lower and the sacrifice of their children's earnings is consequently felt more than with us. The efficiency of the American workmen is mainly attributed, by all who have inquired into the subject, to the primary education acquired by them during a prolonged attendance at school. In our own country great diversity prevails as to the standard authorizing the employment of children as fall-timers. In Scotland this will be remedied by the act of last session. After next year no child under the age of fourteen years can be employed on full time in Scotland, unless it has passed the fifth standard. We have no doubt that all classes interested in industry will quickly reap the benefit of this amendment of the law, and we see no reason why this regulation should not be extended to England and Wales, so far as it applies to factories and workshops.

## Colleges and their Teaching.

We have avoided in the foregoing statement making special observations on the merits or defects of the various scientific and technical colleges and schools which are at work or in course of establishment in this country, but we think it due to those who have founded and those who are conducting these excellent institutions to state that all of them, in each of the three divisions of the United Kingdom, are, in spite of limited means, producing good results. It is most praiseworthy on the part of the professors and teachers that they devote themselves to the important work of tuition for salaries so small as those which they as a rule receive, when many would, by employing their scientific and technical knowledge in private enterprise, obtain much larger pecuniary remuneration. We may remark concerning the colleges that it is not necessary that all of them should be of the highest type. To enable the relatively small number of persons capable of occupying the highest industrial positions to acquire the most complete education of which modern science admits, only a few well equipped institutions of high rank are needed. It is, however, of national importance that these few should be placed in such a position of efficiency as to enable them to carry out successfully the highest educational work in the special direction for which circumstances, particularly of locality, have fitted them. Your commissioners believe that no portion of the national expenditure on education is of greater importance than that employed in the scientific culture of the leaders of industry. Your commissioners fear that the belief in the efficacy of training of this *highest* character is, in England, at present small among those whom it will ultimately benefit; and yet there are few countries? in which so many investigations have been made the practical bearings of which were not at the outset apparent but which have in the end led to the most important practical results. The discovery by Faraday of magneto-electricity and by Joule of the mechanical equivalent of heat at once occur as examples. The Englishman is accustomed to seek for an immediate return, and has yet to learn that an extended and systematic education up to and including the methods of original research is now a necessary preliminary to the fullest development of industry. It is, among other elements of progress, to the gradual but sure growth of public opinion in this direction that your commissioners look for the means of securing to this country in the future, as in the past, the highest position as an industrial nation.

We desire to express our satisfaction at the recent establishment of weaving and dyeing schools in the north of England, and of mechanical laboratories in several localities. The utility of weaving schools to proprietors and managers of factories, and to merchants who desire to become acquainted with the processes of the manufacture of the goods in which they deal, has been so clearly demonstrated on the continent that we need adduce no further arguments in their favor. The weaving and dyeing schools of Leeds have been established and are maintained entirely by the Clothworkers' Company of London. We regard this as one of the most useful and appropriate purposes to which a portion of their funds could have been devoted. The mechanical laboratoriesand mechanical drawing schools at Nottingham, Sheffield, Huddersfield, and elsewhere will be of the greatest service in enlarging the knowledge and experience of young artisans who are kept continuously at one branch in their daily work.

The teaching of art and science subjects in the training colleges of Great Britain for elementary school teachers is very defective. The inspection on the part of the Science and Art Department has until lately been greatly neglected, owing to the divided responsibility for the college? of the Education Department and the Kensington authorities. The answers received by the examiners to such questions as the following: " Write out the heads of a lecture to an elementary class on the chemical and physical properties of water, mentioning the experiments which you would show and your object in showing them," prove conclusively that the students have no idea as to how such a simple mutter ought to be brought before a class. It would greatly conduce to sound and efficient training in science, and particularly in the methods of teaching if those students in training who have shown an aptitude for science work could be sent annually to the Normal School of Science at South Kensington or to other approved efficient institutions. The provision for art teaching in most of the training colleges is inferior even to that at present made for science, and an entire reform In this respect is urgently needed; and similar measures should be taken for systematic instruction in art as in science. Considerable attention is as we have said elsewhere, paid to drawing in the Normal School in Dublin, where it is taught by a competent art master.

