AGRICULTURAL EDUCATION

REPORT

of a Deputation appointed by the Council of University College, Reading, to visit selected centres of agricultural education and research in Canada and in the United States.

Reading
Published by University College,
1910.

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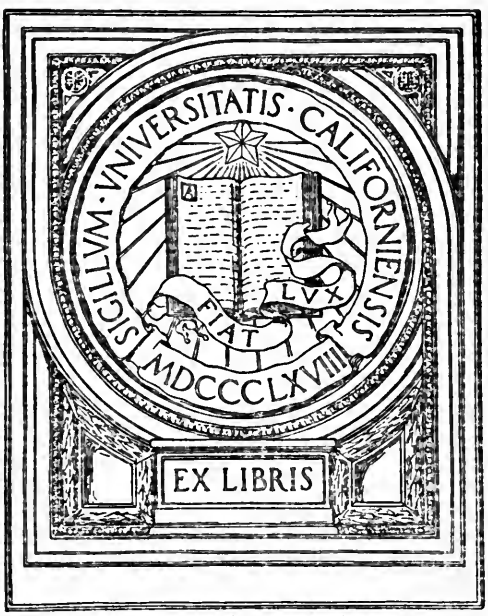

THE PROBLEM OF AGRICULTURAL EDUCATION IN AMERICA AND IN ENGLAND WITH SPECIAL REFERENCE TO A POLICY OF DEVELOPING THE WORK CARRIED ON IN HIGHER AGRICULTURAL AND HORTICULTURAL EDUCATION AT UNIVERSITY COLLEGE, READING, AND IN CONNEXION WITH THE COUNTIES WHICH CONTRIBUTE TO ITS SUPPORT.

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CONTENTS.

Introductory Note.

The Council of University College, Reading, desire to state that the sending of a Deputation on their behalf to the Universities of Canada and of the United States was made possible owing to an offer on the part of two of their members, Mr. Leonard Sutton and Mr. Alfred Palmer, who most generously undertook to defray jointly all expenses in connexion with the tour.

The drafting of the following Report was undertaken by Principal Childs, and carried out by him in consultation with the other members of the Deputation, whose observations and unanimous views it embodies. The Report has been presented to the Council of University College, and is now printed and published by their direction.

J. Herbert Benyon,
President of University College, Reading.

Owen Ridley,
Chairman of Council.

November 22nd, 1910.

REPORT of the Deputation appointed by the Council of University College, Reading, to visit Universities of Canada and of the United States of America.

Appointment, Purpose, and Composition of the Deputation.

On March 22, 1910, the Council of University College, Reading, passed the following Resolution:

"That a Deputation from this Council and College be hereby constituted and appointed with authority to visit during May and June, 1910, selected centres of agricultural education and research in the United States and Canada with the object of collecting information, to be presented in a report and in other ways, such as may be of use in developing the efficiency of agricultural and horticultural education and research; and that the Deputation be also requested to investigate, as may be convenient, and report upon any other aspects of University and College development which may appear deserving of note."

The members of the Deputation appointed in accordance with this Resolution were:

Mr. Leonard Sutton, J.P. Member of the Council of University College, Reading; member of the Firm of Sutton & Sons, Reading; member of the Royal Agricultural College, Cirencester; Fellow of the Linnæan Society; and member of the Town Council of the County Borough of Reading.

Mr. E. D. Mansfield, M.A. Trinity College, Oxford, J.P. Member of the Council of University College, Reading; member of the Berkshire County Council; and Chairman of the Berkshire Higher Education Committee.

Principal W. M. Childs, M.A. Keble College, Oxford. Member of the Council of University College, Reading; member of the Education Committees for Reading, Berkshire, and Hampshire.

Professor Frederick Keeble, M.A., Sc.D. Caius College, Cambridge. Member of the Council of University College, Reading; Dean of the Faculty of Science; and Editor of "The Gardeners' Chronicle."

Mr. R. V. O. Hart-Synnot, D.S.O., B.Sc. London. Director of the Department of Agriculture and Horticulture, University College, Reading; and member of the Advisory Board for Agricultural Education, Berkshire Education Committee.

Plan and Scope of Tour.

The Deputation landed at Quebec on May 13, 1910, and sailed from New York on June 11. The duration of the stay in America being thus limited, it would clearly have been unwise to attempt many visits of inspection. Only a few institutions therefore, were visited, and these were chosen because of their high reputation, particularly in lines of work relating to the special mission of the Deputation. Even so, we, the

members of the Deputation, desire to guard ourselves at the outset against possible misconception. We do not attempt in the following pages to present the reader with a sufficient or final estimate of the activities of any single institution. The range of Canadian and American Universities is so wide and various, that not only does each carry on many branches of work which we had no opportunity to consider, but even the selected aspects and departments studied with all the energy at our command are far too extensive and elaborate to admit of our claiming to treat them with completeness. For example, any attempt to describe exhaustively the buildings which we inspected would fill many hundreds of pages. We must be content to offer here only a selection of facts and considerations, calling attention more especially to those which seem to us to have interest and value for English readers. We hope also that our anxious care to avoid error and misrepresentation has not been in vain.

The following institutions in Canada were visited in the order named : the McGill University, Montreal, and the associated Macdonald College, St. Anne de Bellevue ; the Central Experimental Farm, Ottawa ; the Ontario Agricultural College, Guelph. A brief visit of inspection was also paid to the University of Toronto.

The following institutions in the United States were visited : Cornell University (including the New York State College of Agriculture) ; and Wisconsin University, (including the College of Agriculture). A short visit was also paid to Harvard University, and an unofficial visit to Yale University.

Both in Canada and in the United States the Deputation had the advantage of numerous interviews with representative persons and officials other than those met at Universities. Several visits to special farms, gardens, &c., were also paid.

Acknowledgments.

We wish to acknowledge with the most cordial appreciation the hospitality and courtesy with which we were invariably received. The task entrusted to us, though deeply interesting, was in a high degree arduous, and it would indeed have been attempted in vain without the sympathetic co-operation of the institutions visited. We were met everywhere by a frank and friendly desire to place us in possession of the facts, and to facilitate our enquiries in every possible way. We were repeatedly indebted to the Presidents of the Universities visited, and to Professors and Lecturers, for personal courtesies which added greatly not only to the fruitfulness but to the pleasure of our tour. In Canada the Deputation had the good fortune to secure the kind interest and support of His Excellency the Governor General, Lord Grey ; and our thanks are especially due to him for all his exertions on our behalf. In the United States our chief visit was to Cornell University, and we retain very pleasant memories of marked courtesies and attentions which we received at the hands of President Schurman, and of the Acting Director of the College of Agriculture, Professor Webber.

Scheme of the Report.

In accordance with the Resolution quoted above, constituting the Deputation, we have arranged the contents of our Report in the following order :—

Part I. Agriculture.

A. Notes on Institutions visited and on inquiries made in Canada and the United States :—

i. The Macdonald College, St. Anne de Bellevue.
ii. The Central Experimental Farm, Ottawa.
iii. The Ontario Agricultural College, Guelph.
iv. The Agricultural Policy of the Government of Ontario.

v. Cornell University (including the New York State College of Agriculture).
vi. Wisconsin University (including the College of Agriculture).

B. Observations upon Agricultural Education in America and in England :—

i. Introductory.
ii. Differences in the conditions of agricultural education in England and in America.
iii. The Department of Agriculture and Horticulture at University College, Reading.
iv. Questions of Internal Policy.
v. Questions of External Policy.
vi. Summary of suggestions, and concluding remarks.

Part II. Other Aspects of University Development.

A. Note on Libraries.
B. Note on the Teaching of Domestic Science to Women in Canada.
C. Note on Residence Systems for Students.

PART I. AGRICULTURE.

A.

Notes on Institutions Visited in Canada and in the United States.

1. The Macdonald College, St. Anne de Bellevue.

(1) *General.*

Macdonald College, a new institution, has been founded and endowed at a cost of nearly a million sterling by Sir William Macdonald, one of Canada's greatest educational benefactors. It is not a State institution, and it does not receive State grants of money. Its object is to meet the educational needs of a community mainly rural. Hence it comprises three sections: (1) A School of Agriculture; (2) A School for Teachers; and (3) A School of Household Science for Women. The aim of the College is to provide for Canada through these agencies, "increase of productiveness, with improvement of products in the field and in the industries of the farm and the town, greater comfort and enjoyment in the home, a better taught school for the children, and a nobler sense of the responsibilities of life." (Macdonald College Announcement, 1910-11, p. 7). There is much in this conception and in the organization of the College which is to be attributed to the example of the older agricultural institution at Guelph, Ontario.

The College is incorporated with McGill University, at Montreal, and constitutes its Faculty of Agriculture. Thus Macdonald College Students are eligible for a degree in Agriculture given by McGill University. This association with the neighbouring University was deliberately preferred to autonomy, as tending to assure the character of Macdonald College as a University institution.

The College is situated in the open country, twenty miles west of Montreal, close to the C.P.R. station of St. Anne de Bellevue. The site, which overlooks the Ottawa River, comprises altogether 561 acres. The buildings, which are disposed around an extensive campus,

are of uniform and imposing character. The largest is the Main Building, which includes the training schools for teachers and for household science ; the Women's Residence, which includes the common dining room ; and the Men's Residence. These, however, are merely the massive core of a remarkable assembly of buildings for scientific, agricultural, and residential purposes. The English visitor, indeed, is astonished not only by the spaciousness and completeness of the accommodation provided, and by the perfection and ingenuity of its appliances, but also by the vast initial cost of erection and equipment, and the permanent cost of maintenance. He is not surprised to learn that the resources of the institution are already strained, and indeed unable to provide with commensurate liberality for the legitimate charges of teaching and research. It is necessary to bear in mind that Macdonald College is only now entering upon its fourth year ; that the ideal of its founder, and of those associated with him, has been an ambitious one ; and that some time must elapse before so bold a project can come to fruition, and before full advantage can be taken of the lessons of experience.*

(2) *Buildings and Equipment.*

There is a generous supply of well-equipped laboratories and class-rooms for all branches of agriculture and horticulture, and for the allied sciences. Of special interest is the large museum of agricultural machinery where students are taught the construction of farm implements. This museum, in conjunction with a course of lectures on farm mechanics, forms a most valuable feature in the equipment of the College.

(3) *The Farm.*

The Farm consists of 387 acres worked on a four

*At Montreal, members of the Deputation enjoyed the privilege of a conversation with Sir William Macdonald upon the aims of the College. Their visit to St. Anne's unfortunately coincided with the absence of Principal Robertson (who has since received an important public appointment) in Europe : but they heard much of his distinguished services to Macdonald College and to Canadian education, while the Acting Principal, Dr. F. S. Harrison, most kindly gave them every information on the spot.

course rotation: (1) Roots or Maize (2) Grain (3) Seeds (4) one year's pasture. Signs of good cultivation were abundant, and the luxuriant clover crop, due doubtless to a more thorough working of the soil, contrasted markedly with the poor herbage on some neighbouring fields. Besides the main Farm, there is a horticultural station of 70 acres, of which 20 acres is orchard. There are also about 400 small plots devoted chiefly to cereal breeding.

The Farm buildings will accommodate 100 cows and 180 young stock, 20 horses, 1,000 fowls, and a number of pigs.

The Live Stock at present on the Farm includes: (a) Pigs: Yorkshires, Berkshires and Tamworths. (b) Poultry: Plymouth Rocks, White Wyandottes, White Leghorns, Faverolles, Rhode Island Reds. The fowls live in their colony-houses throughout the winter. They are fed on dry corn, and lay well and keep healthy without the use of any artificial heat. (c) Cattle: the chief feature is the herd of Ayrshires. Dairy Shorthorns and French-Canadians are also kept. The Farm supplies the College with milk and fresh meat, and students are able to learn the methods of slaughtering, and of judging carcases. There is a large pavilion for judging live animals, and the slaughter house is specially equipped for judging the carcases.

(4) *Courses of Instruction.*

Courses of instruction occupy about thirty weeks in a year of two terms, October to December, and January to April or May. The courses may be thus classified :— (a) Short practical courses, of about two weeks' duration, intended for farmers, and farmers' sons. The subjects dealt with include Live Stock and Cereal Husbandry ; and Horticulture and Poultry.

(b) Two Years' Diploma Course, intended primarily for farmers' sons. The first year is devoted to agricultural subjects (with Veterinary Science) and Nature Study ; and to Drawing, History, English and Arithmetic. A course

of physical training is compulsory. During the second year the study of agricultural subjects is continued, while the Nature Study courses are succeeded by instruction in the elements of the agricultural sciences. It is noteworthy that not more pure science is taught than suffices to enable the applied work to be understood. English and general studies are continued. The total number of subjects studied in each of the two years seems excessive. At any given time a student will be attending 16 different lecture courses, and his time table will show from 29 to 34 hours of instruction weekly.

(c) Four Years' Degree Course. Instruction during the first two years is identical with that provided for the Diploma Course. In the third year pure science is entered upon in earnest, full courses being given in Botany, Entomology, Chemistry, and Physics. The agricultural side is represented by Dairy Bacteriology, Forestry, Agricultural History, and Economics; while general studies include English Literature, French, and Trigonometry. A third year student is likely to be pursuing 13 different courses. In the fourth year, however, some specialization is permitted. A student may give special attention to Animal Husbandry, or Cereal Husbandry, or Horticulture; but in any case he will also be receiving instruction in English Literature, French, and Mathematics; and also in Heredity, Agricultural Bacteriology, Plant Diseases, Chemistry of Soils and Fertilisers, Soil Physics, and Climatology. He is further required to work at a thesis on an approved subject.

(5) *Summer Vacation.*

The summer vacation occupies four or five months. Ordinary students are required to work on their home farms. A few selected students are allowed to work on the College Farm, where they receive the current rate of wages.

(6) *Fees.*

1. Tuition Fees. Students resident in the Province of Quebec receive free tuition during their first two

years. In each of the third and fourth years they pay $50. Canadians not residing in the Province of Quebec pay $50 a year, and non-Canadians $100.

2. Residence. Each bed-sitting room is shared by two students. All meals are taken in common hall. The charge for board and lodging amounts to $4 weekly.

In the case of degree students, the cost of tuition and residence for each year of 30 weeks is equivalent to about £34 for local students, and £44 for others. Sundry charges for laboratory materials, laundry, medical attendance, etc., raise these totals to about £40 and £50 respectively.

(7) *Staff.*

The teaching work is divided into the following departments, the staff being indicated in each case :

Departments of Practice.

Cereal Husbandry -	A Professor and a Lecturer.
Animal Husbandry -	,, ,,
Horticulture - -	,, ,,
Poultry - -	A Lecturer.
Farm Management -	,,
Dairying - -	,,

Departments of Science.

Bacteriology - -	A Professor and two Assistants.
Biology - -	A Professor and one Assistant.
Physics - -	,, ,,
Chemistry - -	,, ,,

Zoology and Entomology—A Lecturer.

Other Departments.

Nature Study -	A Professor.
Manual Training -	An Instructor.
Physical Culture -	,,
History and English	A Lecturer.

Total : 15 Departments and a Staff of 23 persons.

(8) *Conditions of Students' Entrance.*

Those desirous of admission to Macdonald College

must : (1) be 17 years of age (2) produce a satisfactory medical certificate as regards health and vaccination (3) produce evidence of having worked upon a farm from seed-time to harvest. In respect of ability, short course students must be able to read and write English acceptably, and must have some knowledge of arithmetic, history, and geography. Candidates for admission to the degree course must pass the McGill University matriculation examination, or an equivalent. Moreover, degree students are not admitted to the third year courses unless their record during the previous two years has been satisfactory.

(9) *Relations with Farmers.*

The very recent institution of the College accounts for the fact that as yet its external activities are only in a preliminary stage.

II. The Central Experimental Farm, Ottawa.

The Experimental Farm at Ottawa was established twenty-five years ago by the Canadian Government, and from that date until now its progress and reputation have been associated with the distinguished services of its Director, Dr. William Saunders, C.M.G., LL.D. The buildings, which are unassuming, are attractively situated in an arboretum of 65 acres. Adjoining this are the horticultural station and the experimental farm, about 400 acres in extent. Financial responsibility is borne by the Dominion Government, and the present annual cost of the institution is about £22,000, but this sum, though inclusive of wages, does not include the stipends of the staff. There are no students; but the staff undertake a heavy burden, greater perhaps than should be placed upon men engaged in research, in dealing with enquiries by correspondence. About 50,000 letters of enquiry are received and answered every year.

The laboratories are not large, but there are excellent farm buildings. The Farm is on sandy soil, but the texture is so fine that, if well compressed, there is no difficulty with drought. The objects of the Farm are to demonstrate the most economical handling of cattle from a business point of view; to carry out experiments in feeding; and to improve the breeds of live stock. The stock kept is considerable. Horses are represented by Clydesdales and Percherons. There are 138 cattle (43 steers and 95 breeding cattle). Shorthorns, Guernseys, Ayrshires, and Canadians are all represented. The cows are kept very clean, and the whole herd is admirably managed. Much attention is paid to methods of feeding. Careful records of all kinds are kept, and their analysis should ultimately yield results of much value. There are about 30 sheep, Shropshires and Leicesters; and 136 pigs, the breeds including Berkshires, Tamworths, and Yorkshires.

The Central Experimental Farm is a State institution, and the staff advise the Government in all questions relating to agriculture. The relations between the Central Farm and the other agricultural institutions of Canada

are less clear. It is obvious that there are many problems of general interest and importance with which the Dominion Government can deal more effectively than any Provincial Government; and the existence of a Central Agricultural Station presupposes some differentiation of agricultural problems into national and local. It is evident that the increasing number and activity of agricultural colleges and institutions in Canada must steadily give importance and urgency to this question of correlation and co-ordination of effort. In the meanwhile the Central Farm at Ottawa is strengthening its hold upon the public by establishing subordinate stations at different points in the vast area of the Dominion. At present, stations of this kind exist in New Brunswick, Prince Edward Island, Manitoba, Saskatchewan, Alberta (2), and British Columbia. Each station has its own staff, but its main activities are under the direction and supervision of an Inspector from the Central Farm at Ottawa. As the system develops, Canada will be provided with a valuable organisation for agricultural investigation, and, if this organisation is appropriately associated with the teaching centres, the prospects of rapid progress are most encouraging.

III. The Ontario Agricultural College, Guelph.

(1) *General.*

The Ontario Agricultural College is situated on the outskirts of the small town of Guelph, about forty miles west of Toronto. Electric cars run between College and town. The College was founded in 1874, by the State of Ontario. It was then realised not only that the mainstay of Canadian prosperity must lie in agriculture, but that only a small minority of farmers were working on sound methods. Most of them at that date depended upon increased acreage for increased returns. Hence, the College was established with two objects: (1) to train young men in the science and art of improved husbandry (2) to conduct experiments and publish the results. In 1904, through the action of Sir William Macdonald, the Macdonald Institute was erected, and the College thus enlarged its scope so as to provide also courses of instruction in Home Economics, chiefly for farmers' daughters, and a training course for teachers of both sexes. Thus at Guelph, as at St. Anne de Bellevue, the broad and generous policy of Sir William Macdonald has made possible an agricultural institution which attacks the rural problem at three fundamental points. Both institutions endeavour to give a training which shall result in better farmers, better wives, and better teachers.

The College at Guelph is affiliated to the University of Toronto, and Guelph students are eligible for the degree in Agriculture granted by that University.

(2) *Finance.*

The College is a State institution and is financed and controlled by the Government of Ontario. The following summary for 1909 conveys an instructive idea of the liberality of the support given to the College:

	Expenditure	Revenue	Net deficiency borne by Government
	$ c.	$ c.	$ c.
The College (including salaries of staff and fees of students and boarding accounts) -	106,078 . 62	30,007 . 31	76,071 . 31
Macdonald Institute and Hall	28,204 . 13	19,074 . 36	9,129 . 77
The Farm -	14,086 . 01	7,048 . 07	7,037 . 94
Experimental Department -	10,026 . 35	120 . 00	9,906 . 35
Dairy Department - -	13,746 . 07	6,955 . 14	6,790 . 93
Poultry - -	4,187 . 63	2,085 . 62	2,102 . 01
Horticulture -	9,052 . 04	104 . 27	8,947 . 77
Mechanical Department -	865 . 98	——	865 . 98
Soil Physics -	1,000 . 00	——	1,000 . 00
Forestry -	1,249 . 58	——	1,249 . 58
	188,496 . 41	65,394 . 77	123,101 . 64

Thus the Government of Ontario subsidises this College to the extent of nearly £25,000 a year. The material return for this outlay may be given in official words as follows:—"The application of scientific principles to the practical operations of the farm, and the interchange and dissemination of the results of experiments conducted at the Agricultural College, and the practical experience on the part of successful farmers, have increased the returns from the farm far in excess of the expenditure on account thereof. The direct gain in yield in one class of grain alone has more than covered the total cost of agricultural education and experimental work in the Province." (Handbook on Women's Institutes, Ontario Department of Agriculture, 1908, pp. 6-7.)