The school boards of our great cities are fully alive to the defective character of the instruction of pupil teachers. In London. Liverpool, and elsewhere they have endeavored to apply a partial remedy by introducing joint instruction, under special teachers qualified in each subject, instead of having each headmaster to instruct the pupil teachers of his own school in every subject. The Education Department has also taken a small step in the right direction by somewhat limiting the number of hours that the pupils may be employed in teaching, so as to give them a little more leisure for learning. No considerable improvement can, however, be expected until the great school boards are authorized to establish colleges for training teachers. These colleges would be day schools and need not receive from the State enormous capitation grants like those now given to the English denominational training colleges, but only small allowances like those granted to the day students in those of Scotland.

## City and Guilds of London Institute.

In concluding this part of our subject, we deem ourselves justified in giving, at the risk of repeating some of the statements we may have made in the earlier parts of our report, a short review of the work initiated, controlled, and contemplated by the City and Guilds of London Institute, inasmuch as this important organization has been created in order to promote the technical instruction of persons of every grade engaged in industry.

The institute had not been in existence very long when your commissioners were appointed, and consequently they have scarcely had the opportunity of estimating the value of the work it is doing in some of its branches. Even now that work is in many parts of the kingdom unknown, and this is particularly the case in Ireland. In Dublin, Cork, and in many other Irish towns nothing was know at the time of our visit of the encouragement to technical instruction offered by the institute's scheme of technological examination, where a in Belfast advantage has been taken of it, and the establishment there of a technical school for instruction in the weaving and dyeing of linen and in mechanical engineering is largely due to its action.

*Central Institution*.—The Central Institution, which is not yet opened, is intended by the institute to fulfil functions resembling those of the great polytechnic schools of the continent. Your commissioners have examined the 'proposed scheme of instruction embodied in the report of the institute, and they have also inspected the building, which is nearly complete. They consider that, as the number of technical classes and technical schools increases, as it is like] v to do, the want of such an institution as that in Exhibition road for the training of teachers will be more and more felt. It will be of great advantage as a technical high school for the metropolis, which is in tact one of our great, st industrial centres. It is intended to afford additional facilities for the prosecution of original research in science. In order, however, that the institution may effect the purpose for which it is intended, it should be well endowed, both for the provision of adequate special instruction and also for the establishment of exhibitions to defray the cast of maintenance of poor students while purshing their studies. Without expressing any positive opinion as to the amount required for this purpose, your commissioners fear that the annual sum at present subscribed by their livery companies is inadequate to the future requirements of the institution.

*Finsbury technical College*.—As regards the Finsbury Technical College, your commissioners believe that the evening classes connected with it are giving valuable technical instruction, such as is greatly needed by the artisans of the district in which the school is situated. The practical laboratory instruction in the applications of electricity to trade purposes is worthy of special mention.

The Program of the day school is well devised, and the offer of scholarships to the principal middle class schools of the metropolis, when enable select there-from to continue their education at the Finsbury College, is a good feature in the scheme. Considering the want that is generally felt of good trade schools into which promising pupils from the upper standards of the public elementary schools may be drafted, your commissioners are of opinion that a more intimate connection of the day department of the Finsbury Technical College with the elementary would also be desirable.

We think that similar trade schools, in which the curriculum consists mainly of practical science teaching, work-hop instruction, drawing, and modern languages, might with advantage be established in other parts of London.

*South London Technical Art School*.—Your commissioners examined with great interest the work of the South London Technical Art School. The teaching of this school has had a direct bearing upon the important manufacturing works of Messrs. Doulton, and in few cases have we been able more definitely to ascertain the extent to which technical instruction has benefited a local industry. In many other branches besides that of the manufacture and painting of pottery, the teaching of design in connection with the material to which it is to be applied would be undoubtedly advantageous. In this school practical instruction is also given in wood engraving, and a class is about to be formed in enamelling; the City and Guilds of London Institute might usefully extend this kind of teaching in other directions.

*Technological classes in the country*.—By means of the institute's scheme of technological examinations, classes have been formed in all the large manufacturing towns, in which the instruction is more specialized, according to the requirements of persons engaged in different industries, than has been thought desirable in the state-aided classes which are held under the direction of the Science and Art Department. It will be seen by the collection of letters from eminent manufacturers, that classes of the former kind are greatly valued and regarded as deserving of continued encouragement.

The regulation of the institute which restricts the payment on results to the case of candidates engaged in the industries to which the examination refers, is a good one; and the introduction of practical tests and the importance which the institute attaches to preliminary science knowledge and to skill in drawing are to be commended. From the rapid increase in the number of candidates for these examinations during the last four years (the number in 1879 having been 202. and in 1853, 2,397), it may be assumed that, as they become more generally known, that number will still further increase, and that much larger funds will be required in payment to teachers on results.

We consider that the institute has rendered efficient service to technical education by means of the contributions it has given to the establishment of technical schools in the great centres of manufacturing industry, where they are even more necessary than in the metropolis. The institute appears to have distributed its grants with judgment and discretion, and in many cases, notably in Nottingham, Manchester, Sheffield, and Leicester, its contributions have had the effect of stimulating local effort in the establishment of new technical classes.

Your commissioners are able generally to indorse the several schemes of technical instruction now in operation or about to be carried on by the City and Guilds of London Institute, and in view of the efficient and permanent working of these schemes we should be glad to sec the funds of the institute made fully adequate to the efficient carrying out of the objects it has in view, which, in our opinion, is not yet the case. We think it is of importance that the grants made by the contributing livery companies should be placed upon a permanent basis.

## Technical Instruction in Ireland.

While the preceding remarks apply to the United Kingdom as a whole, including those portions of Ireland, and more especially of the province of Ulster, in which the factory system is folly developed, other portions of the latter country require to be separately considered. In saying this we refer more particularly to the poor and remote districts of the west.

*Dublin*.—Before proceeding to this part of the subject, however, we would refer very shortly to the question of technical instruction suitable for foremen and workmen in Dublin. While science and art classes, many of them very successful, are to be found in several of the important towns of Ireland, there are scarcely any science classes at work in Dublin. Various reasons were assigned to us for this state of things, some of them of a kind into which it is not expedient that we should enter. At the same time, there is in Dublin the Royal College of Science, with a staff of competent professors an admirable technical museum, and laboratories fairly well equipped for practical work. It appears from the evidence that, of the small number of students who follow a complete course of instruction in this institution, about one-half are Englishmen, holders of the royal exhibitions of the Science and Art Department, scarcely any of whom become teachers of science in Ireland. There are no short summer courses at the college, like those at the normal school at South Kensington, for the instruction of science teachers. There are, we are aware, some courses of evening lectures, but, although the laboratories of the college are the only ones in Dublin available for practical evening instruction, such instruction in science and in mechanical drawing terms no part of the arrangements of the college. It appears that by the rules of the Science and Art Department the professors of the college cannot earn grants on the results of instruction in science, as would he the case if they were ordinary science teachers We are of opinion that so long as the effective work of the college in preparing associate students, is, and more particularly Irish students, is so limited in area as at present, evening classes with practical laboratory work should form a part of the regular college courses, and that the remuneration of the professors should depend in part on the success, or at any rate on the regular attendance, of students at such classes.

*Irish intermediate schools*.—We would also remark that we have received evidence of a very contradictory nature as to the teaching of science in the Irish intermediate schools. We believe, however, that it is engaging the attention of the board of intermediate education, and we only deem it necessary to state in reference to this subject that efficient instruction in science will not be possible in those schools unless they are provided with proper laboratories, which in most if not in all of them are at present entirely wanting.

But the most import ant part of our task with regard to Ireland is to consider the possibility of improving the industrial conditions of the poor and remote districts of the west by means of technical education.