(2) *Buildings and Equipment.*

The College is pleasantly situated on a well-planted campus in the midst of the Farm. The main group of buildings comprises the Macdonald Institute, the Women's hall of residence—a spacious and admirable building—, the building which contains the College headquarters and accommodation for the men's residence, and the chief laboratories, library, museum, &c. The Guelph buildings as a whole lack the imposing character and uniformity of those at St. Anne de Bellevue, but in their air of maturity they possess a distinction which at once strikes the English visitor. According to new world standards, the Guelph College is already old: and inspection of it leaves a satisfactory impression of natural and steady development. Its buildings, which are numerous and are suitably equipped, have been erected as circumstances demanded. Particular attention may be called to the large Machinery Hall where examples of the most modern types of agricultural implements and machines are kept for teaching purposes. In the same Hall is also an interesting nucleus of a collection of bygone agricultural tools, &c., which deserves careful fostering and a room to itself. The Dairy is well-equipped both with hand-and power-machinery. About 80,000 lbs. of butter and 20,000 lbs. of cheese are made annually, the milk being supplied by neighbouring farmers.

(3) *The Farm.*

The Farm consists of about 345 acres, the arable portion being farmed on a four course rotation: (1) Maize or Roots (2) Oats (3) Seeds (4) Wheat (sown in the autumn*). There is some permanent pasture of a coarse character, which in places is very wet. Experimental plots occupy 50 acres, and are chiefly devoted to cereal varieties bred by "selection." There are also a number of alfalfa plots for testing varieties: at present, Turkestan alfalfa gives the best results. Peruvian and Arabian varieties cropped well for a year, but then died out. The

* Spring-sown wheat is found to suffer severely from "rust."

ground devoted to Horticulture consists of 23 acres of orchard and 6 acres of vegetables.

The Farm buildings include a good stock-judging pavilion which will seat 300. There the College herds are judged, and also typical animals from the best farms in Ontario. There is a large cowhouse and a good supply of other buildings for farm purposes.

The Live Stock at present on the Farm includes: (*a*) Pigs. Yorkshires (Large Whites), Berkshires, and Tamworths. (*b*) Poultry. Twenty-five varieties and 15 breeds are kept; 2½ acres are worked under a special poultry rotation: (1) Alfalfa (3—5 years) (2) Maize (3) Grain (4) Grass (5) Grass. The chickens are also put out in the orchards. The Lecturer in charge did not advocate poultry farming as an independent business, but only as supplementary to other kinds of farming, such as fruit-growing. (*c*) Cattle are represented by Shorthorns, Angus, Herefords, Galloways, Holsteins, Ayrshires, and Jerseys. The cows are kept in throughout the winter and are turned out to pasture about mid-June. When placed on seeds pasture they are fed in the morning, before being turned out, in order to prevent over-eating in the field. About an acre per cow is required for the 3½ months (mid-June to the end of September). (*d*) Sheep are represented by Border-Leicesters, Shropshires, and Oxfords.

(4) *Courses of Instruction.*

As at Macdonald College, the courses at Guelph are arranged to occupy 30 weeks divided into two terms, September to December (10 weeks), and January to April or May (14 or 20 weeks). This arrangement enables students to be at home for seed-time, haying, and harvest.

The courses of instruction may be thus classified :—

(a) Short Courses.—Of these there is a variety, such as two weeks' courses in (1) Horticulture, or (2) Stock-judging, and Seed-judging; a four weeks' course in Poultry; a twelve weeks' course in Dairying for the farmer, and a similar course for the factory dairy-

man. It is also possible for students to join the College at any time for practical instruction only, for which the fee charged is nominal. All these short courses are of the usual practical character, and do not seek to attain more than a limited though useful aim.

(b) Two Years' Diploma Course, intended primarily for farmers' sons.—The first year's programme includes agricultural subjects, pure and applied sciences, English, and Arithmetic. Sixteen subjects are dealt with, involving about 26 hours a week. The second year's work is similar ; training in public speaking is added, and a thesis and certain collections must be prepared. Practical work on the farm is compulsory for both years on alternate afternoons throughout the Session. Students are paid for their labour (except for work done during farm classes) at rates varying from 5 to 9 cents per hour: in 1909 the sum thus paid for student labour amounted to £650. Students who have acquitted themselves well during the two years' diploma course and who desire to continue to study some of their second year subjects, are permitted to remain at College for a third year without thereby being obliged to enter upon the four years' course, described below.

(c) Four Years' Degree Course.—Instruction during the first two years is identical with that provided for the Diploma Course. Admission to the degree course is carefully controlled. Thus a student may not enter for it unless he has obtained during his Diploma Course 60 per cent. marks in English, and 50 per cent. in other subjects. Also, he must have spent a period of one year or more, under approved conditions, at the practical work of that branch of agriculture in which he proposes to specialise. If, for example, agriculture itself is the branch selected, the student must have spent at least two years with a practical farmer ; if dairying, then one season must have been spent in a cheese factory and one in a creamery ; if horticulture, then a year's service with a fruit grower or florist is required. The third year's programme for a student who has satisfied these conditions includes eight subjects : four

pure Sciences, Entomology, English, French or German, and Economics. The time-table covers about 30 hours weekly. The year concludes with a six week's course of Nature Study. Before entering upon the fourth year, each student must present a brief report on the principal insect and fungoid pests of his own neighbourhood.

In the fourth year, specialisation is more marked. A candidate selects one of six groups of studies. Each group embraces from seven to eleven subjects, of which English, French or German, and a thesis are always three. Economics is also included in all groups except the Chemical. From one third to one half of the subjects in each group rank as "major subjects," and for these the percentage of pass marks is higher than for the rest.

(5) *Fees.*

Ontario students pay inclusive fees of about $120 (£24) for each of the first two years, and $150 (£30) for each of the second two years. Canadians other than Ontario residents pay about £30, and all other students pay about £35. The charges for tuition vary in individual cases, but all students pay $3 a week for board. Ontario residents are admitted to the Short Courses without fee, but other persons pay $5.

(6) *Staff.*

The Staff of Professors, Lecturers, and Instructors numbers about fifty. There are naturally wide differences in calibre and standing. It would appear also that teaching duties, and the work of carrying out demonstrations for the great number of visitors annually received, are very absorbing, and trench somewhat upon leisure and opportunity for experiments and research.

(7) *Conditions of Students' Entrance.*

Those desirous of admission to the Guelph College must: (1) Be 16 years of age (2) Produce evidence as to character, and as to seriousness of purpose in seeking admission to the College (3) Produce a satisfactory health certificate (4) Have spent a year on a farm, and possess a fair practical knowledge of farm work (5) Pass

an entrance examination in Arithmetic, Geography, and English. (This examination is not a condition of entrance to courses of less duration than one year).

(8) *Number of Students.*

The statistics for 1909 are :—

Diploma and Degree Courses - - -	439
Dairy Courses - - - - -	36
Short Course in Stock and Seed Judging - -	207
„ „ „ Poultry - - -	15
„ „ „ Horticulture - - -	54
Special Students - - - -	15
Teachers' Courses - - - -	134
Domestic Science - - - -	314
Nature Study, &c. - - - -	84
Total -	1,298

(9) *Stock Judging Competition.*

An interesting point, and one deserving of attention in England, is that every year the College sends a team of five fourth-year students to take part in an inter-Collegiate stock-judging competition at Chicago.

(10) *Relations with Farmers.*

Prior to his appointment as head of the Guelph College in 1904, President Creelman had been Superintendent of Farmers' Institutes, and had founded the parallel Institutes for Women. His personal influence, therefore, is doubtless a main reason for the strong hold which the College at Guelph has upon the public interest, and particularly upon farmers. Guelph, in fact, impresses the visitor not so much through its teaching energy, though this is striking, nor through its research activities, though these deserve attention, as through its effectiveness as an instrument of public and national policy. Whatever the means employed, its single aim under State direction is to convey knowledge of improved methods of agriculture to the farmers of Ontario and Canada. It brings to the farmer's door the latest discoveries of agricultural science,

whether made at Guelph, Ottawa, or elsewhere. Its function in short is to be the aggressive distributor of the best ideas and methods; and no part of its organisation is more deserving of study by the English visitor than this. Some account will be given on a later page of the extension methods employed in Canada by the Dominion and State Governments, and further reference will then be made to Guelph. It will, however, be convenient to mention here the four principal ways in which the College maintains contact with the farmers:—(1) By arranging numerous excursions from various districts in order to inspect the College and its Farm during the month of June. The railway and the electric cars bring the visitors to the College doors: they go where they please about the Farm and buildings; demonstrations are organised for their instruction; and the State provides a simple lunch. The popularity of these visits is demonstrated by the numbers taking part in them, and their scale is indeed far beyond any English parallel. We were informed that, during June, 1910, visits were expected from more than 40,000 farmers. (2) By the Experimental Union, chiefly composed of old students of the College. The Experimental Union was established in 1885; and in 1909 about 400 of its members, widely distributed throughout the Province of Ontario, were carrying out, jointly, carefully planned experiments in Agriculture, Horticulture, Forestry, and Poultry-keeping. Between 1886 and 1909, the number of co-operative experiments conducted was 54,345. "In Agriculture alone definite experimental work was conducted on measured plots on no less than 4,853 farms in 1909." "It is impossible to estimate the influence of the co-operative experiments in Ontario in bringing 25,000 to 30,000 farmers to visit the College annually, in overflowing the College with students, in doubling the output of Ontario farms during the past sixteen years, and in the betterment both of the farmers and the farms of Ontario." (See Report of Ontario of Agricultural and Experimental Union, 1909, pp. 9-10, etc.) (3) By the system of appointing College graduates

as county specialists. The mission of these specialists is to win the confidence of the district farmers. The specialist organises farmers' clubs; he advises the farmers, when opportunity occurs, upon technical matters, such as drainage, pests, tuberculosis, etc.; he places him in touch with the College. Further the specialist is attached to the local high school, and he teaches there on certain afternoons of each week. About eleven of these College missionaries have already been appointed. The scheme promises well, and it is hoped that in time a College specialist will be found in every county town. The system is analogous to that of the County Instructors in England and Ireland, with the noteworthy and far-reaching difference that in Canada the local instructor is in close association with an agricultural institution of the first standing as his head-quarters. (4) By publishing and distributing bulletins and leaflets on agricultural practice, by answering enquiries by correspondence, by sending members of the Staff to address farmers' clubs and similar institutions, and by analysing and reporting upon samples submitted by farmers to the College laboratories.

IV. The Agricultural Policy of the Government of Ontario.

Two members of the Deputation had the advantage of an interview at Toronto with Mr. James, Deputy Minister for Agriculture in the Province of Ontario. Mr. James explained the methods adopted by the Ontario Government in dealing with the rural problem. That there is a rural problem in Canada, as in older countries, is shown by the surprising fact, instanced by Mr. James, that in the State of Ontario, notwithstanding its agricultural celebrity, there are fewer farmers to-day than there were ten years ago. He attributed the drift into the towns to two main causes: the greater opportunities of making wealth rapidly, and their superior social attractiveness. Complaints are often heard of the dullness of village life in England; but in Canada organised village life hardly exists. Population is thinly scattered over great areas; and opportunities of social intercourse are few. Take, for example, the case of the farmers' wife. Mr. James remarked that even the widespread interest in religion in rural Canada severs as well as unites, for the religious organisations are sharply distinct. He had been told, for instance, by a farmer's wife that the only occasion which brought the women of any large district together with a common purpose was a funeral. Sir Horace Plunkett's maxim that better living is as much a condition of rural prosperity as better business is strongly enforced by experience in Ontario. The Department of Agriculture has, therefore, boldly faced the whole question, in both its economic and its social aspects. The annual budget of the Department exceeds £150,000 a year: and nine principal agencies are brought to bear upon the problem of rural betterment. These agencies are :—

1. *The Guelph College of Agriculture.*

This—the pioneer effort of the present agricultural policy—has already been fully described. Guelph is the capital centre for teaching, for experiment, for expert knowledge, and for constructive ideas. From Guelph go

forth to the country the trained farmer, the trained rural teacher, and the trained housewife. Guelph is a magazine of expert knowledge and a factory of profitable ideas for application, directly at the service of the Government, and kept in sympathetic contact with the farming public of the Provinces by numberless personal threads. It is worth observing that Guelph could not render these services if its spirit were one of cold academic aloofness and superiority, or if it were in bondage to an official routine. The spirit of Guelph is the opposite of these things, as a day spent there in the society of President Creelman and his colleagues will assuredly testify. Guelph is an interesting example of an institution which on the one hand is affiliated to a University (Toronto), and controlled by the State, and on the other preserves cordial and sympathetic relations with the general public, and continues to exhibit a lively vitality of its own.

2. *The Veterinary College.*

The Ontario Veterinary College maintains two-year and three-year courses in Veterinary science ; and under certain conditions students of the College are eligible for the degree of Bachelor of Veterinary Science awarded by Toronto University.

3. *Agricultural and Horticultural Societies.*

The agricultural societies are, of course, found in the rural districts, while the horticultural societies flourish chiefly in the neighbourhood of towns. A Superintendent supervises these societies, and organises meetings, shows, and exhibitions of produce.

4. *Live Stock Branch.*

Live Stock (apart from Dairying) is so important an interest that societies are formed in reference to it alone, and a special Superintendent is appointed to attend to their interests. Horse shows, sales of cattle, etc., are arranged.

5. *Dairy Branch.*

A Superintendent looks after this branch also. He

supervises the Dairy School at Kingston in eastern Ontario. Associated with him are 30 inspectors who visit cheese factories and creameries, and supervise their sanitary conditions and general methods of work.

6. *Fruit Branch.*

Fruit is an important branch of Ontario agriculture. An experimental fruit farm is maintained by the Government, in the Niagara district. There are about twelve officials who are at work in helping and organizing the fruit industry. Part of their work is to organise local societies of fruit growers. Honey also comes within their reference.

7. *Colonisation Branch.*

The Agricultural Department attends to the settlement of new lands, and offices with the organisation requisite for the purpose are maintained both in Canada and in England.

8. *Statistical and Publications Branch.*

Full reports and statistics of the agricultural work of each year are presented by the Department to the Legislative Assembly.

9. *Institutes for (a) Farmers, and (b) Women.*

(*a*) Farmers' Institutes began to arise about 1885, and now one of them is found in every county of the Province. The chief function of the Institute is to organise a series of lectures in its county every winter. It forms local centres which may be identical with those of the agricultural societies or supplementary to them, the relations between the Institute and the agricultural and kindred societies of its district being adjusted by the Superintendent of Farmers' Institutes. Each year the Superintendent sends to each Institute a list of twelve lectures, and the Institute arranges for two of them to be given at each of its centres. The Superintendent thus employs two lecturers throughout the season, each of whom has a list of six subjects, on any of which he is competent to lecture.

(b) Early in the history of the Farmers' Institutes, it was found that the farmers who attended the meetings brought their wives and daughters with them. The interest taken by women in such branches of agriculture as fruit-growing, dairying, and poultry raising, led after a few years to the formation of Institutes for Women. The first of these associations arose in 1891. In 1900 there were 33, with a membership of 1,600 ; and in 1910 there were no fewer than 554 with a membership of 14,000. During the year ending June, 1908, these Institutes held 3,868 meetings, at which the aggregate attendance was 93,780. It is interesting to notice that the Institutes have steadily enlarged the scope of their aim and function. Content at first to discuss purely agricultural topics, they soon entered upon the more general field of subjects of interest to mothers and "home-makers." Still the scope widened. Meetings are now not simply for reiterated discussion of foods, food values, and methods of housework, but are occasions also for satisfying the claims of general intelligence, and for developing neighbourly, civic, and patriotic spirit. They provide, in short, a common ground which the social organisation of Ontario had lacked hitherto. The official statement of the objects of the Women's Institutes runs thus: "the dissemination of knowledge relating to domestic economy, including household architecture, with special attention to home sanitation ; a better understanding of the economic and hygienic value of foods, clothing, and fuel, and a more scientific care and training of children with a view to raising the general standard of the health and morals of our people ; or the carrying on of any line of work, which has for its object the uplifting of the home, or the betterment of conditions surrounding rural life." (Handbook for Women's Institutes, 1908, p. 12.) Each Institute must hold at least four meetings a year. It can secure at least once in each season the services of a competent lecturer on payment only of travelling expenses. The Institutes possess an official organ in the "Home Journal" ; and every year a general Convention is held at the Guelph College, which is attended by several hundred

delegates and others. A useful Handbook with every information concerning the establishment and maintenance of Institutes is published, and an Annual Report on the work of the Institutes is presented to the Legislative Assembly of Ontario. The growth and usefulness of the whole movement in spite of not a few difficulties are indeed most striking. Imagination has inspired policy, and aspirations which otherwise would have lain dormant or isolated have found powerful and corporate expression. The manifold activity of the Institutes at the present day is thus described in Superintendent Putnam's Report for 1909 to the Minister for Agriculture: "In those sections where the work has been established for some years, an increased interest is being taken in the growing of flowers, planting of shrubbery, installation of labour-saving devices, etc. Not only has the Institute influenced the home, but the members have gone out among the schools to see that the surroundings are sanitary, and that some attention is given to beautifying the school grounds, and local councils have been approached with a view to inducing them to spend time and money in improving the appearance of streets in villages and towns. Assistance has been given by the Institutes in the installation of street lamps, putting down of side-walks, planting of trees, etc. Such work as this cannot be done unless the Institute concerned either secures money from some local source to assist them in their undertakings, or raises funds by holding concerts, tea-meetings, etc. The number of libraries established is an index of the influence which the Institution is having upon the literary tastes of the people. In a majority of cases the Institute co-operates with the local library, particularly in the purchase of books and periodicals which are of special interest to the home makers." (Report on the Women's Institutes of Ontario, 1909, p. 5.)

Note. The appointment of Guelph College graduates as agricultural specialists in country towns has already been referred to in the section dealing with the Guelph College, (see p. 27). The system is likely to develop and to become an important means of furthering the rural policy of the Ontario Government.

v. Cornell University (including the New York State College of Agriculture).

(1) *The University.*

Cornell University is situated at Ithaca in the north-west corner of the State of New York. Ithaca is a country town of broad thoroughfares well-planted with trees, and possessing much of the charm and seclusion of a "garden city." It stands at the southern end of Lake Cayuga, a sheet of water more than thirty miles in length and varying in width from one mile to three. The town climbs eastward towards a steep summit, and here, occupying a spacious plateau, is the University. The site is a commanding one; from the campus, which extends to nearly 300 acres, the visitor looks down upon the blue waters of the lake, and the many-folded hills which enclose it. The precincts of the University are roughly demarked on the north and south by two ravines, deeply cut through the limestone plateau. The sudden vistas of lake and hill, the cascades, pools, and torrents in ravines spanned by light bridges, the avenues and the spaciousness of the campus, endow Cornell University and its situation with a romantic beauty.