*Books used in Irish national schools*.—By the courtesy of Sir Patrick Keenan, k. C. M. G., the resident commissioner of national education in Ireland, your commissioners have been furnished with what they understood to be a complete set of the books used in the Irish national schools. They find that these hooks art well adapted for the literary instruction of the children of various ages in those schools, and that they contain much interesting information on the natural features and resources of Ireland. But, except as to agriculture, they do not afford adequate assistance towards graduated instruction in industrial processes or in the rudiments of the sciences on which those processes are founded. As the Irish national education commissioners are by their regulations mainly responsible for the selection of the books used in the schools, this defect should receive their early attention.

*Home industries and manual dexterity of Irish people*.—There is a general consensus of opinion on the part Of persons of all ranks in that country, whatever may he their views on other subjects, that the prosperity of the poorer districts of Ireland may be greatly promoted by technical instruction in handicraft and in borne industries. There is a conviction not less general, and it is one which our visits have fully confirmed in our minds, that the children and voting people of Inland of the laboring class possess great manual dexterity and aptitude, which only require to be developed in order to be useful to themselves and to those among whom tiny live. As evidence of this we need only to refer to the remarkable success of the Christian Brothers and to that of the ladies of religious orders in training children and young persons for handicrafts in industrial schools and institutions of a like nature. There appears to be no reason why similar instruction to that which is given in these schools should not be given elsewhere if the necessary funds and teachers are forthcoming. We have shown that instruction of this kind given on the continent to persons in remote districts, who would otherwise be idle, has added materially to their resources, both directly and by training them for employment in larger industrial concerns, and we have ascertained that no great expenditure of public money has been required in order to produce these effects.

Not only is instruction of this kind to be desirable, but we have found that there is a willingness on the part of benevolent persons in Ireland to assist its promotion by subscription and in other ways. It is true that by some it has been proposed that the government should itself initiate, if it did not entirely charge itself with, this work, but we were happy to find there were others who would be quite satisfied if its utility the imprimatur of the government and if the state offered rewards for the ascertained result of instruction of this kind. We are of opinion that successful work of this nature, whether it be conducted by individuals or societies or by religious bodies, deserves the recognition and reward of the government. We think it no part of our duty to state which are the home industries best adapted to the conditions of different parts of Ireland. Each locality will be able to form its own judgment in regards to this, and due weight should be given by the government to such local expression of opinion, payment in all cases being dependent upon the result obtained in the schools or classes. We do not think it would be possible for the government to train teachers for a variety of home industries, but it might contribute to the payment of such teachers appointed by the localities, and it would be expedient to established a class of itinerant teachers for service in districts where resident instructors cannot be maintained.

These suggestions apply even in greater degree to the instruction of girls that of boys.

*Instruction in the use of tools in Irish primary schools*.—We need scareely point out that, if it be deemed desirable to introduce manual instruction in the use of tools in elementary schools at all, this would apply in an eminent degree to the primary schools of Ireland. It was stated in evidence before us that in some parts Irealand ordinary handicrafts, like those of the mason, have heroine absolutely extinct. Whether the children remain in their own immediate localities or migrate to other parts of the country or emigrate to our colonies or to foreign countries, such instruction leading up to their apprenticeship as skilled laborers, instead of their fulfilling, as is now too much the case, the part of mere hewers of wood and drawers of water, would he of the greatest value to them. We are happy to find that the authorities of the national board of education in Ireland appreciate the importance of introducing instruction in manual work into their schools. They have already begun to give instruction of this kind to some few of their teachers, with a view to quality them for imparting it to the children in the schools: hut, in order that this instruction may be satisfactory, it is important that the training of the teachers themselves should be systematic and thorough; and, obvious as this might appear to be, we do not hesitate to impress it upon the minds of the authorities of the national hoard. Until the teachers are able them salves to give the instruction, it might be given by skilled and intelligent artisans. We have reason to believe that, whenever efficient teachers can he found, the national hoard will he prepared to pay for the results of manual teaching in the primary schools. It is scarcely necessary to say that our statement with regard to drawing, in reference to schools generally, applies with equal force to the Irish schools. We may remark that the progress of children in learning home trades will ho much more satisfactory if they have been trained at school in the use of the ordinary tools for working in wood and iron and in drawing.

We shall deal with instruction in agriculture in Ireland in the succeeding subsection, in which we review the separate report of Mr. Jenkins and the evidence which we personally received in Ireland on that special branch of the subject.

*Compulsory attendance in Irish primary schools*.—While dealing with Irish education, we cannot refrain from expressing our satisfaction at having found that public opinion among all classes in Ireland is in favor of some measure for gradually making primary education in that country compulsory. The subject is one surrounded with difficulties of a nature which appear to us to place the discussion of its details beyond the scope of our commission. We consider, however, that we should not do our duty if we did not express our decided opinion that no marked progress in the direction of technical education can be effected in Ireland until primary education in that country has been placed on a proper footing.

## Agricultural Education.

As stated at the commencement of this report, your commissioners did not think that an inquiry into the instruction of the industrial classes would be complete unless it included some notice of the instruction of the large and important class of agriculturists.

We were unable ourselves to conduct this branch of the inquiry, except partially in regard to Ireland, but we trust that those who read the report on agricultural education of our subcommissioner, Mr. H. M. Jenkins, the secretary of the Royal Agricultural Society of England, submitted herewith, will think that we have been well advised in placing the inquiry in his hands. As supplementary to his report, your commissioners refer to the Irish evidence in the appendix and to the narrative of their visits to the Royal Albert College, at Glasnevin, to the Munster Dairy School, and to parts of the south and west of Inland. We have not inquired into the state of agriculture, as an art, abroad and at home; to have done this would have lengthened the inquiry beyond measure, and it was the less needed, as this branch of the question has been incidentally treated in the recent report of the royal commission on agriculture. It will, however, he seen from the report of our subcominissioner that those best able to form an opinion attribute a great and beneficial influence upon the progress of agriculture to the agricultural schools of various grades of the continent, and more especially to those like Hohenheim and Grignon, in which practice is combined with scientific teaching.

At a time like the present, when cheap railway and water conveyance of agricultural products from distant countries has completely changed the economical conditions of successful agriculture in Great Britain, it is of the greatest importance that those who are interested in the cultivation of the soil, whether as proprietors or as tanners, should not simply he familiar with existing practices at home, important as is such a familiarity, but that they should understand also the reasons which have caused these practices to prevail, in order to he able to decide to what extent they should continue to be pursued. They should likewise be acquainted with the nature and mode of cultivation of crops, the rearing and feeding of cattle, and the dairy practice of other countries.

The practice of growing beet roots for the manufacture of sugar has been attended with most beneficial changes in continental agriculture. This cultivation is carried on in countries varying remarkably in the conditions of climate in regard to heat and moisture. Should the recovery of ammonia in the manufacture of coke and from the raw coal used in the blast-furnace be attended with the success which there is every reason to anticipate, the cheapening of nitrogenous immures may indicate some considerable changes in the agricultural practice of our own country.

*Higher aqricultural schools*.—To impart knowledge of this description is the proper function of the agricultural school. In Great Britain the agricultural department of the normal school of South Kensington, the Royal Agricultural College of Cirencester, and the College of Dnwnton are the only institutions for higher agricultural education, the former principally for training teachers, the two latter for the education of land owners, land agents, and farmers. The first of these has been so short a time in existence that no definite judgment of its results can be formed by the test of practical successor failure. But we agree with our subcomissionerin thinking that the complete course of four years at the normal school is inconveniently and unnecessarily long, that at least all students who propose to become associates should on entrance prove that they possess the amount of practical knowledge of agriculture which can be acquired by a year's residence on a farm, and that visits to farms and factories connected with agriculture during the recess should be encouraged and rewarded by scholarships to those who have profited by them. Our subcommissioner considers that colleges like those of Cirencester and Dowuton do not require " propping" by the state, but taht scholarships tenable at those colleges might be given by the government to deserving students in the agricultural divisions of county schools.