The University, with its staff of 578 and student roll of over 4,000, dominates the town. The main buildings are imposing, particularly the Hall of Humanities (dedicated to the late Professor Goldwin Smith, one of the first Professors at Cornell University and its signal friend), the Rockefeller Physics Laboratory, and the Library, the lofty tower of which is a distinctive feature of the group. The charm of their setting compensates for the severely utilitarian character of the majority, and for the indifference to congruity in architectural style. It was not possible for the Deputation, during their brief stay, to form more than a very general idea of a University which, judged by numerical standards, approaches the scale of Oxford or Cambridge. Their principal observations will relate to Agriculture, together with a few notes (on a later page) with regard to Libraries and to

the Residence of Students. No one, however, can visit Cornell even for a few days and fail to receive the impression of a strong University spirit. It is omnipresent, —in the laboratories, in the library, on the campus, on the baseball ground, on the lake, in the streets. It is not English, nor is it without a note of strain : but though the contrasts with English University conditions are not less observable than the resemblances, the English visitor of experience will surely recognise in Cornell a great University in the making. It is indeed most striking to remember that this organisation, now so many-sided and so extensive, so rich in lands, buildings, endowments, teachers, and students, was originated by a man of humble origin, Ezra Cornell, whose death occurred only a few years ago ; that its history goes back less than fifty years ; and that as recently as twenty years ago its scale was little more than that of a small local College. To-day it comprises a Graduate School and eight "Colleges": Arts and Sciences, Law, Medicine, Veterinary Science, Agriculture, Architecture, Civil Engineering, and Mechanical Engineering and Mechanic Arts. Students throng to Cornell, not only from all parts of the United States but from all parts of the world ; nor could any instance more significant than the swift growth of Cornell be quoted to demonstrate the enthusiasm, the munificence, and the ability which during the last quarter of a century Americans have lavished upon the creation and development of Universities.

(2) *The College of Agriculture.*

Almost from the earliest days of Cornell University, agricultural teaching has been one of its activities ; but a decisive advance took place in 1904, when by an act of the Legislature of the State of New York the "New York State College of Agriculture at Cornell University" was established. The sum of £50,000 was voted for buildings, which were occupied in 1907. Like the State Veterinary College at Cornell, the College of Agriculture is administered by the Board of Trustees of Cornell

University.* These two institutions are the only State colleges or departments in Cornell University. The Agricultural College is supported by (*a*) direct State appropriation (*b*) certain parts of the federal funds for the maintenance of agricultural colleges (*c*) annual appropriation from Cornell University (*d*) income funds of the College and (*e*) the Federal Experiment Station funds (the Federal Experiment Station being part of the College of Agriculture.) Students of the College of Agriculture are subject to the University regulations.

(3) *Buildings and Equipment.*

The buildings, which with their equipment cost about £80,000, consist of a main building, Agronomy building, Dairy building, and Animal Husbandry building. They contain an abundance of good lecture rooms and laboratories. Dairying is exceptionally well supplied, there being altogether 26 rooms devoted to it. But the increase in the number of students already indicates that more buildings will be required, and a large scheme for extension is under consideration. The cost of this scheme, which it is hoped to execute within ten years, is estimated at £250,000. Increase in the cost of maintenance will make necessary a revenue of £50,000, apart from £15,000 for the Veterinary College.

(4) *The Farm.*

The Farm consists of about 1,000 acres, of which 600 are arable. The land is not of the best quality, and since much of it has only been acquired recently, its condition cannot well be criticised. It is being worked on a five course rotation : (1) and (2) Maize (3) Oats (4) Wheat

*" The State is represented on the Board by the Governor, Lieutenant Governor, the Speaker of the Assembly, the Commissioner of Education, the Commissioner of Agriculture, ex-officio, and by five members appointed by the Governor. The people are further represented by the President of the State Agricultural Society and by a Trustee appointed by the State Grange. Ten members of the Board are elected by the alumni. The fifteen remaining elective members of the Board are chosen by the Board itself. It will be seen from the above statement that the State now has equal control with the alumni in the Government of the University and thus of the College of Agriculture." (" Some facts concerning the New York State College of Agriculture." By H. J. Webber, Acting Director, p. 5.)

(5) Clover and Timothy Hay. Progress is being made in the various branches of cultivation : orchards are being planted, and additional farm buildings are to be erected.

The Live Stock on the Farm includes (*a*) Pigs. Jersey Reds, and Cheshires (a cross between a local breed and the Large White). The pigs are fed chiefly on skim milk and purchased middlings. (*b*) Cattle. Fifty milking cows are kept. Holsteins do best, yielding 1,100 to 1,400 gallons with about $3\frac{1}{2}$ per cent. fat. Jerseys also do well yielding about 300-400 lbs. of fat per annum. Guernseys and Shorthorns show a less satisfactory record. Calves, being pedigree animals, are sold for breeding, and fetch from $10 to $30 when seven days old. Fat stock are sold to the trade. (*c*) Sheep. There are several mixed breeds. "Hot-house" lambs are reared. These are dropped in November or December, killed when eight weeks old and shipped to New York. Their dead weight is about 33 lbs., and they fetch about $10. (*d*) Horses. The Percheron is the most popular. Clydesdale stallions are kept and their service is granted to neighbouring farmers.

(5) *Courses of Instruction.*

Apart from the work done by "Special Students" and Postgraduates (see *Students* below), the organised courses of instruction are as follows :—

(a) Twelve weeks' Courses. (November to February) are given in each of the following branches :—General Agriculture, Poultry Husbandry, Dairy Industry, Horticulture, and Home Economics.

Note. Since 1907 a system of "Branch Schools" has been started in New York State. These are an agricultural variety of the ordinary High School. It is hoped that ultimately the Branch Schools will provide the instruction given now in the Twelve Weeks' Courses at Cornell, and so enable the University to confine its attention to the longer courses and the more advanced students.

(b) Four Years' Course for a Degree. The four year course in agriculture is of equal academic rank with other degree courses in Cornell University. The year is divided into two terms of about 12 and 18 weeks respectively, October to December, and February to June. Class work occupies about 18 hours per week, in addition to physical training and drill which are compulsory. The first year's work comprises English, Botany, Chemistry, Biology, and Electives (up to four hours weekly). In the second year, the subjects are Geology, Chemistry, Physics, Physiology, and Electives (up to 13 hours weekly). The third and fourth years are devoted to Agricultural Electives. The students, in accordance with the system prevalent in American Universities, select subjects from a prescribed list. The subjects are arranged in four groups. A student will spend most of his time in studying a particular group, but he must also give some time to each of the other groups.

It is noteworthy that the pure science subjects are dealt with in the Science Departments, which are distinct from those of Agricultural and Applied Science; and that instruction in pure science precedes instruction in applied science. This procedure is not considered wholly satisfactory, but it is defended on the grounds that the previous training of most of the students has been of a uniform character, and that the lecturers in applied science demand of their students some previous knowledge of pure science.

(6) *Fees.*

"Tuition is free to regular and special students in the College of Agriculture." ("Information for Students in the New York State College of Agriculture at Cornell University," Sept., 1909, p. 18). In the case of the Winter Courses a tuition fee of $25 is charged to non-residents of the State of New York. All students pay a matriculation fee of $5 and an infirmary fee of $2. Post-graduates, regular third and fourth year students, and all special students pay a terminal laboratory fee. A student's

yearly expenses, including board and lodging for 30 weeks, amount to £60 and upwards.

(7) *Staff.*

The Staff of the College of Agriculture numbers about 70 Professors, Lecturers, and Instructors. There are about 20 departments. In fifteen cases the head of a Department is a Professor, whilst in the remaining five the head is an Assistant Professor. The Departments are these:—Agriculture, Farm Produce, Animal Husbandry, Dairy Industry, Agricultural Chemistry, Biology, Entomology and General Invertebrate Zoology, Drawing, Extension Work, Farm Crops and Farm Management, Farm Mechanics, Horticulture, Plant Breeding, Plant Pathology, Plant Physiology, Poultry Husbandry, Rural Economy, Soil Technology, Rural Art, Pomology.

In addition to these, there are lecturers in Nature Study, Home Economics, and Meteorology. The Meteorologist is a State official with a large district to supervise, and with a government recording station to control. He lectures to students, but their attendance is voluntary.

(8) *Students and Statistics.*

There are four classes of students :—(1) Those attending the short Winter Courses. These courses are described as "business or occupational courses, not academic." Admission is by application, and no special conditions appear to be enforced. (2) Degree Course Students. Men students must be sixteen years of age; women, seventeen. Adequate credentials must be produced, or an entrance examination must be passed. Students are advised to gain at least one year's practical experience on a farm before coming to College. (3) Special Students. These students must be 21 years of age. They follow no prescribed course, but at least two-thirds of all their work must be in subjects announced on the official programme of the College of Agriculture. Every application for admission as a special student is considered on its own merits by a Committee of the Faculty. Special students stay in the College about two years, and their work is

intended to help them to become successful farmers. (4) Post-graduates. The large number of post-graduate students in Agriculture is a distinctive feature of the College. At the date of the Deputation's visit the number was 76.

The registrations of students in the College of Agriculture during the past six years are shewn in the following table :—

	1904-5	1905-6	1906-7	1907-8	1908-9	1909-10
Regulars (4 years degree Course) -	98	129	145	209	272	419
Specials - -	90	95	124	138	144	120
Post-graduates -	31	40	36	43	58	58
Winter Course -	199	253	244	270	364	371
Totals -	418	517	549	660	838	968

The sources of the supply of students during the past three years were as follows :—

Students.	1907-8	1908-9	1909-10
From New York States -	474	610	706
,, other States - -	146	188	213
,, Foreign Countries -	40	40	49
	660	838	968

A computation made a few years ago shewed that 91 per cent. of the ex-students of the College were either farming or pursuing some line of work directly allied to agriculture.*

(9) *Relations with Farmers and the Public.*

A separate department of the College of Agriculture deals with Extension Teaching. Meetings, demonstrations, and lectures are organised at centres in New York State. There is a very large issue of leaflets and bulletins, many of them well-illustrated. These consist of leaflets, &c. relating to the *Farmers' Reading Course* and the *Farmers' Wives' Reading Course*, and to courses in *Home Nature Study*, as well as of research publications of a more advanced character. The publications of the Agricultural

* The statistics given in this section are taken from Professor Webber's pamphlet, "Some Facts concerning the New York State College of Agriculture" (March, 1910) pp. 10–12.

Experiment Station include to date (May, 1910) 22 annual reports and 277 bulletins. These publications are distributed free to such residents of the State as apply for them, so far as the means of the Station will permit. Many bulletins are sent out free of postal charges, and all publications are sent at reduced rates. About 5,000 farmers receive bulletins about five times a year, and 14,000 farmers' wives receive the publications of the *Reading Course* designed for them. *Home Nature Study* leaflets are sent to 6,000 teachers, and to 70,000 boys and girls.

VI. Wisconsin University: (including the College of Agriculture).

(1). *The University.*

Wisconsin University includes Colleges of Letters and Science, Engineering, and Agriculture; Schools of Medicine and of Law; the Graduate School; and the Extension Division. The history of the University goes back to 1836, which, it is interesting to note, was the first year of Wisconsin Territory. Little progress, however, was made until 1848, when Wisconsin was admitted as a State of the Union. In that year the Legislature of Wisconsin passed an act for the establishment "at or near the village of Madison of an institution of learning under the name and style of the University of Wisconsin." The government of the University was to be by a board of regents elected by the legislature. Thus from the outset Wisconsin University has been a State institution.

After the Civil War, the University grew rapidly. In 1870 it was attended by nearly 500 students. An extensive reorganisation took place about this date, a feature of which was the admission of women as students of the University as well as men. The teaching of Law and Agriculture was undertaken, and many new buildings were erected. By 1901 the University had 2,600 students, including more than 100 post-graduates. The most recent statistics for the University as a whole are as follows:—College of Letters and Science, 2241; College of Engineering, 781; College of Agriculture, 403; Law School, 159; School of Music, 143; Summer Session of 1909, 741; other enrolments (chiefly agriculture) 545. Total, 4,947.* The Graduate School numbers 281 students, who are distributed among the totals given above. "Officers of Instruction and Administration" number about 500.

* "Catalogue of Wisconsin University," 1909-10. pp. 601-3. In arriving at the grand total, 66 is deducted from the total of students in the School of Music, since that number of students in the School were already enrolled in other Colleges of the University.

The University is supported partly by the income of federal grants; partly by taxation of the people of the State; partly by students' fees; and to a slight extent by private gifts. It represents the culmination of the free educational system of the State. In the educational policy of the State, the University sustains a similar relation to the high schools that the high schools sustain to the primary and grammar schools. The State through the University undertakes to furnish instruction in the various branches requisite for a liberal education, and in numerous technical branches also. Research, and the diffusion of knowledge outside the University among the people of the State, by means of an extension system, are also among the stated purposes of the University. The discipline of the University in relation to students appeals to the civic ideal; and the University, as a State institution, is careful to avoid "all that is sectarian or partisan."*

Wisconsin University occupies an excellent situation at Madison, which, though the capital of the State, is yet a town of modest proportions. The University grounds occupy 600 acres, and extend for upwards of a mile along the southern shores of Lake Mendota, a sheet of water about four miles wide and six miles long. The older buildings stand upon an eminence known as University Hill. The total number of University buildings used "for instructional purposes" is nineteen. As a group they are not effectively disposed upon the ground, but the fault may be due to unavoidable historical circumstances. Several of them, particularly the Library of the State Historical Society, are of imposing size and dignity.

(2) *The College of Agriculture.*

As already stated, an agricultural department was established at the University about 40 years ago. Students of the College of Agriculture are of the same standing as students of the other Colleges of the University, and for certain purposes, e.g. in general sciences,

* Most of the foregoing particulars are taken from the University Catalogue for 1909-10. pp. 43-54, and pp. 601-3.

languages, and mathematics, receive instruction with non-agricultural students. The buildings devoted to the College of Agriculture are seven in number : Agricultural Hall (which includes the administrative headquarters, an auditorium to hold 750, library, and several agricultural sciences); Hiram Smith Hall (Dairy Department), the Soils Building, the Horticultural Building, just completed, the Agronomy building, which includes a grain-judging room able to hold several hundred students ; the Agricultural Engineering Building; and the Live Stock Pavilion. This last is a remarkable structure of concrete and brick. It includes an arena in the form of an ellipse 66 by 164 feet, capable of seating 2,500. A system of moveable curtains enables the arena to be divided into sections. Beneath the amphitheatre-seats are 15 box stalls and 22 standing stalls for horses belonging to the University Farm. The Live Stock Pavilion has been erected in consequence of the large attendances of farmers at stock-judging competitions and at certain of the shorter courses in agriculture. As a group, the agricultural buildings are remarkably spacious and complete.

(3) *The Farm.*

There are two Farms: University Farm, adjacent to the campus, of 300 acres of land, and Hill Farm, two miles away, which includes about 290 acres devoted to experiments with farm crops, fertilizers, tillage, drainage, etc. The land is worked on a four-course rotation (1) Maize (2) Oats or Barley (3) Clover and Timothy Hay (4) Pasture.

The Live Stock on the Farm includes: (a) Pigs: Berkshires, Tamworths, and Poland-Chinas. (b) Cattle: Jerseys, Guernseys, Ayrshires, and Holsteins. About 25 cows are kept, and the net profit on them last year amounted to £12 12s. a head. (c) Horses. Clydesdales and Percherons.

(4) *Courses of Instruction.*

These are numerous, and vary widely in duration and character. A few brief notes may be of interest :—

(a) Five Day Course in Dairying, for Managers of Creameries or Cheese Factories.—A chief object is to bring to the notice of those attending the course any recent advances in dairying science.

(b) Five Day Course in Home Economics, for Farmers' Wives.—Instruction is given in cooking, sewing, and nursing.

(c) Ten Day Course in Agriculture for Farmers. —The course is given in February, a convenient time for farmers, and aims at being popular and useful. One principal topic is selected, such as milk-production, beef-production, or cereal husbandry. The hours of work are from 8.30 a.m. till 12, and from 2 till 4. In the evening there is a demonstration, or a lecture or discussion on a topic of general interest. The course has been a notable success.

(d) Ten Weeks Summer Dairy Course, intended for beginners.

(e) Twelve Weeks Winter Dairy Course, intended for persons who have had at least six months' experience in a creamery or cheese factory, and desire to become creamery buttermakers and factory cheesemakers.

(f) Short Course in Agriculture, occupying two winter terms of 14 weeks each.—It is intended for those engaged in farming who can devote only a part of the year to study. During the first term, the period from 8 a.m. to 12 is devoted daily to lectures and class work in Crops, Horticulture, Live Stock, Dairying, Soils, Agricultural Chemistry, Business Methods, and Agricultural Engineering. Two hours every afternoon are assigned to practical work in the Dairy, Stock Judging, and the Shops, a third of the term being devoted to each of these branches in turn. During the second term, the morning period is given to Live Stock, Veterinary Science, Poultry, Bacteriology, Business Methods, Farm Management, and Agricultural Engineering. The afternoon period is given for half the term to Crops or Horticulture, and for the other half to Soils or Live Stock.

(g) Middle Course in Agriculture, extending over two years and leading to a certificate.—During the first year about 16 hours a week are spent in English, Chemistry, Agricultural Electives, Crops, Live Stock, Agricultural Engineering, and Dairying. The same time weekly is occupied during the second year with Biology, Bacteriology, Horticulture, Live Stock, Agricultural Electives, Agricultural Chemistry, Agricultural Bacteriology, and Soils. There are two terms in each year and the subjects are studied in a prescribed order. "Considerable work in the basal sciences is required to lay a foundation for the distinctively agricultural work." Two hours gymnastics and two hours drill, weekly, are compulsory additions to the time table.

(h) Long Course (four years degree course) in Agriculture.—The aim here is scientific training, the field of study is very wide, and much liberty of selection is permitted. During the first and second years the work is the same as for the Middle Course, except that in the first year Electives are replaced by German, and in the second year by Chemistry and Mathematics. In the third year the weekly time table covers $16\frac{1}{2}$ hours as follows: Physics (5), Botany (3), Agricultural Economics ($2\frac{1}{2}$), Agricultural Electives (6). In the fourth year a "major line of study," including a thesis, occupies 5 hours; a "minor line of study," including a thesis, 5 hours; and 3 Electives 6 hours. Total, 16 hours weekly. No student is given the degree who cannot show that he has devoted at least six months to practical farm work.

The Long Course was instituted in 1876, but for twenty years there were never more than ten students attending it. In 1902 the numbers had not risen above 36. Up to this date the course was regarded as in great measure a failure, and the reason assigned was that the first stages of the work were entirely devoted to pure science. Hence in 1902 two noteworthy modifications were introduced. In the first place, much of the pure science was postponed to the later stages of the course, and secondly students who desired to stay at the College for

two years only were taken separately from those who were prepared to stay four years. Further, in 1908, the course for the two year students was modified to form the Middle Course. These changes have resulted in a marked increase in the attendance at both courses. The Dean of the Faculty of Agriculture (Professor H. L. Russell) emphasised as conditions of successful agricultural instruction (of the type under consideration) that all students should begin to study agricultural subjects at the beginning of their course, and that Short Course students and Long Course students should be taught separately. It should, however, be observed that the latter point has a special urgency in American Colleges where the numbers to be dealt with are usually very large.

(j) Post-graduates.—The line of study is left largely to the selection of the student, subject to the approval of the agricultural faculty. "When contributions to knowledge of permanent value are made they may be published through the bulletins of the Experiment Station with proper credit to the contributor."

(5) *Fees.*

Students who are resident in Wisconsin State pay nothing for tuition. Other students pay £10 per annum. There are small charges for laboratory and similar expenses which do not exceed £6 per annum. Board and lodging expenses vary between £1 and £2 weekly.

(6) *Staff.*

The Staff consists of about 50 persons, of whom nearly 20 are Professors. The majority combine teaching with research, but it would appear that the burden of teaching in some cases is making research impossible. Professor S. M. Babcock, Ph. D., LL.D., widely known as the inventor of the test for butter fat, holds the posts of Assistant Director and Chief Chemist of the Agricultural Experiment Station, and of Professor of Agricultural Chemistry. His invention in 1890 gave a great impetus to the Dairy courses of instruction, for in the

following year 100 students came for the express purpose of studying his methods.

(7) *Statistics of Students.*

The numbers attending all the courses of instruction in the College of Agriculture are steadily rising. The following figures relate to the year 1909-10:

Long Course - - - -	267
Middle Course - - -	67
Short Course - - -	461
Dairy Course - - -	100
Farmers' Course - - -	825
Women's Course (first year) -	450
	2,170

In 1908-9 there were 24 Post-graduate students.

(8) *Conditions of Admission.*

Before entrance to the Long or Middle Courses, a certificate from a recognised High School must be presented, or an examination must be passed. For the Short Course, a student must be 16 years of age, and have had an adequate public school education. Persons who are 21 years of age and of approved capacity, and graduates from other Universities, may be admitted as students in order to engage in special lines of work.