*Secondary agricultural schools*.—These agricultural divisions which are intended by our subcommissioner to provide secondary agricultural instruction have still to he created. Mr. Jenkins proposes that farms should be attached to county schools, in which the pupils in the higher forms should be taught the principles and practice of farming and should take part in farming operations and the management of stock. The experience of schools of this kind on the continent and of some Isolated attempts in this country shows that they cannot be self supporting. He proposes that the locality (the county) should equip the school and, we suppose, the farm attached to it, and that the government should contribute as liberally to the buildings as to those of schools of science. We can see no objection to the latter proposal, and we approve of the suggestion that the governing bodies of counties should have the power of establishing and maintaining agricultural schools or contributing there to under proper conditions; we should be glad to see this power conferred on them by the proposed measure for reorganizing county government. But it would also appear to us that an active participation in the encouragement of secondary agricultural schools would bean object well worthy of our great national agricultural societies. Their funds have hitherto been devoted mainly to the encouragement by premiums of improvements in cattle breeding and in agricultural machinery. The commercial demand for animals of a high class and for implements of the best construction is now so great that any other than an honorary recognition of merit seems to be no longer required; and, if a portion only of the money now distributed in prizes were offered in aid of local subscriptions for the addition of an agricultural department to the existing and in many cases nourishing county schools, it is probable that sO desirable an experiment as that proposed by our subcommissioner would very soon be carried into effect.

We are aware that the fact of the number of competitors for the Royal Agricultural Society's junior scholarships having been small may not encourage that great society to increase its efforts in the direction of agricultural education, but we believe with Mr. Jenkins that the fault lies in a great measure with the want of competent teachers, a want which is now in the course of being supplied by the Normal School of Science and otherwise. With respect to the classes in the " principles of agriculture" in connection with the Science and Art Department, which properly come under the head of secondary instruction, Mr. Jenkins is of opinion that " the attempt to teach the principles of a subject without first teaching its facts and phenomena is very much like trying to build an actual castle in the air." We quite agree in this opinion, and we consider it essential, even if it should involve some change in the program of the department, that the examiners should so arrange their questions as to ascertain as far as possible from his replies that the student is acquainted with facts to which the principles are applicable, just as in chemistry, for instance, the examiner would not be satisfied with a mere knowledge of the laws affecting the combinations of chemical elements and compounds, but would expect the student to be acquainted with the nature and properties of the substances entering into combination. Unfortunately, there is not the same room for a practical examination in agriculture as that which is now very properly required by the department in other sciences. On the whole it may be expected that young men following the profession of farmers and acquainted with farming practice will derive advantage from the classes in the theory of agriculture which are held in county towns.

*Farm apprentice schools*.—Of our subcomnissioner's suggestions in regard to lower agricultural education in Great Britain, that which recommends the apprenticeship of youths to selected farmers is very important if it can he carried out. There can be no doubt that, if competent farmers can be found willing to receive boys and girls as apprentices (the girls in the dairy), and to allow a part of their time to he spent in continuing their school instruction, us is suggested by Mr. Jenkins, there could be no better training for the pupils. The French fermes-ecoles and German Acker-bauschulon are examples of this kind of training.

*Instruction in agriculture in rural elementary schools*.—His recommendations in reference to elementary schools in rural districts are more definite. We agree with him in thinking that instruction in the theory and practice of agriculture should, in Great Britain, as it already does in Ireland, after suitable introductory object lessons, form in the upper standards a part of the ordinary elementary subjects of rural schools, and should not he relegated to "class subjects;" and that, if time cannot otherwise be found for them, which we scarcely anticipate, some of the elementary subjects, such as the higher branches of arithmetic, should be transferred from the former to the latter category; and, further, that encouragement should be given, by way of grants, to practical work on plots of land attached to such schools. One good result of this would probably be that children, taking a more intelligent interest in farm work, would be less anxious to migrate from the country into the larger towns.

It is probable that, if a demand existed for a practical knowledge of agriculture on the part of teachers in rural schools, some of the farmers' sons who at present unhealthily increase the competition for farms would qualify themselves to become elementary teachers.

*Agricultural education in Ireland*.—The subject of agricultural education, which is of national interest in Great Britain, is a question of life and death for Ireland. We are happy to find that this is thoroughly felt both by the government and by the people. There is progress in all directions. The Albert Agricultural Institution at Glasnevin, near Dublin, no longer confines itself to the instruction of young men who intend to become farmers or land agents, but is training teachers who will disseminate a knowledge of sound theory and likewise of successful practice throughout Ireland; for the Glasnevin farms, the 6-acre as well as the 100-acre, are pecuniarily successful. The Minister Agricultural and Dairy School, especially its dairy department, as will appear from the evidence given before us, is ascertained and acknowledged by all classes to be rendering eminent service to the farmers of the county of Cork. Every elementary teacher in Ireland is required to pass an examination in agriculture, and the science and practice of agriculture are taught, to all boys in the three upper standards (or classes, as they are called in Ireland) of all rural schools. Last year nearly 45,000 boys were examined in this subject. Small farms are attached to some of these schools, and special grants are made for proficiency in practical agriculture as tested on those farms. What is most encouraging is that the authorities of the national board themselves are not satisfied with what is being done. They are anxious that more encouragement should be given to the patrons of schools to furnish them with small example farms; they admit that when this is done results cannot be effectively gauged by their single agricultural inspector, Mr. Carroll, in addition to his duties as head of the Glasnevin institution. Your commissioners believe that the board would gladly see the successful experiment of the Cork Dairy School repeated in other parts of Ireland, each such school being established, as at Cork, by local effort, conducted by local managers in accordance with the wants of the locality, and supported in part by local subscriptions. Your commissioners trust that the treasury would see its way clear to encourage and aid such schools by giants out of imperial funds.

The evidence shows that the members of some boards of guardians are not satisfied with the prevailing absence of agricultural instruction for the children in the Irish workhouses. They desire that the plots of laud attached to the workhouses should be more generally used than they now are, for this instruction.

At the same time the faults of the past are acknowledged. It was stated in evidence before us that the failure to introduce the cultivation of flax in the south of Ireland was due in a great measure to the ignorance of the instructors and to their having persuaded the people to grow it on unsuitable land, with the result of stunted crops, badly prepared, and scarcely fit for the commonest tissues.

That some of the instructors were ignorant we cannot doubt; but the example of Flanders and other countries shows that flax can be grown on the poorest soils, provided that they are liberally manured and receive such painstaking and assiduous cultivation as the peasants of those countries bestow on them. Failures, however, like that of flax culture in the south of Ireland will induce the promoters of agricultural education in that country to proceed with caution, and not to raise a prejudice against it by schemes for which the teachers are not qualified and the learners are not ripe.

# Kensington Local Examinations.

# Class List

*[unclear: names]* *of Successful Pupils at the Midsummer Examinations and Exhibitions*, 1886.

## Boys.

## Senior Division.

## Junior Division.

## Preliminary Division.

## Part Certificates.

## Special Certificates.

## Senior Division.

## Junior Division.

## Preliminary Division.

## Exhibitions.

**Oil Painting.**

**Water Colours.**

**Drawing.**

**Maps.**

**Practical Music.**

**Senior Division.**

**Junior Division.**

**Preliminary Division.**

**Girls.**

**Senior Division.**

**Junior Division.**

**Preliminary Division.**

**Part Certificates.**

**Special Certificates.**

**Senior Division.**

**Junior Division.**

**Preliminary Division.**

**Exhibitions.**

**Girls.**

**Oil Painting.**

**Plaques.**

## Water Colours.

## Drawings

## Maps.

## Needlework.

## Practical Music.

## Senior Division.

## Junior Division.

## Preliminary Division.

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