(9) *Relations with the Government.*

The University, as already mentioned, is a State institution, and it is regarded by the State as the authority on all agricultural questions. All legislation dealing with agricultural technicalities is drafted in consultation with the agricultural staff, and the latter are concerned, through their extension system, in seeing that the law is observed. Examples are the laws relating to foods and fertilisers, seeds, stallions, and the inspection of nursery stock before sale. The University is thus directly associated with State administration, and it undoubtedly gains status with the

public for this reason. On the other hand, the State gains by the practice of calling to its aid the trained and specialised knowledge which is possessed by the University.

(10) *Relations with Farmers and the Public.*

Wisconsin University is remarkable for the numerous and close relations which it has established with farmers throughout the State. Farmers attend the short courses of instruction by the hundred, and visit the experimental plots, &c., by the thousand. Moreover, the University has organised an elaborate Extension Division, of the activities of which a brief outline may be given :—

(a) Correspondence Courses.—The 35 departments of the University provide between them 200 different courses of instruction. As far as may be, correspondents are grouped into district classes, and the instructors visit classes at regular intervals at convenient centres. The work began in 1906, and by 1908 there were 1100 students. About half of them pursue courses in technical work, science, languages, history, and music. Engineering claims 400 students. About 350 students are doing work which is considered to be of University grade. The students are of all ages and social conditions. At Milwaukee, the Merchants' and Manufacturers' Association, recognising the value of the correspondence work, have afforded their employees special facilities for entering the courses.

(b) Extension Lecture Courses.—The development of this branch has been retarded through lack of funds.

(c) Debating and Public Discussion Department. —The aim here is to stimulate interest in public questions of importance. Debates and discussions are organised, and advisory leaflets and bulletins are issued.

(d) Department of General Information and Welfare.—The function in this case is two-fold :— (1) Information is collected, from other States and countries, relating to modern researches and discoveries. This information is distributed in a popular form to the Wisconsin public. (2) The Department assists localities in solving particular problems. For example, 120 bakers

combined to request the University to assist them in regard to their special problems, and undertook to attend any lectures or demonstrations that might be organised. The University replied by building a Bakers' Institute where technical difficulties are investigated as they arise by experts obtained for the purpose.

It is hoped ultimately to divide the State into eleven extension districts, in each of which shall be a resident representative of the University. Each Centre should possess or be connected with a library, and should be able to add a laboratory, and other requisites, according to the needs of the locality.

(11) *The Experimental Association.*

Just as the Extension Division connects the University with the general public, so the Experimental Association connects it with the trained farmers. Membership is restricted to past members of the University, and so greatly is membership prized that students have been known to join the University in order to qualify for the Association. The object in view is to develop Wisconsin as a great seed-producing* area, from which other States and other countries may draw much of their seed supply. At the University good strains of maize and grain are carefully selected or bred, and these are sold to members at current market prices. Members are grouped into "County Orders," each of which has its own Secretary, who must keep in close touch with his members and with the University. He receives a small stipend, and his expenses for each day on duty. One of his duties is to visit each member twice a year. If a member is found to be farming badly, and so not to be maintaining the standard of seed, he forfeits membership of the Association. By means of this organisation very large orders for seed can be dealt with, and the Association, acting through the University, already has a very large trade with other States in the Union, with China, with Japan, and with Europe. The influence of the agricultural

* i.e., maize and grain.

teaching of the University is also notable in regard to the dairying industry. In 1890 the value of the dairying industry in Wisconsin State was five million dollars, and at that date many irregular trade practices were in vogue. In 1910, the value stands at seventy million dollars, and carefully-framed laws guard against adulteration. One half of the cheese factories of the United States, and one sixth of the butter factories, are now situated in the State of Wisconsin.

B.

Observations upon Agricultural Education in England and in America.

Introductory.

There are some general conclusions with respect to the teaching of agriculture in America which must strike the reader of the foregoing pages no less forcibly than ourselves who had the advantage of visiting the institutions described. Whatever estimate may be formed of the standards and performances of the Universities of Canada and of the United States, it is impossible either to dispute or to disregard their magnitude of scale, their energy of enterprise, or their success in result. There is, for example, no agricultural institution in this country which is housed and equipped like Macdonald, none which can show a roll of students and post-graduates like that of Guelph, Cornell, or Wisconsin, none which is based upon a contact and alliance with farmers such as that which flourishes at Wisconsin or Guelph, and none which can produce a record of material assistance to the agriculture of the region like that of Wisconsin. The buildings at Macdonald cost most of a million sterling, and were the gift of one man. Cornell possesses more serious students of agriculture than all the English Colleges together.* Throughout the vast agricultural areas of Ontario and Wisconsin, Guelph and Wisconsin University respectively are farm-house names; and thousands of farmers, judging shrewdly from experience, look to them for guidance and instruction. And it has been shewn in the preceding pages how the unrivalled position of Wisconsin in the production of cheese and butter is the direct outcome of scientific teaching happily wedded to prudent legislation. If any one still doubts these things, and deems it worth while to go on repeating the sceptical question "Can

* From the returns given in the Annual Report on the Colleges by the Board of Agriculture, 1910, [Cd. 5388], it would appear that the number of such students in 1908-9 at 12 institutions (exclusive of the Royal Veterinary College) was about 500. The latest figures for a similar class of student are at Cornell, 597; at Guelph, 475; at Wisconsin, 358.

agriculture be taught?" our advice is that he should go to Canada and the United States and see the thing done, and done upon a great scale. Even the narrow field which has been surveyed in this Report is amply sufficient to demonstrate the untiring energy and confidence and the remarkable success with which, both in Canada and in the United States, trained intelligence and scientific knowledge are brought to bear upon the problems of agriculture and of rural society. This is the first broad and outstanding conclusion. In our view it is better to fix attention upon this stimulating lesson rather than to indulge in sterile debate whether or not all the agricultural activities which we saw at work in America can properly be described as of a University character, or to attempt the invidious task of estimating and comparing the relative values of the agricultural experiments and research carried on in America and in our own country.

There is, of course, no novelty in this recognition of the vigorous effectiveness of the agricultural instruction given in Canada and in the United States. Members of the Deputation were told, even before they left England, that they would return with this view strongly impressed upon them. They were also told, not less authoritatively, that the example of America would be of no service as a guide to the solution of problems at home, for the simple reason that the conditions of the two cases are quite different. This dictum cannot be accepted. Yet it contains an important element of truth. There are undoubted and far-reaching differences between the problem of agricultural instruction in America and the problem in this country. It will repay us to consider these carefully, before proceeding to offer specific suggestions.

Differences in the Conditions of Agricultural Education in England and in America.

(a) *Climate.*

The primary differentiating factor is climate. Hot summers and severe and prolonged winters characterise

the region traversed by the Deputation. These natural conditions affect the whole of agricultural practice, including tillage, the selection of crops, the breeds of live-stock, their feeding and housing, the dates and seasons of the year's agricultural routine. Moreover, climate has an important bearing upon the organisation of instruction. It is at once evident that it governs more directly than in England the period assigned to University sessions. Practically the Universities and Colleges of America are in session during the winter, from October to April or May, and in vacation during the rest of the year. This arrangement accords well with the circumstances of the agricultural student, the farmer's son, and the young farmer. He is able to spend in the class-room and laboratory, more conveniently than would be the case in England, the long winter period during which in Canada and America most agricultural work is at a standstill ; while in the summer he goes home to help on the farm, at a time of ceaseless pressure, and to gain there —or possibly on the farm of a stranger—several months' experience in farm work, which is an invaluable corollary to the University training of the winter. Owing, therefore, to climatic differences alone, agriculture across the Atlantic is not the same as agriculture at home, while the same differences make it more easy for farmers in Canada and in the United States to send their sons to study at agricultural colleges.

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*Table 35 of the General Report on the Census of 1901 (England and Wales) gives the following statistics :—

		(Thousands)	Total (Thousands)
Persons engaged in Agriculture—			
	Males	1159	1198
	Females	39	
Persons engaged in Mines and Quarries—			
	Males	800	805
	Females	5	
Persons engaged in Metals, Machines, Implements, and Conveyances—			
	Males	1167	1228
	Females	61	
Persons engaged in Building and Works of Construction—			
	Males	1126	1128
	Females	2	

(2) *Economic Position of Agriculture.*

Related to climatic conditions is the wide contrast in the economic position of agriculture. Agriculture is no longer the predominant economic interest of England. The claim that it employs more persons than any other single industry no longer passes without challenge ;* although in the consideration and esteem accorded to it by public opinion on social and traditional grounds it is still easily supreme. Nevertheless, the wealth of England, the prosperity of her people, her economic position as compared with that of other nations, are no longer primarily dependent upon her agriculture. The opposite is the case with Canada, and with vast regions of the United States. Nature has there reserved enormous areas of land for the farmer. In districts of older occupation, such as Ontario and Wisconsin, farmers are counted by the thousand. As yet, the tide of immigration has done little more than touch the fringe of the new lands of western Canada. Everywhere in these regions agriculture is the mainstay of prosperity, for the individual and for the community. Remove it, and the economic structure of society collapses. The great cities, such as Toronto and Chicago, even though their commercial opportunities and their social glitter attract population from the districts around them, ultimately owe their prosperity, or most of it, to agriculture. This economic supremacy of agriculture has many consequences, of which only one need be named here. In Canada, and in those parts of the United States visited by the Deputation,

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	(Thousands)	Total (Thousands)
Persons engaged in Textile Fabrics—		
Males	492	1155
Females	663	
Workers and Dealers in Dress—		
Males	415	1127
Females	712	

The total number of persons over ten years of age "engaged in occupations" was, in thousands, Males 10,157 ; Females, 4,172. Total, 14,329. The proportion of those engaged in Agriculture was, therefore, approximately, one-twelfth of the whole number.

agriculture figures so largely in the public eye, it is a business fact of such paramount importance to governments, and the scale and theatre of its operations are so vast and so rapidly extending, that it is regarded as a career with a confidence not found in the old country, while the conditions of its successful study and pursuit are considered no less worthy of attention than those relating to Medicine, Engineering, and Law. This is a difference which can only be expressed in general terms, but it produces remarkable results both here and in America.

(3) *Relative scope of Universities and conditions of their success.*

Problems of agricultural policy in America differ from our own because they are the problems of youthful communities. It is the fashion to flatter American energy and to decry British deliberateness, and probably in each case the fashion is overdone. The atmosphere of the western continent may or may not have the bracing properties claimed for it. But undoubtedly the visitor finds there a keenness and a confidence in regard to public enterprise which makes light of obstacles, and is in itself a harbinger of success. The consciousness of rapid material progress in the past, of almost boundless opportunities for progress in the future, generates the sanguine temperament and a readiness to try experiments, which is much less characteristic of older communities, and is altogether favourable to educational enterprise. Thus Sir William Macdonald plans and builds for a future which is to him not a dim speculation, but a certainty: students everywhere are keen to equip themselves with university training, even if they can only raise money to pay for it by working in vacations as farm-hands, stewards, waitresses, clerks, or miners; a Canadian mayor rejoices that the education rate of his city is the highest in the Dominion; and the Legislatures of New York State or of Wisconsin will not hesitate to invest large sums of public money in establishing Universities to educate their youth for the tasks of the future. Moreover, this confident purpose enjoys a

freedom of opportunity which is peculiar to a youthful society. In England, the reformer, whatever his school or his aim, is faced by an intricate, mature, and deeply-rooted established order. Very early in his career he becomes familiar with the significance of vested interests, rival agencies and efforts, conflicting jurisdictions, prior claims, and an indisposition springing from manifold causes to accept change or novelty either in idea or in fact. These things and the type of difficulty which they suggest are not absent from America: and some of them may even be abnormally active there. But generally speaking the ground is much clearer there than here for constructive educational effort. There are fewer things in the way. A new University in America, for example, if it is reasonably conducted, has a much simpler task in winning recognition for its mission and its claims at the bar of public opinion than a new University in England. The reason is not necessarily because public opinion here has a superior idea of what a University ought to be. It is rather because a new University set down in a young social order, fills a visible and felt need, while in England, though the need may be equally great, society is less conscious of it and is inured to its neglect. In America the University is quickly seized upon as the nucleus, sometimes developing with amazing swiftness, of an educational armament of the most diversified description. Scrutinise, for example, the activities of the Extension Division of Wisconsin University, and it will at once be apparent that the University function is not confined by conventional boundaries, and that a variety of work is undertaken which in England would be declined, often because it was already being done by existing agencies. America, in short, regards a University as a lever to be used in very numerous ways to advance the interests of civilisation. It is hardly too much to say that university education is often interpreted as including anything in the intellectual sphere which is beyond the school-stage. We may dislike an interpretation of this laxity; but we cannot deny that, thanks to the catholic range of its activities only possible in equal measure on the clear

stage of a young community, a University in America has an excellent opportunity of impressing popular opinion with the useful character of its services. It follows, moreover, that because the University is so conspicuous a unit in the intellectual organisation of society, and because its work ministers so directly to public needs, there is far less hesitation in Canada and in the United States than in England about the propriety of liberal State aid. Moreover, the political organisation of Canada and of the United States relieves the question of State aid of some of the difficulties which exist in this country. The English Board of Agriculture, for example, is believed to find difficulty in increasing the grants in aid of one or two Colleges without shewing similar liberality to the rest; whereas in the United States the College or University not only shares in the general grants of the Federal Government, but it monopolises the benevolence of its own State. It is not millionaires alone who have backed the Universities of those countries. Democracy has backed them too. Guelph is State-made; the agricultural college at Cornell is State-made; the whole of Wisconsin University is State-made. State control is liable to peculiar dangers, which cannot be discussed here. The points to be emphasized are that the Universities of Canada and the United States can run a course clearer than is possible to new Universities in older countries; that they are able to concentrate in their hands a variety of educational functions elsewhere distributed or declined; and that they gain a peculiar prestige because they are welcomed, used, and fostered by the State as instruments and allies of the first value in promoting the general welfare of society. The liberality of State support explains many of the contrasts between the progress of advanced agricultural education in America and its progress here. Take the instance of tuition fees. At Macdonald, the student from the Province of Quebec receives free tuition for his first two years. At Guelph, the fees of an Ontario student are greatly reduced. At Cornell and Wisconsin the local student is exempt from tuition fees altogether.

(4) *Ability and Attitude of Farmers.*

One circumstance in particular will be held, in the opinion of competent judges, to differentiate more markedly than anything yet mentioned the problems of agricultural instruction in America from those which confront us here. This circumstance relates to the capacity of the farmer, and to his attitude to agricultural education. English farmers have no rivals in the world. They have been bred for generations from the best agricultural classes. They know thoroughly the details of farm practice, and they have very firmly rooted views upon the subject. They inherit a traditional experience and skill enabling them to produce unrivalled results, both in crops and in stock. It is therefore very difficult to convince them that anyone who is not a farmer can teach them anything, or that any preparation for an agricultural career can be of serious value except that which is gained under the direction of a practical farmer in the school of hard-won experience. The farmer has not, perhaps, been particularly impressed by the quality of some of the agricultural instructors who perambulate the counties. Only very able specialists can hope to meet with real success as extension instructors, and again and again the slow progress of extension activities has been due to a disastrous disregard of this fundamental truth. To the farmer, again, with his proper respect for practice, it appears that the agricultural professor is too often in bondage to theory. He has not always found the experimental work conducted by agricultural colleges very illuminating or convincing ; nor is he always aware of what is being done in those institutions, or indeed by farmers in other parts of the country. He both suffers and gains from the independence of isolation. And lastly any programme of agricultural education comes to him disadvantageously because the whole subject of education is associated in his mind with burdensome county rates. Hence the progress of agricultural education in England has been delayed for these reasons, and especially by the fact that English farmers are not

exempt from the prejudices which in part at least are the outcome of their competence. Yet a great change would come over their general attitude if two plain truths could be driven home. The first is that the marvellous progress of English farming during the last two centuries has been mainly due to agricultural education, which itself resulted from the labours of men of science and experimenters many of whom were not successful practical farmers. For example, the methods of drilling and horse-hoeing introduced by Jethro Tull of Berkshire early in the eighteenth century, and based upon a close study of plant life, were vehemently denounced by the practical farmers of the day, but they have since been generally adopted. Few men did more for English agriculture than Arthur Young and yet, having failed twice in practical farming, he appeared to many of his contemporaries as an educational faddist. Townshend's experiments revolutionised the rotation of crops ; and Bakewell changed greatly the character of the chief breeds of live-stock. Thrashing machinery owed its introduction to individual experimenters ; and a Scotch farmer with a turn for science first gave the impetus to the application of chemical science to manuring and to other branches of agricultural practice. "The work of Liebig, Gilbert, and Lawes in one direction only — the feeding of the plant — has resulted in the use of fertilisers drawn either from fossil deposits or manufacturing waste products that has brought up the yield of our crops to an entirely new level. Lawes reports that the average crop of wheat in his district at the beginning of his experiments was about twenty bushels per acre ; to-day it is over thirty bushels. Of course it is not only fertilisers that have done this. Scientific method has also been applied to the machines which cultivate the soil, to the breeds of plants growing there, and to the eradication of the diseases from which they suffer."* Other examples could be quoted, but so demonstrable a proposition as the value of science to agriculture need not be laboured.

*Address to Sub-Section F (Agriculture), British Association, Dublin, 1908, by the Right Hon. Sir Horace Plunkett, K.C.V.O., F.R.S., p. 4.

The second point is that farmers often misunderstand the object of an agricultural college. It is not easy to convince a farmer that no agricultural college really proposes to manufacture farmers. The business of the agricultural college is to give men a training which shall stand them in good stead when they come to manage farms, and more especially, to instruct them in modern methods. It cannot give the experience necessary to success. The farming public retains a good deal of scepticism upon all these points, though there is satisfactory evidence that its attitude towards agricultural education and agricultural colleges is gradually becoming more favourable. The Departmental Committee appointed by the Board of Agriculture and Fisheries to investigate agricultural education in England and Wales, stated in their Report [Cd. 4206] published in 1908, that evidence submitted to them showed "in an unmistakable manner that the attitude of farmers on the subject has undergone, or is undergoing, a change." (p. 11). Even so, the Report confesses that the majority of farmers have not been reached by the agricultural colleges at all, and quotes the declaration of an important witness "that the colleges, however well conducted, do not at present directly affect more than 5 per cent. of the farmers of England." (p. 12) If such a statement is at all justified, it is almost superfluous to remark that, whatever may be the reasons, advanced or scientific training in agriculture has yet to win the confidence of the English farmer.

But it has won the confidence of the farmers of America. No fact more deeply impresses the visitor to the Colleges of Canada and the United States. He sees agricultural colleges full of students; agricultural colleges helping the farmer at every turn; and farmers believing in and valuing the colleges. It is hoped that the general tenor of these observations may throw some light upon the causes of this most significant—and, for Englishmen, disturbing—contrast. But undoubtedly one main cause of it is that in America it is much easier to help the

farmer than it is in England. It is easier because the standards of farming are less high, and because the capacity of the average farmer is less complete. To say this is by no means to minimise the remarkable ability with which American Colleges have addressed themselves to their task, which is indeed beset by other and peculiar difficulties not experienced in this country. But the fact is to be recognised that the Colleges of Canada and the United States have to deal with farmers who differ in quality and in mental attitude from those of this country. Many of them have had little previous experience of country life: a large proportion indeed have come directly from the towns. Consequently they have neither the skill nor the knowledge of English farmers, nor the same confidence in themselves. Hence the problem of helping them is simplified. The conditions of a new life in a new country stimulate a habit of inquiry and a readiness to learn, and the continual stream of settlers from abroad or from other parts of the continent, bringing with them a varied stock of ideas and experience, tends to keep the farming community in a receptive frame of mind. Finally, the old protector of ignorance—the system of using up the land and then moving to fresh areas—is rapidly becoming impossible. The farmer is faced with the problem of maintaining the fertility of his land. He needs help, and he knows it. For these reasons the scientific agriculturist, the expert, and the agricultural college have an opportunity in Canada and in the United States more favourable than that which exists in this country. The admirable use which they have made of it has further strengthened their hold upon farming opinion.

(5) *Value of American experience in agricultural education. Scope of Practical Suggestions.*

We have now touched upon the chief circumstances which differentiate the problem of agricultural instruction in America from the same problem in this country. We have referred to the climatic differences, the contrast in the economic position of agriculture, the larger freedom of

opportunity enjoyed by Universities in younger communities, the relative capacities of the farmers, and their attitude in regard to agricultural instruction. In our opinion the sum total of these differences is considerable, and such as to prohibit the hasty application to English problems of generalisations derived from the study of American examples. But upon the other hand, apart from these differentiating circumstances, the object of agricultural instruction in all three countries is the same. It is to help the farmer, to improve agriculture, to invigorate country life. It appears to us to be unreasonable to dismiss as irrelevant and useless the immense and successful experience which has been accumulated in pursuit of these aims in Canada and in the United States. Even if it were true that we have nothing to learn from their methods, we should still have to admit, with or without reluctance, that we have a great deal to learn from their spirit. With this conviction we have recorded our impressions of the institutions visited, and of their work and policy ; and in now proceeding to develop our ideas about agricultural teaching at home, we shall frequently refer to the lessons to be learned from Canada and the United States.

The Deputation was appointed by the Council of University College, Reading, with the primary object of presenting a Report which should be of assistance in developing the agricultural department of that institution. Though we hope that some of our notes and observations may be of interest and use to other institutions concerned with similar work, it appears to us that in putting forward any practical suggestions we should keep in view, in the first instance at least, the special circumstances of the College at Reading. This Report will fall into the hands of many persons who have only a slight acquaintance with the existing work of the College in agriculture and horticulture; and therefore, mainly for the information of such readers and to secure a complete statement of the whole problem raised for our consideration, it will be useful at this point to set forth briefly what that work is.

Department of Agriculture and Horticulture at University College, Reading.

(1) *General.*

University College, Reading, was founded in 1892, and incorporated in 1896. Since an inspection by the Treasury Commissioners in 1901, the College has held the rank of a University College. Of recent years the Faculties of Letters and Science, which compose the central part of the College, have grown rapidly, and there are now, for example, nearly 120 students reading for the degrees (external) of B.A. and B.Sc. of London University. The College was re-established in 1905 in new buildings upon a new and extensive site. There are Departments of Fine Arts, Music, Commerce, and Evening Classes, in addition to the Department of Agriculture, formed in 1893 upon a basis of grants from the Board of Agriculture and from County Councils. The teaching of Horticulture was added in 1902, and in 1903 a farm was purchased. A Committee, representative of Oxford University, the Royal Agricultural Society, the Royal Horticultural Society, and the College awards diplomas in Agriculture, Horticulture, and Dairying. Since 1896, the Dairy Institute of the British Dairy Farmers' Association has been established in Reading. The Institute is the property of the College, was moved to the new College site in 1909,

is managed by a Joint Committee representing the College and the Association, and is conducted in intimate association with the Agricultural Department, which it adjoins. The first grant by the Board of Agriculture in aid of agricultural teaching at Reading was given in 1894, and amounted to £150. The sum was increased until in 1897 it reached £800. In 1905, the supplementary grant of £200, granted to all recognised institutions which acquire a College Farm, was received ; but otherwise the volume of government aid to agricultural education at Reading has remained stationary for thirteen years. In the summer of 1910, however, the Board signified their intention of giving the College a special grant in aid of Horticulture ; the amount of the grant is not at present (November, 1910) known. A separate grant of £300 a year is paid by the Board to the British Dairy Institute Joint Committee in respect of the Institute's work. The County Council grants received by the College—from Reading, Berkshire, Oxfordshire, Buckinghamshire, and Hampshire—are relatively small. They amount in all to less than £2,000 annually, and of this sum only a portion is available for Agriculture. Unfortunately, the general revenue of the College is by no means in a condition to bear the burden consequently imposed upon it.

(2) *Buildings.*

The buildings devoted exclusively to the purpose of the Department are not extensive. They consist of a separate block, erected in 1905-6, which contains class-rooms, bacteriological, botanical (agricultural), and chemical (agricultural) laboratories, Director's office, and one or two private rooms for other members of staff. Immediately adjoining is the British Dairy Institute. The Institute contains milk-receiving, butter-making, and milk-testing rooms ; rooms for the manufacture of pressed, unpressed, and soft cheeses ; and ripening rooms for the different varieties of cheese. It is equipped with the best modern apparatus for the manufacture of dairy produce, including power-driven separating and butter-making plant, a steam turbine separator, and cold storage plant.

It should be borne in mind that the general buildings of the College, including the Hall, Library, and Common Rooms, and the laboratories (Chemistry, Botany, Physics, Zoology, and Commerce) are used by the students of the Department.

(3) *Farm, Fruit Station, and Gardens.*

The Farm, 141 acres in extent, is situated at Shinfield, two and a half miles from the College. The soil is somewhat varied, and is capable of growing all the common crops. The rotation is adapted mainly for the production of milk, all of which is at present taken by the Dairy Institute. In addition to 11 acres laid out as a Fruit Station, there are 60 acres of arable, 60 acres of grass, 7 acres of wood, and 3 acres of buildings. In addition to buildings already existing when the College came into possession, new farm buildings and cottages have been erected. A field of about 8½ acres is reserved for agricultural experiments. A member of the staff, who holds the rank of Lecturer in Agriculture, resides upon the Farm and superintends its management, while a general supervision is exercised by a Farm Committee appointed by the Council of University College.

Adjoining the main College site is a tract of 4 acres which is devoted to practical Horticulture. It consists of vegetable and flower-gardens and orchard, and is provided with sheds for potting and packing, an office, a demonstration room, a workshop, and a fruit store. It contains a large number of pits and frames and 15 glass-houses (greenhouses, vineries, peach house, etc.). Intensive cultivation of early vegetables is carried on in a portion of the ground equipped with bell-glasses.

(4) *Courses of Instruction.*

The following courses of instruction are provided :—

(a) Degree course in Agriculture.—The course, which extends over a minimum period of three years, is in preparation for the Intermediate and Final Examinations of the B.Sc. degree (external) in Agriculture of the University of London.

(b) Diploma of Associateship Course in Agriculture.—This is a two years' course (two sessions of 30 weeks each) designed for those who may hereafter become tenant farmers, farm managers, land agents, or landlords. The first year is spent chiefly in the study of the sciences upon which the practice of Agriculture is founded. Instruction is also given in Agriculture proper by lectures and practical demonstrations on the Farm, in Surveying, and in Book-keeping. In the second year, the student is instructed in the application of these sciences to Agriculture, as well as in the more advanced details of farm management. Practical work in the British Dairy Institute is included, and competence in prescribed manual farm operations is required. A Diploma with Distinction is awarded to students who, having passed the examinations for the Diploma in Agriculture, spend a third year at the College in pursuing special studies in Agriculture, and pass an examination in connexion therewith.

(c) Diploma of Associateship Course in Horticulture.—This is a two years' course (two sessions of 40 weeks' each) designed for those who intend to take up Horticulture as a career. It provides training in the sciences on which the practice of Horticulture is based, in the growing and marketing of vegetables, flowers and fruit, and in Book-keeping. Students spend upwards of 20 hours a week in the gardens. A Diploma with Distinction is awarded under conditions similar to those attaching to the Diploma with Distinction in Agriculture.

(d) The Certificate Course in Agriculture.—This course extends over six months (October to March) and provides instruction in Agriculture and in elementary science as applied to Agriculture. It is designed primarily for farmers' sons, who having had practical experience of farm work, are desirous of devoting one winter to the systematic study of Agriculture.

(e) The Certificate Course in Horticulture.—This course occupies one year, and is of a more practical and technical nature than the Diploma Course.

(f) Courses in Dairying. These are :—

(1) Diploma Course in Dairying.—This course occupies two years and includes scientific and practical dairying. It is designed for those who hereafter may be teachers of dairying, managers of dairy farms, or creamery managers.

(2) Certificate Course in Dairying.—This course, which occupies one year, is a preparation for the Diploma of the British Dairy Farmers' Association, or for the National Diploma in Dairying, as well as for the College Certificate.

(3) Shorter Courses in Dairying occupy six months or three months.—These are conducted by the Dairy Institute and the College, are mainly of a practical character, and conclude with examinations upon which the certificate of the British Dairy Farmers' Association may be gained.

(5) *Staff.*

The Staff consists of a Director, a Professor of Agricultural Botany and an Assistant, two Lecturers in Agriculture (one of whom resides at the College Farm), a Lecturer and Analyst in Agricultural Chemistry, a Lecturer in Veterinary Hygiene, a Lecturer and Practical Instructor in Horticulture, and an Assistant. At the British Dairy Institute there is a Manager who is also Chief Instructor, and an Instructress. There are four "external lecturers" whose work is in connexion with the neighbouring counties (see p. 99). It is important to observe that the Department of Agriculture and Horticulture relies upon the aid of the Professors of Chemistry, Physics, Botany, and Zoology in the Faculty of Science, and is able to use their laboratories. Similar aid is received from the Department of Commerce and Technical Subjects: e.g. in regard to Book-keeping, Agricultural Engineering, Surveying, and Meteorology.

(6) *Students.*

(a) Conditions of Admission.—Students are not admitted to the Degree (London University) Course in

Agriculture until they have passed the London University Matriculation examination. Those desirous of undertaking a Diploma Course in Agriculture or Horticulture must (1) pass a simple entrance examination, or produce evidence of having passed an equivalent test: (2) produce satisfactory evidence as to character, and as to the seriousness of their purpose in becoming Diploma students.

All day students of University College must be at least 16 years of age.

(b) Fees.—Students whose parents reside in Reading, Berkshire, Buckinghamshire, Hampshire, or Oxfordshire, i.e. within areas whose County Councils contribute to the maintenance of the College, obtain a reduction of (in general) 25 per cent. upon the ordinary tuition fees.

	One Term	One Session (Three Terms)	One Session (Reduced for local students)
B.Sc. (Agriculture) Diploma in Agriculture „ „ Dairying	£12	£24	£18

	Two Terms	Two Terms (Reduced for local students)
Certificate in Agriculture	£16	£12

	One Year	One Year (Reduced for local students)
Certificate in Dairying	£30	£24
Six Months' Course in Dairying	£16	
Three „ „ „	£10	

	One Session (40 weeks)	One Session (Reduced for local students)
Diploma in Horticulture	£24	£18
Certificate in Horticulture	£24	£18

Proportionate charges are made to students who may be specially admitted for shorter periods of study.

There are also minor charges in connexion with examinations, &c.

(c) Residence.—All students whose homes are at a distance from Reading, following full courses of day study,

are required to reside in Wantage Hall (Men), St. Patrick's Hostel (Men), St. Andrew's Hostel (Women), St. George's Hostel (Women), or in certain cases, in Recognised Houses under the supervision of the College authorities.

The cost of board and lodgings for a session of 30 weeks in a Hall of Residence or Recognised House varies from about £30 to £45.

The total cost of tuition, board, and lodging for a session of 30 weeks, may be approximately estimated at about £65 for those Diploma Course Students in Agriculture who cannot claim any reduction in tuition fees on the ground of residence within the area of a contributing county. For Students who are able to claim such reduction, the total cost would be approximately £58. Since the session for Horticultural Students extends to 40 weeks, their total expenses are slightly in excess of these amounts.

(7) *Extension Work. Experiments.*

The Department's principal activities outside the College within the area of the contributing counties are : (1) Lectures to Farmers and Gardeners (2) Field Experiments (3) Identification of Pests, Diseases, &c. (4) Analysis of Farm seeds, soils, manures, waters, feeding stuffs, dairy produce, &c.* (5) Advice with regard to the management of Gardens and Orchards (6) Issue of Bulletins and Reports on Agricultural subjects (7) Examination of Schools, judging at Agricultural Shows, &c. In illustration, it may be mentioned that lectures are given at selected centres, both in agriculture and horticulture, and of recent years well-attended winter courses for farmers and gardeners respectively have also been held at the College. Demonstrations in butter-making and milk-testing are usually given at the Oxfordshire Agricultural

* The analytical practice of University College, Reading, is in accord with the principle laid down by the Departmental Committee. "The Committee, while of opinion that analysis for commercial or trade purposes forms no part of the function of an agricultural college in receipt of State aid, consider that when analytical work is distinctly of educational value it may properly be carried out by the chemist at such an institution." (Departmental Committee on Agricultural Education. [Cd. 4206] p. 29).

Show. Inquiries from farmers and gardeners increase in number, and about 150 are dealt with annually by correspondence and visits. Analytical work also grows; about 240 samples were analysed during the session 1909-10. The chief experiments carried out on the College Farm have related to the manuring of grass and other crops, and to the comparative value of different forms of nitrogenous fertilisers. Trials of the relative merits of English, Scotch, and Irish seed potatoes have been conducted for the Irish Board of Agriculture, and various crops have been tested by growth in plots. Experiments in the manuring of grass land and Swede crops have been carried out on twenty Oxfordshire farms. Official trials of 400 varieties of sweet peas have been conducted in the gardens for several successive years for the National Sweet Pea Society; and these trials have been inspected by visitors from all parts of the country and from the Continent and the United States. Other experiments and trials which need not here be detailed are also carried out in the gardens. Numerous publications and reports dealing with the results of experiments have been issued by the Department. Other publications relating to agricultural and horticultural subjects have been issued by members of the staff, of which the most noteworthy are Professor Percival's fourth edition of his "Agricultural Botany," and his recently published treatise on "Agricultural Bacteriology."

Two-fold Nature of Problem.

The foregoing sketch of the agricultural department shews that the problem of agricultural development at Reading, as elsewhere, resolves itself into two parts, the internal and the external. There is the problem of so organising and maintaining agricultural teaching and research within the Institution that both shall be carried on with the maximum efficiency. There is also the problem of bringing the agricultural department into helpful relations with the agriculture of the district; in other words, of helping the local farmer. Both these tasks must be faced in any policy of development at Reading,

if the College there is to make good adequately and permanently its claim to be the recognised University centre for agricultural instruction throughout a wide area. It should be noted that, of the two tasks, the internal of necessity has the priority both for consideration and in importance. The first duty of an agricultural college is to teach its students well; and to accomplish this duty demands many conditions, of which an adequate staff is only one. Moreover, if the internal work of teaching and research is well done, its good effects are bound to be felt in the area outside, since a proportion, possibly a large proportion, of the students of the College will certainly be drawn from the surrounding district. Upon the other hand, while it would be futile to impose an ambitious programme of extension activities upon a staff already overburdened with internal duties, an agricultural college fails at a vital point unless it wins the interest and confidence of farmers. Not only does it fail to realise its true function, but it loses invaluable support. The significant remark on a preceding page (p. 27) that the College at Guelph overflows with students because Ontario farmers, by means of the Experimental Union and other links, are interested in its doings, can hardly have escaped notice. In England the confidence of farmers has yet to be won; and it cannot be won without effort, —active, well-directed, capable, and persistent. They cannot know about the College, still less become interested in its work, unless the College makes itself known and interesting to them. In framing the following observations and suggestions, therefore, we have kept this double function of an agricultural college or department—the internal and the external—carefully in view.

Questions of Internal Policy.

The questions of internal policy to which we desire to call attention are (1) Staff (2) Curriculum (3) Admission and Entrance of Students (4) The Farm (5) Experiments and Research (6) Buildings (7) After Careers of Students.

(1) *Staff.*

Nothing can be more in accord with experience and common sense than the truth that to do good work there must be good men to do it. An agricultural department if it is to be efficient and to be worthy of a University institution, must command four kinds of ability on its staff. There must be ability to organise and direct; ability to teach; ability to supervise individual students; and ability to experiment and research. One of the worst and most common blunders in making appointments is to fail to discriminate between these kinds of ability, or to fail to provide enough of each. Because a man has one kind of ability it does not follow that he has the rest. Directive and organising faculty does not always accompany learning; brilliance in research sometimes goes with poor teaching; many competent teachers lack imaginative and creative powers essential for the performance of research of the highest order; and experience shows that unless students are handled one by one as well as collectively, many of them will fail to profit as they ought by the instruction they receive, however excellent it may be.

In the first instance, therefore, the problem of staffing should be considered from this point of view. The principle of specialisation, however, should be carried further. At present, both at Reading and elsewhere, most members of the teaching staff are dealing with too many subjects of instruction. The Departmental Committee on agricultural education rightly called attention to this serious

flaw.* "The quality of the instruction given by the colleges, both in the indoor and external lectures, has suffered from the circumstance that teachers have been required to deal with too many subjects, or in the case of agriculture with a subject too wide to be treated effectively by a single man. 'Agriculture' as defined in the ordinary syllabus covers the whole range of arable and stock farming, and frequently includes such related subjects as estate management, forestry, fruit-farming, and market gardening. Of these the teacher of agriculture is supposed to possess an expert knowledge. Though there may be no difficulty in acquiring a sufficient acquaintance with all these subjects in order to pass examinations, or to train students to pass them, a higher standard of knowledge is required in teachers in universities and colleges. The professor must be an expert in his subject, and his teaching must be such as will be of value not only to the elementary and advanced student, but in the case of a subject like agriculture, to the experienced practical farmer. The evidence taken by the Committee clearly shows that the advice of the teacher is frequently sought, and it is obviously desirable that the practice should be encouraged and that the farmer, when in a difficulty, should learn to resort for advice with as much confidence to the agricultural expert as he now does to the medical specialist or to the skilled engineer. But if the knowledge of the teacher of agriculture is thus to be sought often, the teacher must follow the example of similar wide subjects and must specialise." "Teachers must be thoroughly trained specialists."†

Efficient teaching of university standard demands two things, a high personal calibre and concentration upon a definite line of study. The principle of specialisation of teaching functions is carried to a remarkable length in America, and in this respect we may well borrow from their experience. Unless the principle is observed in all except quite minor appointments, it is unreasonable to expect an agricultural

*Departmental Report on Agricultural Education [Cd. 4206] p. 23.
† Annual Report of Board of Agriculture [Cd. 5388] p. vii.

college to make progress, its instructors to win reputation and respect, or its performances in general to satisfy the exacting standards of external critics. In our opinion, the first step in any policy of agricultural development at Reading must be to review the existing staffing provision in the light of the principles here laid down. It will probably be found that some readjustments in the existing distribution of duties, and certain new appointments in connexion with special branches of agriculture or horticulture are required. In making any new appointment of major rank, it is impossible to exaggerate the importance of securing a first-class man. At the risk of wearisome repetition, we reiterate that the question of personnel goes to the very root of efficiency in agricultural instruction. Associate a College or department with men of conspicious ability and energy, and it is hardly too much to say that all other desirable things will follow in their proper places. No proposition receives more lip-homage in educational circles, and perhaps none is more frequently flouted in practice. We who have lately seen what has been done by such personalities as those of Babcock at Wisconsin, Bailey at Cornell, Creelman at Guelph, and Robertson at Macdonald, desire urgently to impress upon the Council of University College, Reading, the extreme importance of bearing this point in mind in any policy of development which they may think proper to initiate.

(2) *Curriculum.*

(a) Control.—As soon as a College has attained a sufficient measure of competence and strength as a University institution, it should itself determine and control its principal courses of study, and the examinations in connexion with them. Any system by which syllabuses and regulations are imposed from without is educationally indefensible, and is inconsistent with the freedom and encouragement of initiative and development.* In England, as in America, an institution of recognised

* The observation applies to the main courses of College study. Here there should be freedom. But this freedom is quite consistent with the acceptance of external examinations and syllabuses to suit a minority of individual cases. The National Diploma Examinations in Dairying and Agriculture are instances.

standing, providing agricultural instruction, should be free to shape its educational policy in accordance with its special circumstances, of which it can reasonably claim to have a better knowledge, and to be a better judge, than any other persons or authorities.

(b) Character of Courses.—The general scope and variety (as distinct from details of syllabuses and procedure) of the courses of agricultural instruction which it is desirable to provide at Reading is much the same as elsewhere, whether in English or American Colleges. The broad character of the provision must always be governed by consideration of the types of persons who seek agricultural education. The main types are three. (1) The student who seeks a thorough and complete training in the science and practice of Agriculture in order, most probably, that he may qualify as a farmer on a large scale or as an expert or specialist instructor. For all such students, as well as for students who without this special motive desire to enter for a long course of advanced study, a degree course, occupying three or four years, is a necessity. (2) The student who as a rule proceeds directly from school to College in order to receive a training prior to becoming a farmer or horticulturist, at home or abroad. Such students can rarely stay at College more than two years, and for them a two years' Diploma course is required. (3) The student who having left school at the age of 14 or 15 and subsequently having engaged in work on his home farm or other farm, wishes to improve his knowledge of agriculture by six or nine months' study, chiefly from a practical point of view. For this type of student a Winter Course is necessary, with possibilities of extension, e.g., in Dairying. Farm Schools supply a similar kind of training, and care should be taken to avoid overlapping.

These are the main types of students, and we consider that in respect of duration and intention, the four year, two year, and six months courses at Reading are suitably designed to meet their needs.

At Reading, in addition to the above, the existence of the British Dairy Institute enables a variety of short courses in dairying to be offered, for which there is a steady demand.

Three other needs must always be considered and met. (1) Every effort should be made to give facilities to the properly qualified postgraduate student who wishes to investigate or study some special problem of Agriculture or Horticulture. The Graduate Schools are one of the most striking features of the agricultural Colleges of Canada and of the United States. At Cornell at the time of our visit there were 58 graduate students working in the agricultural laboratories; at Wisconsin, in 1908-9, 24. The numbers of such students in English Universities and Colleges are relatively small. At Reading there have been several whose work has been chiefly in connexion with botanical and bacteriological investigations. The purpose of a University department is to advance knowledge as well as to distribute it; and upon every ground the research student should be encouraged. Provided that no such student is admitted without satisfactory credentials, that every student works under the direction of a professor who approves the course of study proposed, that the total number of such students does not exceed the material resources of the laboratories, we think that the presence of such students should be encouraged in every way possible. For such post-graduate students the fees charged should be nominal, and financial aid should be forthcoming for certain students of undoubted ability who need it. The further point should also be borne in mind—that it is by a post-graduate system that the existing generation of teachers and specialists can most effectively pass on their knowledge to their successors. (2) The provision of vacation courses for teachers should be one of the regular activities of the Department. Further reference to this point will be found in the section devoted to external questions (see p. 100). (3) Short courses for practical farmers should form a regular part of the work of the specialists on the teaching staff. Each

course should last three or four days, be confined to one subject treated from different points of view by various members of the staff, and be illustrated by demonstrations at the College Farm.

(c) The teaching of Science.—The relative claim of pure sciences in an agricultural curriculum such as that provided at Reading, the period in the course when pure sciences should be studied, the measure of proficiency in purely scientific knowledge to which a degree or diploma student should attain, are difficult questions. It is doubtful whether as yet any wholly satisfactory treatment of them has anywhere been devised. Our views upon these points are the outcome of experience at home, as well as of observation of American and Canadian practice and its results, and we propose to give frank expression to them.

All the American and Canadian institutions visited recognise not only that a College education alone cannot make the complete farmer, but also that there are parts of training essential to a farmer's education which no College can effectively provide. Thus they assume, in fact they impose as a condition, that a student who wishes to enter upon one of the long courses of agricultural study must have spent at least one year working upon a farm.* Upon that foundation of familiarity with farm-routine they proceed to build, concentrating their effort upon instructing the student in modern and improved methods of agriculture. It is not their aim to produce the finished farmer. An agricultural college can no more do that than a school of navigation can produce a captain of a liner. The main function of the agricultural college is to teach the best methods of farming. Practical experience before and after the college course is what makes, and what alone can make, the farmer; but if, during the college period, he has studied and mastered the best agricultural methods, and has undergone the mental training which that study involves, his chance of becoming an intelligent and successful farmer is much increased.

* Cf. Macdonald College, p. 17; Guelph College, p. 25; Cornell University, p. 39.

When, however, we scrutinise the curricula of agricultural institutions we find in a majority of instances, both here and in America, that the instruction deemed necessary to give this knowledge of better methods of agriculture consists, both in two year and in four year courses, partly of empirical or technical instruction, and partly of instruction in pure science, such as Physics and Chemistry. As a rule during the first half of the course the student's time-table is occupied, in proportions roughly equal, by studies in pure science and studies in the technical and practical subjects.* Such a curriculum is sanctioned by custom, but it is doubtful whether the principles upon which it is suffered to rest are often reasoned out. The student whose aim is to become a farmer, and the student whose aim is to become an expert or specialist instructor, are alike subjected to this system. In our opinion the system is wrong. Signs of dissatisfaction with its results, and of effort to adjust the claims of the respective branches of study, were noted by us in America; and we believe that few Colleges in England have been exempt from difficulties and discontent arising from this source.

The question is so important as to deserve close attention. To justify the present method in agricultural education of University standard, according to which, during the first two years of the course half of the student's time is devoted to "science" and half to technical subjects, it is necessary to shew either that such study of science provides a really valuable training, or that it supplies useful knowledge which is directly applicable to practical agriculture. Now, the value of the mental training and discipline to be obtained from the study of Chemistry, or Physics, or Botany, is indisputable; but only when the study is carried on under certain conditions. These conditions are that the study shall be close and continuous, and that the time devoted to lectures and laboratory work shall be ample. Briefly, the study must be thorough if

* For details upon this point, see particulars of courses of instruction as given in the Annual Report of the Board of Agriculture and Fisheries, 1910 [Cd. 5388.]

the good is to result. But agricultural students required to study technical subjects and pure sciences simultaneously are unable to give to their scientific studies either the requisite time or concentration of mind. Consequently they gain only a small part of the intellectual stimulus and discipline which should result from the study of science. Moreover, although agriculture is based upon science, yet the direct bearing of Chemistry or Physics upon Agriculture is hardly to be grasped by students with only a smattering of these sciences; and therefore the practical value of the scientific knowledge possessed by an ordinary agricultural student at the end of two years' study, pursued under the unsatisfactory conditions described, is almost *nil*. Much of the knowledge which he acquired, being unrelated to his practical interests, is quickly forgotten; and there remains to him no permanent benefit of training and only a small stock of scientific knowledge, little of which is capable of application in his work as a farmer. Students themselves are conscious of the futility of studying science under the conditions which usually prevail. Their attitude towards it is not "friendly." They feel that it stands between them and their agriculture: and their feeling is often only too well justified. In our opinion, the comparative fewness of serious agricultural students in this country is in part due to dissatisfaction with the curriculum.*

The present system is equally unsatisfactory if we consider it in relation to the small group of really able students who take up the study of agriculture. When such men enter upon a course of study as described, partly scientific and partly technical, they are apt to suffer in two ways. First, their progress is impeded by the low standards of the average student for whom the course in science has been planned; and secondly, they tend because of their ability and antecedents to neglect their practical

* It is worth noting that at Reading the student of Horticulture spends a relatively larger amount of time in "practical" studies than the student of Agriculture. Opinion, even of those who teach him pure science, would certainly not pronounce the horticultural student less intelligent or less keen.

agriculture in favour of science. And yet precisely because these more intellectual men are usually without experience of farm work, it is important that the practical side of agriculture should from the first arouse and hold their interest and attention. Otherwise, agriculture is likely to suffer serious losses. For these are the very men, however small their numbers, who are capable of becoming able investigators and teachers, or really "inventive" farmers. If, however, agriculture is to profit by their abilities, agriculture must be the predominant interest throughout the course of training of these abler students. They must be agriculturists first, and men of pure science afterwards. In our opinion the courses of instruction, as ordinarily arranged, are not calculated to produce this desirable result.

It appears to us that a better procedure would be the following. Before admission to one of the longer courses in agriculture, a student should have at least a fair acquaintance with ordinary farm routine. He cannot gain this acquaintance unless he spends at least one year in practical work on a farm.* The first two years of the College course should be devoted, by all students alike, to the definitely agricultural subjects, and to subsidiary subjects such as book-keeping and mathematics. Instruction should also be given in the simpler technical facts of soils and manures, farm weeds, and the common disease-producing fungi and insects, as well as in the care and use of farm implements. Such courses should be short, thorough, limited in scope, and precise in application. They should not spread away into an attempt, impossible under the conditions, to teach the general principles and procedure of Chemistry, Botany, Physics, and Zoology. On the other hand, we are strongly of opinion that in most agricultural courses the "culture" side is insufficiently developed, although agricultural students, as a rule are by no means in a position to neglect it. A system of weekly essays gives opportunity for improving composition, and of directing

* Further reference to this proposal will be found on p. 84

reading. It will have been noticed that the inclusion of simple courses in Literature and History is a feature of the agricultural curricula at the Macdonald and Guelph Colleges, and we appreciate the importance of the object which these courses have in view. The provision of such teaching should present no difficulty to an Agricultural Department which is incorporated in a University institution.*

The decisive point in the curriculum would be reached at the end of two years. Students then segregate into three groups: (*a*) those who having obtained the practical instruction they needed proceed to take up farming at home or abroad; (*b*) those who desire to stay a third year in order to study more fully some one branch of agriculture; and (*c*) those who wish to complete their training as experts or specialists by a further two years of study. The last group, who may be described as "degree" students, should receive special attention, despite their small numbers, because of their ability and serious purpose. By the beginning of the second period of two years, these degree students on the one hand will have become keenly interested in the practical side of agriculture, and on the other hand will be feeling the imperative need of more scientific knowledge. Instead of the reluctance which is at present usually felt by an agricultural student when called upon to study sciences at the beginning of his course (whereas he had set his heart upon studying agriculture), it may be confidently anticipated that these degree students will now work with zest and vigour at such sciences as Botany and Chemistry in relation to Agriculture, and that their progress in scientific knowledge will be more satisfactory and rapid than under the old system. It is not now necessary to plan the curriculum in detail, but it is obvious that during the third and fourth years the student should give a large portion of his time to the

* A well-illustrated course of lectures dealing with the progress of English agriculture, and shewing how almost every step has been due to individual experiment and the application of scientific ideas to practice, would not only instruct the student in a most important branch of social history, but should increase his respect for scientific and enlightened methods of agriculture.

two basic sciences, Botany and Chemistry, while continuing the study of strictly agricultural subjects. For the training of specialists, postgraduate study for a further period, possibly the condition of an honours degree, should also be organised, and it might be well to adopt the practice of Canadian and American Universities* of requiring such students to write a thesis upon an approved subject.

Thus the essence of our observations upon curriculum is that the first part of the route to competence in scientific agriculture lies through technical and practical study. We believe that the progress of agricultural education of a University standard has been retarded in this country by the attempt to force science upon the student at the wrong point in his career. The prime consideration in a practical teaching policy is to keep alive and vigorous the student's interest in agriculture, and not to submerge it by an unseasonable deluge of what he is apt to regard as tiresome and irrelevant studies. We have confidence that if he is given the agricultural curriculum which he desires, the intelligent student will form naturally and independently an ambition to possess a more extensive acquaintance with the sciences upon which the practice of agriculture rests. We found in America, for instance at Macdonald (p. 15) and Wisconsin (p. 46), much to enforce the reasonableness of our view. If this view should prove to be correct, it will be of little use to denounce it as heretical : for the result will be that the advanced student will study science to better purpose than in the past, and that the scheme of his curriculum will be in harmony with the natural trend of his intellectual development.

(3) *Admission and Entrance of Students.*

An examination of the statistics of students attending agricultural Departments and Colleges in this country suggests that probably few of these institutions are able to enforce entrance conditions with severity. At Reading, during recent years increased strictness has been exercised,

* At Cornell post-graduate courses extend to three years, making a total training period of seven years.

and we urge that the standards of admission should be gradually raised until no student is accepted for one of the longer courses who is not in ability and purpose clearly fitted to pursue the course of study with advantage to himself and the Department.

The point is of capital importance in relation to efficiency. Experience shows everywhere that the agricultural college is too often regarded as the last refuge of the incompetent.* Thither, unless checked by admission barriers, betake themselves some of the idlers, dullards, and failures of school, as well as the serious and capable student. Others seek admission because an outdoor career has been recommended as a corrective of some physical or mental ailment, and of these only a proportion are capable of becoming satisfactory students. In all such cases scrutiny by the College authorities is imperative, and a policy of sifting and rejection should be pursued. The advantage of larger fee receipts and larger numbers is dearly purchased if it means lowering the standards of work and retarding the progress of the capable student, through the admission of the backward or unfit.

Our chief observation under this heading, however, relates to the condition of previous experience of farm work. In the preceding section we have urged that before admission to one of the longer courses in agriculture a student should show that he is acquainted with ordinary farm routine. The advantages resulting from the application of this condition are so obvious and great, and so clearly illustrated by American and Canadian experience, that it is hardly needful to discuss them. Nevertheless, we recognise that there might be difficulty in applying the condition in its entirety at once. We suggest, therefore, that in adopting it at Reading, it should be accompanied by an alternative, namely, that students unable to shew a previous experience of one year upon a farm must spend, either during the vacations of their first two years at

* Cf. Annual Report of the Board of Agriculture, 1910 [Cd. 5388], p. vii., "The experience of most of those who have been engaged in the teaching of Agriculture is that the quality of the students admitted to our agricultural colleges is often unsatisfactory."

College, or at least before starting on their third year's course, a sufficient period on a farm under approved conditions. A similar condition should be imposed in reference to two year courses of study. It should be possible to arrange that some at least of these students should gain their practical experience by working on the College Farm.*

(4) *The Farm.*

A College Farm should fulfil three main functions. (*a*) It should serve the purpose of an agricultural laboratory where students are instructed in general agricultural practice. If this educational object is to be attained, it is evident that the Farm cannot be conducted merely for commercial profit. For example, students cannot be taught to milk except at the expense of the milk-yield ; it is probable that some live stock not very well suited to the district must be kept for demonstration purposes ; and some crops must be grown, because of their importance elsewhere, in spite of the fact that the soil of the Farm may not be specially adapted to them. These are the first conditions of an educational farm, and they at once differentiate its purpose and management from that of a purely commercial undertaking. (*b*) The Farm should carry on experiments. As far as possible, these should relate to the problems of the district and be suggested by practical farmers, who will thereby have an additional interest in visiting the College, and will be more likely to respect and to co-operate with its experimental work. Farmers not seldom visit the Farm at Reading, and have always shewn considerable interest in the experiments there ; but there is room for a great development in this respect. (*c*) The third function of a College Farm is to demonstrate a typical branch of local agriculture, carried on in the best possible way as a going and economical concern. At Reading the branch of agriculture selected should be dairy farming.† We

* Cf. practice in this respect at Guelph.

† The Farm at Reading possesses an excellent market for milk in the University College, and its halls of residence, and in the British Dairy Institute.

do not enter here into the question of the best method of organising the management of such a Farm. The assistance of an Advisory Committee of farmers in connexion with it would be of obvious value, for in this way their sympathy and interest is most readily to be obtained. The criticism of practical men and their discussion of the methods and experiments practised on the Farm would in themselves be guarantees that a sound policy would be pursued.

Briefly then, we consider that the educational side of a College Farm, and the side which is managed on specialised and strictly commercial lines, are both necessary for obtaining the best results ; that they respresent distinct and separate functions, and that confusion between them is one of the reasons why College Farms often fail to convince either the farmer or the man of science. For the result of an unsatisfactory compromise is that the farms do not pay because their experimental and educational work is costly, while their experiments are apt to be starved and unconvincing through fear of balance sheets. The difficulty can only be surmounted by the division of the Farm into two separate parts ; one for teaching and experiment, the other for commercial demonstration.

(5) *Experiments and Research.*

It is increasingly felt that a University Department should have as one of its principal aims and activities the carrying on of experiments and of research. "In higher institutions providing agricultural education, original work should not only be encouraged, but expected."* Reputation and efficiency of teaching, in other words, the prosperity of the Department, both depend upon the degree of sincerity and effectiveness with which this aim and this activity are pursued. Yet there still is much that is haphazard and unsatisfactory about this aspect of agricultural education. Without entering upon the wider questions which, it is understood, are at present engaging the attention of the Board of Agriculture in connexion

* Report of Departmental Committee [Cd. 4206], p. 26.

with the schemes of the Development Commission, we suggest that the research question should be considered in such a Department as that at Reading from three points of view. (1) Whilst facilities should be provided to enable specially qualified members of staff to pursue researches, the immediate practical applications of which may not be obvious, the main research effort of the staff should concentrate upon the investigation of local problems. If this aim is to be effectively attained, the staff should include specialists, each of whom should base his programme of researches upon a survey of the agriculture of the region over which the influence of the College extends. The purpose of the researches should be to elucidate the ways in which the agricultural practice of the region is capable of improvement, and whenever a point is established experimentally, it should receive demonstration upon the College Farm, and elsewhere, in order that publicity may be given to it. (2) The continual repetition of experiments, the results of which are foregone and accepted truths, is to be deprecated. Nevertheless, it must be remembered that "demonstration" is as important from the practical point of view as research itself, and therefore provision should be made—and at Reading is made—for demonstration experiments in different parts of the area.* (3) How is the work of experiment and research to be organised in reference to the staff? No member of the staff should be wholly occupied with teaching. Each should have enough time either for laboratory research, or for work of investigation and demonstration in the field. "Each teacher must be expected to work at his subject; the agriculturist must farm; the chemist work in his laboratory; and so with the others, otherwise college teachers would soon become unfit for the positions they occupy."† Nevertheless, it is certain that not all the members of an agricultural staff are likely to be able to carry out original investigation of the highest kinds. In making appoint-

* Agricultural university institutions might well agree to conduct, more often, simultaneous trials and demonstrations of new methods suggested by researches, which are not extensively known among the agricultural community.

† Annual Report of the Board of Agriculture, 1910, [Cd. 5388], p. vii.

ments, it ought always to be recognised that some men are wanted primarily for teaching, and that among such men there are some who are not able to carry out independent investigation. To insist upon such men attempting research of the higher order is useless. Their function is to teach, and to conduct under direction trials and demonstrations. The latter work is not research, and should not be confused with it.* Nevertheless, as we have already observed, it is important work, and those who are associated with it, retain touch with practical agriculture, and are not likely to degenerate into merely academic agriculturists. Other men, on the contrary, should primarily be researchers, though it is desirable that they should also lecture on their special subjects. The majority of the staff should both research and teach, for this is the ideal condition for the University agriculturist.

(6) *Buildings.*

The existing buildings of the Agricultural Department are excellent as far as they go, but even though supplemented by the adjacent British Dairy Institute, it is already evident that any considerable increase in the number of students using them, or the addition of new members of staff, would make an enlargement of them indispensable. Fortunately, the style of building adopted by the Council of University College, Reading, is very simple and economical. The laboratory buildings can best be described as single-storey workshops. They have proved most satisfactory in use, and their simplicity of construction makes it possible to build substantial additions to them at moderate cost. Agriculture and Horticulture will certainly require more laboratory and class-room

* Cp. on this important point the Annual Report of the Board of Agriculture, 1910, [Cd. 5388] p. xii. "The "expert" agriculturist laying out manurial plots on a farm, or the chemist analysing agricultural products in his laboratory, may be no more engaged in research than the farm labourer, or the miller, carrying out his routine tasks. In order that work may become research it must satisfy one or both of two conditions (1) it must, as a result of observation or experiment, result in the collection of fresh facts : (2) it must involve an examination of the facts collected, or phenomena observed, and the reduction of these to a form in which they constitute an addition to knowledge."

accommodation in the near future, and we think that the agricultural buildings would be made more interesting and useful to students and farmers if they included a well-arranged agricultural museum and a machinery hall, where, as for example at Guelph or Macdonald, specimens of the best types of agricultural machines and implements could be kept for educational purposes. One of the conditions of success alike for a College or for a Department is to possess buildings with interesting contents; and we think that the Agricultural Department at Reading is not as well provided in this respect as it should be.

(7) *After careers of Students.*

It was stated on a previous page (p. 40.) that 91 per cent. of the ex-students of the College of Agriculture at Cornell University were engaged in farming, or were pursuing some line of work directly allied to agriculture. So high a proportion compels us to realise that the subsequent career of an agricultural student in Canada or the United States is exempt from many of the difficulties experienced here. For him land is available, and he proceeds to farm it. Very different are the conditions which characterise a country of old occupation. A student at an English college may give every promise of practical ability as a farmer, but it by no means follows that a farmer's career will be open to him at home. He may become a teacher of agriculture, or he may emigrate in order to become a farmer in a distant land, within or without the Empire, unless he is fortunate enough to command an opening as a farmer in England. We venture to suggest that more might be done to help such a student to secure a suitable career than is done at present. It should be the business of some organisation, working upon the lines, for example, of the Cambridge Appointments Committee, and representing perhaps not one institution but several, to try to find opportunities and careers in this country as well as abroad, for young men of agricultural ability.

Questions of External Policy.

The Opportunity of the College.

The nucleus of the College at Reading came into being only eighteen years ago. Ten years were absorbed in the effort to gain status as a University institution. The chief tasks and achievements of the second decade, thus far, have been the rebuilding of the College upon a new site, and its endowment; the recasting of its internal organisation, and a great extension of its scheme of residential halls. In the meanwhile, sharing in the rapid advance of the College, the Department of Agriculture and Horticulture has developed from small beginnings until in respect of the number of long-course students in attendance it has become the largest agricultural department, with the exception of that at Cambridge, in connexion with any University institution in England and Wales.* Moreover, as already stated (p. 64) the resources of the Department (e.g. horticultural ground, Farm, British Dairy Institute, new buildings) have during the same period been greatly improved and extended. Thus

* The statement is based upon the statistics in the latest Annual Report of the Board of Agriculture, 1910. [Cd. 5388]. The Report shews that, in 1908-9 of students taking courses of study occupying two full sessions, or more, Reading had 46, Bangor 13, Leeds University 16, Newcastle 17, Aberystwyth 14, Cambridge University 51 (apart from a number of Forestry students). If students taking winter courses (one period of six months, or more than one) be included, the gross figures are Reading 58, Bangor 13, Leeds University 49, Newcastle 24, Aberystwyth 45, Cambridge University 51 (apart from a number of students in Forestry). Each institution also records a number of "special students," the duration and character of whose studies is not stated.

the general position and outlook are highly encouraging. It is to be observed, however, that the growth of the Department has been characterised, and indeed only made possible, by concentration of effort upon internal problems rather than upon external. The amount of external work carried on in the region around, both independently and in co-operation with neighbouring County Councils, is considerable, as already shewn, and is increasing. But it has not hitherto received as much attention as the internal work in connexion with the regular students of the College.* In our opinion this concentration upon the internal problems has been entirely justified, for until the internal work is sound and sufficiently strong it is folly to undertake more than moderate responsibilities outside. But we are equally convinced that the time has now come when the question of developing the external work of the Department among agriculturists of the surrounding counties should be taken up with energy. Like Guelph, the College at Reading should aim at becoming "the aggressive distributor of the best ideas and methods" of agriculture. We desire to approach and to treat this question as one of public policy, for we believe that the interests of agriculturists throughout a wide region will be promoted by the development of a vigorous extension side to the Agricultural Department at Reading.

If an institution is to serve a large district (and experience and economy dictate that the district shall be large), it should occupy a central and accessible position. University College is well qualified in this respect. Reading stands on the border-line between Oxfordshire and Berkshire, within seven miles of Hampshire and eight miles of Buckinghamshire. The railway routes which converge upon Reading give ready access to it from all this area except part of Buckinghamshire. To this circumstance modern Reading owes much of its prosperity, and the College much of its growth. Primarily because the College is so conveniently situated,

* It should be observed that a considerable proportion of these students come from the area of the contributing counties.

the County Councils of the four counties named have been able to make use of and to support its educational work. Their Education Committees send to it a steady stream of county scholars, their secondary schools are in touch with it, and in other ways the College plays a part of growing importance in the higher education of the region. But undoubtedly its greatest opportunity of service is in regard to agriculture. The new Universities and Colleges of northern England stand in relation to great urban and manufacturing centres, and their educational policy is accordingly marked by the prominence given to engineering and technology. But the College at Reading, apart from its responsibilities towards Reading itself, stands in the midst of a rural area of great extent, the interests and pursuits of which are predominantly agricultural. In Berkshire, Buckinghamshire, Hampshire and Oxfordshire there are 8,737 farmers. If we include Dorset, a county not now connected with any higher institution providing agricultural education (but which formerly co-operated with the College at Reading), and Wiltshire (which is not in connexion with any higher institution providing agricultural education*), the total is raised to 14,925.† These statistics explain why the Board of Agriculture selected Reading for its collegiate centre in south-central England, and in our opinion they point with irresistible force and clearness to the line upon which our educational policy, apart from purely University studies in Letters and Science, should specialise and develop. The true aim and ambition should be to build up a Department which should in effect become an Agricultural University, providing first and foremost for the needs of the great agricultural community around it. If, however, this aim is to be pursued with any prospect of success, it appears to us that foremost among necessary conditions are the

* Annual Report of the Board of Agriculture for 1908-9 [Cd. 5388] pp. 73, 111.

† Census of 1901. Farmers here includes male and female, and the following, descriptions of agriculturist: Yeoman, tacksman, cheesemaker, (on Farm), crofter, dairy farmer, fruit grower or farmer, poultry farmer, hop-,potato-,seed-, grower, horse-,or cattle-,sheep-,farmer. No employees are included.

three following: (1) a thorough acquaintance with the agricultural circumstances of the district (2) a more effective co-operation between County Councils and the College in respect of agricultural education and (3) the institution at the College of an Extension Section to deal specifically with the external work of the Agricultural Department.

(1) *Knowledge of Local Conditions.*

The point scarcely needs enforcing. "Teachers in England and Wales are not sufficiently provided with material based on the close study of local conditions."* It is plain that if the external work of the Agricultural Department is to be effective, it must bear directly upon the problems and needs of local agriculture. Demonstrations and extension lectures which are not inspired by an intimate knowledge of the local farmer's needs are for the most part waste of time and money. If the services rendered are to have direct value to the farmer it is evident that two things are requisite. In the first place, the Agricultural Department should be enabled, in the manner already indicated (p. 87), to make a systematic study of the agriculture of the region. The localities, circumstances, and needs of the chief classes of agriculturists—dairy farmers, stock raisers, fruit growers, and the like—should be carefully studied; and the programme of external work should be based upon the knowledge thus gained. Secondly, means should be taken by personal inquiries, conferences, addresses to Farmers' Clubs, and in such other ways as may commend themselves, to elicit the views of farmers themselves with respect to the most useful kind of educational service which the College could render. Whether it would be feasible to organise in the neighbouring counties Farmers' Institutes on the lines of those in Ontario described on p. 31 is a question which can hardly be discussed here; but the Ontario example is at least suggestive and stimulating. It is certain that in every county there are already several agricultural and

* Report of Departmental Committee [Cd. 4206] p. 8.

horticultural organisations which might advantageously be brought into relation with the collegiate centre for agricultural teaching. In short, whatever the means employed and whatever the difficulties in the way, the prime object should be to found agricultural service upon local agricultural needs, to give service of real value, and to eradicate altogether from the scheme of external work the haphazard, spasmodic, and casual element which, we believe, has too often in the history of English agricultural education been a cause of failure.

(2) *Co-operation with County Councils.*

There are two main questions. In the first place, there is the question of direct grants in aid of the Agricultural Department at Reading. The smallness of the grants at present received is in serious contrast with the amount of grants received by similar institutions in other parts of the country, and this contrast attracted attention when the Departmental Committee of the Board of Agriculture was inquiring into the agricultural work of the College at Reading. We are aware of the strain imposed by the cost of general higher education upon the resources of the counties, and we recognise that more support is not likely to be forthcoming except in return for definite services to be rendered. If, however, the College at Reading should be in a position to shew that it is ready and able to serve in increased measure the needs of higher agricultural education in a particular county, it is reasonable to suppose that the agricultural interest in that county would be able and willing to secure consideration of proposals made on its behalf. We would also point out that a modest increase in the subsidies at present given by the several county councils would more than proportionately strengthen the work of the Department.*

* The following particulars relative to County Council contributions to Agricultural Departments of Universities and University Colleges, and to agricultural institutions, are extracted from the Annual Report [Cd. 5388] of the Board of Agriculture, published in 1910, but referring to the year 1908-9.

The second question concerns the relations between the agricultural external work of University College, Reading, as it is or may be carried on, and the existing or future agricultural teaching carried on under the direct control of County Councils. Hampshire, for example, maintains a county staff which discharges two sets of duties, one in connexion with the Farm School at Basing, the other in connexion with migratory instruction in dairying, poultry-keeping, farming, horticulture, &c. throughout the county. The contact of the Agricultural Department at Reading with this work is principally in respect of the Farm School, which is inspected and examined annually, and from which selected students proceed to the agricultural courses of instruction at

Institutions.	Amount of County Council Grants received in aid of Agricultural Education.	Remarks.
	£	
Wye, South Eastern Agricultural College ...	6,176	
Leeds University	5,175	(£809) "For maintenance and tuition of scholars."
Midland Agricultural and Dairy College ...	3,219	
Chelmsford Technical Laboratories ...	2,398	
Uckfield Agricultural and Horticultural College	2,118	
Holmes Chapel College of Agriculture and Horticulture	1,900	
Harper Adams Agricultural College ...	1,593	Includes Scholarships.
Newcastle, Armstrong College	1,439	
Hampshire Farm School, Basing ...	1,417	
Cambridge University	1,035	
Aberystwyth University College ...	936	Includes Scholarships £521.
Cumberland and Westmorland Farm School ...	864	
Agricultural Institute, Ridgmont ...	750	
Bangor, University College of North Wales ...	709	Includes Scholarships.
Harris Institute, Preston	650	
University College, Reading	584	Includes both grants in aid and Scholarships.
Ipswich Dairy Institute	582	Includes Scholarships and local classes.
National Fruit and Cider Institute (Long Ashton)	550	
British Dairy Institute, Reading... ...	Nil.	

Reading. Oxfordshire also maintains a system of migratory instruction, and in this case the members of staff concerned appear as external lecturers of University College, Reading, in accordance with the arrangement explained previously on p. 68. The College also undertakes by agreement to render specified services in connexion with lectures and experiments. A similar practice prevails in Buckinghamshire. Berkshire discontinued some years ago its system of migratory teaching. A county instructor is at present associated with the staff of University College, and works in the College laboratories; but the general policy of the County Council in regard to agricultural instruction is now under consideration. Both Wilts and Dorset carry on migratory work, but as already stated, these counties are not at present associated with the College at Reading.

It appears to us that the principles which should govern the organisation of agricultural education, as between the College and the neighbouring County Councils, admit of clear statement, and, except perhaps in some points of detailed application, are such as must meet with general acceptance. The function of a collegiate centre, recognised by the Board of Agriculture, in relation to a given area is to provide, according to its means, the highest kind of agricultural education and research. When in 1890, the Board of Agriculture, acting in virtue of the Board of Agriculture Act of 1889, first undertook the organisation of agricultural education, it deliberately decided to create collegiate centres which should discharge this important function. "It was decided that the first thing to be done was to build up a series of central institutions, capable on the one hand of giving instruction, and on the other of conducting agricultural experiments and taking such other steps for enlisting the interest and support of the agricultural community in their work as might seem to be desirable. . . . . The broad result has been that most parts of the country have been provided with institutions capable of furnishing higher instruction in agriculture."* Any scheme of agricultural education,

* Annual Report, 1910 [Cd. 5388] pp. v—vi.

organised within the area of its influence whether by a local or national authority, which failed to recognise the existence of the collegiate centre and its function, which failed to relate all forms of agricultural education to the centre and to ensure co-operation with it, would inevitably lead to duplication, waste of effort, and from the ratepayer's point of view, waste of money. On this point, which has recently gained a fresh and serious importance owing to the division of responsibility for agricultural education between the Boards of Agriculture and Education, we may quote from the Resolution adopted in March 1909, by the Rural Education Conference held in London, and also by the Central Chamber of Agriculture, and by the Farmers' Club. "That each group of counties should be connected with an Agricultural College or Institute equipped with an efficient staff and apparatus for giving the higher forms of agricultural instruction, both practical and scientific. That the Local Education Authorities should provide scholarships for continuing the education of young men from the Secondary School at such Institutions. That a portion of the staff of the Institution should be available for peripatetic instruction in the adjoining counties. That the Institution should be supported by contributions from the counties as well as from the Central Department, and that experimental farms and stations should be maintained in connexion with each College or Institute."*

Earlier in our Report we described the College at Guelph as "the capital centre for teaching, for experiment, for expert knowledge, and for constructive ideas" in agricultural education in the province of Ontario. (see p. 29.) Allowing for every difference of circumstance, it appears to us that this description indicates the ideal function of the English agricultural College or Department in relation to its region.

Admitting, however, the importance of recognising, aiding, and using the agricultural college as the "head and centre" of agricultural education within its area, it is

* Board of Agriculture Annual Report, 1909. [Cd. 4802] p. 150.

probable that some County Councils will always wish to carry on certain kinds of less advanced agricultural instruction under their direct and undivided control. Work of this kind is at present undertaken in many counties, including, as already noticed, Hampshire, Oxfordshire, and Buckinghamshire. The co-ordination of such work with the work carried on by the collegiate centre at Reading should not present difficulty, but if either is to be effective the co-ordination must be real and living. Both the collegiate centre and the county instructors should be active; but their activity should not be carried on in ignorance of, or in rivalry with, one another. This is not the place to prescribe in detail the exact character of such schemes of co-ordination. What is needed in each case is a treaty the terms and aim of which are periodically reviewed. Hence arises the suggestion of a Joint Committee, the desirability of which was so strongly enforced by the Departmental Committee on Agricultural Education. Their Report [Cd. 4206 p. 37] urged "that, so far as control by local authorities is concerned, the organisation and supervision of agricultural instruction should always be entrusted either to a special committee, or to a sub-committee reporting direct to the education committee of the county council, and consisting principally of agriculturists and of representatives of the college to which the county may be affiliated." We are of opinion that if agricultural education is to be developed successfully in the region under consideration, and if the resources of the Department of Reading are to be utilised to the best advantage, this principal of joint-consultation should be further extended. At present the Director of the Agricultural Department serves as a member of the Advisory Committee of the Hampshire Education Committee, while the Principal of the College, a member of Council, and the Agricultural Director serve as members of the Agricultural Sub-Committee of the Berkshire Education Committee. No similar arrangement prevails in regard to Oxfordshire and Buckinghamshire. The Council of University College,

Reading, includes representatives of all four counties, but this arrangement, though of the highest general value, does not secure special consultation with regard to agricultural education in a particular county. The practice, again, by which county instructors in agriculture in Oxfordshire and Buckinghamshire are appointed by the County Councils in consultation with the College and take rank as members of the College staff is excellent as far as it goes,* but the contact with the agricultural Department at Reading can only be made effective by frequent interchange of visits and by periodical conferences. In the case of Berkshire, where a similar arrangement prevails, the county instructor is able to use the College laboratories, and contact is easier owing to both the College and the County Council head-quarters being situated in the same town. The intimate association between the county instructors in Ontario and the College at Guelph is a valuable precedent of a sound method of organisation. (see p. 38).

In conclusion upon this point, we desire to urge most strongly the importance both to County Councils and to the College at Reading of taking all possible measures to secure a thorough co-operation and understanding in the work of agricultural education. That work is by common consent beset with peculiar difficulties; and it cannot be undertaken with any real prospect of success unless all available resources are brought to bear, and are directed in obedience to a well-understood scheme of organisation. This argument leads irresistibly to the idea of associating several counties in support of a common scheme, and upon this point some general proposals will be found in the next section. "It is assumed that these higher institutions (i.e. collegiate centres of agricultural teaching) will serve a group of counties."

(3) *Institution of an Extension Section.*

The branches of extension work already in existence

* It is specially commended in the Report of the Departmental Committee [Cd. 4206] p. 24.

at University College, Reading, include (*a*) the analysis of soils, manures, feeding-stuffs, water, etc. (*b*) seed testing (*c*) the identification of insect and fungoid pests, and advice by letter as to treatment (*d*) advice on questions relating to dairy produce, and agriculture generally (*e*) occasional lectures to farmers' clubs, and similar organisations, on agricultural topics (*f*) judging and demonstrations at agricultural shows (*g*) organisation of vacation courses for rural teachers and others. All this work has to be carried on by members of staff already immersed in teaching duties, and consequently it has never been possible to develop it with freedom. But the College realises that nothing would invigorate its work more quickly or more thoroughly than an augmentation of the staff resources for extension work. From what has already been said, it will be evident that all extension work should be carried on in consultation with farmers' organisations, and in co-operation with the county education authorities. The principle which is practised in reference to the Farmers' Institutes in Ontario might be followed with advantage. The College should put forward its list of lecturers and their subjects, and the selection of centres should be guided by the recommendations of local farmers and of the county education authorities.

The external work of the agricultural Department is a factor of such vital importance in gaining the confidence of farmers that, in our opinion, a special section of the Department should at the earliest possible date be established to deal with it. Two conditions in organisation are imperative if the work is to be developed and conducted successfully. First, the staffing resources of the Department must admit of the extension work receiving adequate attention. The lecturers and others employed must not only be competent for their work, but they must be able to give to it the time it demands without detriment to the internal efficiency of the Department. It is folly to distract a lecturer with outside duties if he is already fully burdened with internal teaching

duties; and it is also folly to send out men to address farmers who are not able, owing to other claims or to insufficient special training, to give them the best information. These observations suggest the appointment of additional members to the staff for the main purpose of representing the College in external work. Each of these new members should be a master of some one section of agriculture, or of agricultural science. As instances of sections, for which experts should be appointed, we may mention grass-land, cereals, green crops, soils and manures, feeding stuffs and dairy produce, fruit, insect diseases, and fungoid diseases. It is only when given a restricted field of this kind that a man can make himself really an authority on his work, and that he can acquire that well-founded confidence so essential to one who will be called upon to advise practical men. Moreover, it is upon the provision of such an extension staff that we must rely if we desire to enroll farmers in large numbers in support of science and to make the College a powerful intellectual centre of country life. Any such scheme would be expensive, and quite beyond the resources of the College, or of any one county. If, however, a group of six counties were to combine to support the extension scheme, they would gain the great advantage of the services of an efficient staff of specialists.*

It is probable that after the extension work has developed, a special officer should be appointed who

* Annual Report of the Board of Agriculture, 1910, [Cd. 5388] p. vi. It may be of interest to outline here the proposals which University College, Reading, has submitted to the Board of Agriculture in connexion with the Development Fund Schemes for agricultural education and research. (1) Grants are asked for to make possible the following researches and undertakings (a) an inquiry into the micro-flora of the chief English cheeses at different stages of ripening, beginning with Stilton cheese (b) the raising of improved types of cereals by the methods of "selection" (c) an inquiry into the "hardiness" of apple trees (d) research in dairy chemistry (e) an inquiry into the relation of air and soil temperature to the yield of certain crops, more particularly wheat. (2) grants are also asked for to make possible the provision of the nucleus of an extension staff of highly trained specialists, each of whom would deal with a single section of agriculture or agricultural science, and all of whom would devote their main energy to work in the counties associated with University College. In the first instance, the sections represented would probably be Soils and Manures, Feeding Stuffs and Dairy Produce, Grass Land, Cereals, and Dairy Farming.

should be responsible under the Director for all arrangements in connexion with outside work. The work involves much correspondence and negotiation, and we think that if it is to be efficiently performed, a member of staff, himself a trained agriculturist, should be appointed to give it continuous supervision. The library system also would require to be strengthened and developed.

In the event of the College undertaking extension work, other than purely agricultural, this Extension Section might without difficulty be enlarged so as to include a wider scope of activity.

Summary of Suggestions and Concluding Remarks.

Holding most strongly that the time has arrived for the adoption of an energetic policy of development in agricultural education and research at University College, Reading, we have outlined in the foregoing Report the main features of such a policy. Our suggestions have been founded upon our experience and knowledge of the actual conditions which prevail in England and at Reading, but we have also been influenced at many points by our study of agricultural education in Canada and in the United States. The views and suggestions put forward may be thus summarised. (1) The problem of agricultural development at Reading is two-fold, internal and external. Hitherto the internal problem has rightly received most attention; but the time has now come when the external problem demands comprehensive

treatment. (2) The staff of the department should be strengthened; appointments should be governed by two main considerations, high personal calibre and specialisation of teaching or research function. Personnel determines efficiency. (3) University College, Reading, should control its main courses of agricultural and horticultural instruction, both syllabuses and examinations. (4) The existing scheme of courses of study is satisfactory, but more attention should be given to the case of long-course students and post-graduate students, and to vacation courses for teachers and others. (5) Pure science should be taught principally in the later stage of the agricultural course, the earlier stages being given a stronger bias towards "practical" work than is the case at present. (6) The standards of admission for students should gradually be raised, and students should be required either to show previous experience of farm-work or to gain such experience during their course. (7) The College Farm should answer three main purposes; it should be educational, it should develop its experimental side, and it should specialise in dairying. The Fruit Station should be maintained. (8) Experiments and research should be systematically planned, partly in reference to local needs and partly in reference to the special aptitudes of members of the staff. (9) Growth will necessitate additional buildings, among which it would be desirable to include an agricultural Museum and a Machinery Hall. (10) As regards external work, the situation of the College at the heart of a great agricultural region gives it a notable opportunity. Local conditions should be carefully studied; and every attempt should be made to secure the sympathetic interest of farmers. Increased support should be sought from County Councils, and the position of the College as the recognised collegiate centre for higher agricultural education in south-central England should be made more real and effective by means of carefully organised schemes of joint-action with the several County Councils. Lastly, in order to enable the external work to be properly undertaken and performed, and to

mark the opening of a new chapter of external activity, an Extension Section of the Department of Agriculture at Reading should be organised with as little delay as possible.

The recommendations, thus enumerated, constitute no more than the outline of a policy. If the policy commends itself to the Council of University College, Reading, it will be the task of others to fill in the outline, and to convert general recommendations into definite and practical proposals. Our own duty is discharged (in respect of the agricultural reference) now that we have given an account of our visits to Canadian and American institutions, and have reviewed the problem at Reading in the light of past experience and new knowledge. We have indicated where in our opinion the Agricultural Department of the College should be further strengthened, and we have pointed out the great opportunity which lies before it.

We are, however, unwilling to conclude the agricultural and main section of our Report without reference to the underlying question of finance. It is futile to talk of opportunity and development unless a successful effort is made simultaneously to provide the indispensable ways and means. The Council of University College, Reading, cannot possibly do more on their existing resources than they are doing at the present moment. Already they carry on their work at a heavy annual loss, and were it not for the fact that the support accorded to the College by the State and by public bodies has been nobly supplemented by private munificence, the University College and its Agricultural Department, if they existed at all, would be negligible factors. Unless the splendid growth of eighteen years is to be jeopardized,

the resources of the College must be extended. There can be no development on a stationary income. The greatest opportunity which has ever presented itself for advancing agricultural education in south-central England will be lost unless at the critical moment help is forthcoming to enable it to be grasped. There are three principal sources from which that help may be derived: private donors, County Councils, and the State. The donors who have done so much to bring University College, Reading, to its present strength and reputation may surely hope that a wider group of leading residents in the surrounding counties will now come forward to aid in securing for the institution not only stability, but a career of extended usefulness. The resident in Buckinghamshire or Hampshire will not be asked to contribute money to a College with which his county has no concern. His contribution will bring—he can stipulate that it shall bring—direct benefit to the agriculture and agricultural education of his county. If by one act both College and county can be benefited, the appeal to local public spirit should not be made in vain. As regards help from County Councils, our views have already been expressed. We advise that the College should vigorously press its claims for consideration upon all Local Education Authorities; that it should seek conference with them; and that every effort should be made to keep the members of the County Councils and the public acquainted with its work and aims. Lastly, there is the question of State aid. The present inadequacy of State aid to all forms of University education is an admitted and lamentable fact. In no direction is that inadequacy more grave than in reference to higher education in agriculture. The Report of the Departmental Committee on Agriculture [Cd. 4206] claims for the State "the credit of having, by its policy, created a desire for (agricultural) knowledge." (p. 8). But if the State led the way, it has subsequently lagged behind. For the Report also declares that "evidence from all (institutions) tends to show that their funds are quite inadequate for the work which lies ready at hand."

(p. 12). On a later page in the same Report the funds available for agricultural instruction are declared to be "wholly inadequate for maintaining that work efficiently." The Committee add that "they are of opinion that, irrespective of further developments, further means should be provided for this purpose." (p. 33). They conclude with the following declaration: "It is therefore obvious that the principal, if not the only, source from which the balance of the funds required can be obtained is the national exchequer." (p. 34). The Board of Agriculture, it is understood, have now larger funds at their disposal, and there may be some hope that grants which, like that made by the Board to the College at Reading, have remained stationary for a long period, may before long be raised. It remains to be seen how far the funds of the Development Commissioners will be available for the furtherance of educational and research work such as that carried on by the Agricultural Department at Reading. It is, indeed, high time that something was done in earnest to strengthen such institutions and those who work in them and for them. A member of the Moseley Commission of 1903 after inspecting the agricultural work of the Guelph College in Ontario and hearing of the annual grants given in aid of that College by the Government of the Province (see p. 21), was moved to describe the maximum grants of the Board of Agriculture in aid of the corresponding institutions at home as "grotesque."* The word is not too strong. Canada and the United States are setting standards in agricultural education which we cannot ignore or belittle. We believe that there is only one respect in which the competition between ourselves and them is unequal. In personnel, in energy, in ability the old country holds her own. But she is behindhand in the generosity inspired by faith. The sums doled out to Universities and University Colleges and Agricultural Departments are not only much smaller than those given for similar purposes in other countries,

* Moseley Education Commission Report p. 298.

but good work is left undone, opportunities are lost, efficiency is retarded and impaired through sheer want of the necessary ways and means. University College, Reading, is only one of many institutions of its order which find their future, almost their existence, menaced by the inadequacy of revenue. It would almost seem that the time has come when a national association of the "Friends of University Education" should be formed with the object of taking measures to convince Ministers, Members of Parliament, the Press, and the Public, before it is too late, of the imperative necessity of making more liberal State grants to Universities and Colleges if we are to give students of intelligence the education and training they need, if we are to retain in the service of knowledge men of experience and power, and if Britain is to hold her place among the nations.*

* It may be useful to observe here that at Reading local munificence has been conspicuous, has been encouraged by State recognition of the progress accomplished, and, together with that progress, has been such as amply to justify a confident hope that further liberality from the State will be forthcoming. The public recognition of worth and effectiveness implied in the award of Treasury and other government grants has been an indispensable antecedent condition of each of the considerable private benefactions which have been received by University College, Reading, in the last few years. Only the chief instances need be mentioned. These instances are—the gift of a new College site; four donations of £10,000, £10,000, £6,000, and £3,000 to the Building Fund; the gift of an endowment (£50,000) on condition that the College maintained its status as a University College; the gift of Wantage Hall, and its endowment; recent anonymous donations to discharge College indebtedness amounting to nearly £30,000; and the purchase (through enabling donations amounting to £4,000) of five acres of land. These gifts, as well as an incalculable amount of personal effort, have been given in the reasonable belief that as the effectiveness of the College grows, so the volume of State assistance will grow also.

PART II. OTHER ASPECTS OF UNIVERSITY DEVELOPMENT.

A.

Note on Libraries.

In their Annual Report for the year 1908-9 to the Court of Governors, the Council of University College, Reading, thus referred to their College Library: "It has been evident for some time past that the Library cannot indefinitely be housed in its adapted and inadequate quarters in the Acacias Building. The Library is greatly used by students of all Faculties and Departments, and it is often overcrowded. It cannot conveniently, nor perhaps safely, be made to accommodate very many more books. When it is remembered that there is no part of educational provision more absolutely vital for serious students than a comprehensive, well-ordered, and spacious library, the Council are encouraged to hope that before long the roll of munificent gifts to the College may be lengthened (as recently at Sheffield University) by the gift and foundation of a permanent and worthy library building. Whoever made so noble a gift would have the certainty and satisfaction of knowing that he was ministering in perpetuity, and in the most direct and helpful way, to the needs of a steadily growing body of earnest students upon whom the disabilities mentioned are beginning to press, and will press with increasing weight."

The nucleus of a Library was formed soon after the foundation of the College in 1892. Growth was at first very slow. In 1900 the number of volumes was only 1,715. It is now upwards of 7,000. The collection is good, as far as it goes, for the books have been carefully chosen; but the branches of study and research pursued in a University College are so numerous that a Library of these dimensions must inevitably be characterised by most serious deficiencies. No large bequest or donation has ever been received wherewith to provide a generous supply of standard works in all departments of study. The funds at the disposal of the Council for Library purposes vary from £150 to £200

a year,* apart from expenditure on Library administration, and are quite inadequate to meet the pressing needs of the College. The Library staff consists of a Librarian (honorary), and a Superintendent and Assistant (both paid). The Library occupies the upper floor of the Acacias Building (formerly a private residence), and one or two adjacent rooms. The disposition of the rooms and the arrangement of the books in them are attractive and interesting, but the accommodation, alike for books and for readers, is at the present time severely strained. Not more than 50 persons can use the Library at one time without much inconvenience resulting, and no more space is available.

It will be evident from these particulars that the Library question at Reading is both serious and urgent. It discloses the weakest part in the development of the College as a University institution. It might not be reasonable to urge that a College founded as recently as 1892 should possess already a collection of books equal to those found at Liverpool, Manchester, or Birmingham, where the totals of volumes vary from about 50,000 to over 120,000. But it is pertinent to notice that the Library at Reading is at present the smallest Library to be found at any of the new Universities and University Colleges, and that its financial resources are the least. No University institution can rest content with a poor library, for such a weakness means depriving advanced students of necessary books, particularly the literary student to whom a library is in truth a laboratory, and it means denying to professors and lecturers engaged in research the inestimable boon of having a good library of reference on the spot. In a recent report, President Lowell, of Harvard University, described the Harvard Library as "the principal workshop of the University."

During our tour in Canada and the United States, therefore, we gave such attention as was possible to the Libraries of the institutions visited. The following brief notes relate to the Libraries at the McGill University,

* Of this sum, about £70 has to be expended on periodical publications, binding, and minor equipment.

Macdonald College, Toronto University, and Cornell University.

McGill University Library, Montreal.

In 1891 Mr. Peter Redpath (1821-1894), Senior Governor of McGill University and already one of its chief benefactors, addressed a letter to the Chancellor of the University in which he announced his intention "to make provision for all the requirements of a University Library." The new building was opened on October 31, 1894, by Their Excellencies the Governor General of Canada and the Countess of Aberdeen.

Mr. Redpath, in presenting his gift to the University, observed that it had been planned after careful study of many of the best libraries then existing. The building is of Montreal limestone, and all construction is as nearly fire-proof as possible. "The style adopted is a free treatment of Romanesque." The internal accommodation includes (1) reading room, 110 feet long, 43 feet wide, and 44 feet high. (2) librarian's room and cataloguing room.* (3) periodicals room. (4) professors' room. (5) muniment room. (6) five seminar rooms for special studies. (7) book-stack. The architect's description of the book-stack system, an almost universal feature of modern libraries in Canada and in the United States, may be quoted: "The books are placed by themselves in a large, lofty chamber, well lighted from two or more sides, and sometimes also from the top. This chamber is made absolutely fireproof, and is cut off by fireproof doors from the rest of the building. It is divided into several storeys by open gratings, or by iron and thick, rough, plate-glass; these storeys are generally not more than 7 feet to 8 feet high, so that the librarians can reach any book on the shelves without the aid of a ladder. The book-cases are generally of iron, with shelves sometimes of iron and sometimes of wood. Access is obtained to the different storeys by light iron stairs, either straight or circular. . . . This stack-room has four

* At the time of our visit, the University Librarian, Mr. Charles H. Gould, B.A., was assisted by a staff of eight persons.

storeys, with straight stairs, and a lift for books ; on each storey there is a wide bay window, for privileged readers, where they can consult any of the books on the spot, and not obstruct the passage-ways between the books."

Since 1893 the Library building at McGill University has been considerably enlarged. It contained in 1893 about 35,000 volumes. One who took part in the opening ceremony observed that "a great institution like this should have a library of over 100,000 volumes at least." In the Annual Report of the Governors, Principal, and Fellows of McGill University for 1908-09, the total number of volumes is given as 123,088 ; and the number of additions for the year as 4,856. In the same year the expenditure on the Library, "for books, &c." (i.e. exclusive of the cost of the Library Staff and the maintenance of the fabric) was equivalent to £1,270. It should be noted that the Library possesses endowments.*

Macdonald College Library, St. Anne de Bellevue.

Macdonald College is a new institution, and its Library is not important as a collection of books. It deserves notice, however, because within modest limits its quarters and their arrangement could hardly be improved. The Library, and the Assembly Hall above it, constitute a large projecting wing of the Main Building. The library accommodation consists of a reading room and book-stack with administrative offices. The dimensions of the reading room are approximately 75 feet by 60 feet ; height about 16 feet. The visitor, entering the reading room by the main door in the middle of the southern end, sees at the opposite end a counter, to which books are brought from the book-stack beyond for distribution to the readers. The reading room itself is divided by two rows of columns, which support the flat recessed ceiling, into three parts. Down the middle is a broad space in which are arranged two rows of four tables each for students. On either side beyond the columns is a series

* Numerous particulars in this section are taken from the Report of the Governors, &c. just mentioned, and from the published account of proceedings at the opening of the McGill University Library in 1893.

of five alcoves or compartments, each lighted by a large window and separated from its neighbours by bookcases six feet high, and provided with a table for study. All wooden fittings, furniture, and panelling, are of oak, or oak-veneer. The bookcases forming the walls of alcoves, with their returns on each side, enable a large number of books to be kept in the reading room itself. The book-stack presents no features of special interest. The arrangements for filing pamphlets are excellent.

Thus the Library at Macdonald College affords some useful suggestions in general design, but in the event of a new library being built at Reading, some additional provision would be requisite, particularly in respect of seminar rooms.

Toronto University Library.

At the date of our visit to Toronto University, the Library was in the builders' hands. An important extension was being made. This extension includes (*a*) a stack-room which will enable 250,000 volumes to be stored, or about twice as many as the present number of volumes in the Library; (*b*) administrative offices, cataloguing room, &c.; and (*c*) a reading room (about 60 feet by 30) for professors. At Toronto, men students and women students have separate reading rooms. On the top floor of the new building, there are about twelve seminar rooms, while the University Press and a book-bindery are given quarters in the basement. The Report of the Board of Governors of Toronto University for the year ending 30th June 1909 shews (pp. 63, 65, 69—70) that expenditure on the Library for 1908—9 was equivalent to about £3,077. Details were as follows: maintenance of building £197; books and periodicals, &c. £2,880. The Librarian and his staff of ten persons accounted, in addition, for an expenditure of about £1,680.

Cornell University Library.

The Library occupies a commanding position at the south-west corner of the campus, and its lofty tower is conspicuous among the University buildings. The

Library building was presented and endowed* in 1891 by the Hon. Henry W. Sage upon the twenty-fourth anniversary of the founding of the University.

The extreme dimensions of the building are 170 feet by 153 feet. "The general outlines are somewhat in the form of a cross, the book-stacks occupying the southern and western arms, the reading rooms the eastern, while the northern provides accommodation for the offices of administration, the White Library, and seven seminary rooms." The building is of stone, and is fireproof. Apart from porch, entrance hall, and cloak rooms, it includes (*a*) general reading room, 126 feet by 66 feet. Seats are provided for 220 readers, allowing to each a desk 2 feet by 2 feet 10 inches. Around the walls are cases for a permanent reference library of 8,000 volumes, within reach of all readers. At one end is the delivery desk, communicating with the stack-rooms. (*b*) periodicals room, 50 feet by 21. There are wall bookcases with capacity for 6,750 volumes. (*c*) Librarian's room and cataloguing room (45 feet by 22). (*d*) the President White Historical Library, disposed in a special room, on the alcove system, with galleries. (*e*) seminar rooms for Philosophy, European History, American History, Classics, Modern Languages, English, and Economics. Each seminar room has its own set of reference books. (*f*) book-stacks (south and west) with capacity for 400,000 volumes, the whole building having capacity for 475,000 volumes. The stacks are divided into seven stories, each seven feet high, and the fall of the ground made it possible so to build them that the delivery desk in the general reading room is at the vertical middle of the stacks. Hence "in either stack the most distant book is only 120 feet from the centre of the delivery desk." (*g*) basement, containing newspaper stacks and patent collections, an open-shelf circulating library, and a lecture room with seating capacity for 240 persons.

*The endowment was nearly £60,000, "the income to be used only for the purchase of books." We were informed that the total endowment is now about £160,000.

The Library is open from 8 a.m. to 10.45 p.m. It appears to be greatly used, and to be admirably administered. The members of the Deputation who inspected it were much indebted to the courtesy of the University Librarian, Mr. G. W. Harris, Ph. B.

The Librarian's Report for 1908-9 states that the Library then contained 369,051 volumes, and 55,000 pamphlets. Additions during the year had included 15,413 volumes and 2,000 pamphlets. In regard to finance, "the sum available for the increase of the Library" in 1909-10 was about £3,480. About £840 is spent on periodicals alone. The Librarian mentions that a course of lectures is regularly given on the use of books, and another course on general bibliography. The Library is administered by a special Council, consisting of the President of the University, a member of the Board of Trustees, 4 representatives of the University Faculty, and the Librarian. The Library Staff includes the Librarian and about 20 assistants.*

The University also possesses the Goldwin Smith Hall Library, the Law Library, and the Barnes Reference Library, which are separately housed.

Concluding Observations.

It is scarcely the duty of the Deputation to recommend to the Council a particular policy with regard to the existing Library at University College, Reading, or with regard to the erection of a new Library building. Our opportunities for inquiry were necessarily limited, and in the event of the project of a new Library being undertaken at Reading, the whole subject should receive further and thorough investigation. We content ourselves with calling attention to several points, the importance of which was suggested to us, or reinforced, by our inspections.

We endorse to the full all that has been said in the Report of the Council of University College,

*Many particulars in this section have been obtained from the Cornell University Register, 1909-10; the Librarian's Report 1908-9; and from the published report of "Exercises at the opening of the Library Building, Cornell University, 1891."

Reading, mentioned at the beginning of this section, concerning the urgency and seriousness of the Library question. It is proved by experience at Reading and elsewhere that a University institution is at a grave disadvantage unless it possesses a really ample and comprehensive Library: while, on the other hand, the possession of such a Library strengthens the work and attractiveness of the institution at every point. Further, we attach importance to the following considerations: (*a*) The Library should occupy a central position in relation to the departmental buildings of the College. (*b*) It should include a large reading room, within which should be kept, accessible to readers, an ample collection of reference and other books. (*c*) The fire-proof book-stack system should be adopted as a means of storing conveniently and safely the books not placed in the reading rooms. (*d*) There should be a room for the special use of professors and lecturers. (*e*) There should be a room for periodicals, and rooms for seminar and special studies. (*f*) There should be good office accommodation for the Library staff.

We recognise that the provision of a Library with these features would be a costly undertaking, but we are of opinion that the problem will not otherwise be ultimately solved. We do not overlook the fact that the maintenance of such a Library would be a considerable annual charge, apart from cost of books, and we therefore hope that in building it care would be taken to restrict the sum spent on structure to the lowest reasonable dimensions, and to reserve if possible a substantial sum in order to secure a permanent income from endowment.

B.

Note on the Teaching of Domestic Science to Women in Canada.

In the Universities of Canada, and also in those of the United States, much attention is now given to the training of women in Domestic or Household Science, or "Home Economics." The object aimed at can be stated simply. It is to improve the standards and conditions of life in the home. Skill in the art of managing a household is the outcome not merely of happy personal accident—though the personal element must always count for much—but also of right knowledge and right principles of application ; in other words of right training. Everywhere, both in the old countries and in the new, home-making is "the largest single industry"; it is a province within which women are supreme; and hence there is a wise tendency in educational policy, in England as in America, to pay increased heed to these considerations in planning the education of girls and women. The difficulty of obtaining domestic servants in Canada and the United States invests the problem in those countries with peculiar significance. The competency of the wife and mother, of the woman housekeeper, is nowhere a more important condition of social happiness and well-being than in scattered rural communities. Accordingly, just as Agricultural Colleges have arisen in America with the object of training men to be better farmers, so Institutes and Departments of Home Science have arisen more recently with the object of training women to be better home-makers. Thus at Guelph, "the Home Economics Department has two objects in view. The one to bring to the vocation of home-making the same kind of help which the Ontario Agricultural College brings to the business of farming ; the other to provide for the adequate training of teachers of Home Science for our public schools."

We found provision for the training of women in Home Science at most of the institutions visited. Our opportunities, however, for close investigation of its

character and scope, were restricted to two Canadian instances, those of Macdonald and Guelph; and it may be noted that in each case the provision had been made possible by the munificence of Sir William Macdonald, in pursuance of his policy for rural betterment—"better farmers, better wives, and better teachers."*

The School of Household Science at Macdonald College.

The School occupies part of the Main Building. Students of Household Science receive instruction in Chemistry, Physics, and other scientific and applied subjects, in the College departments. The accommodation special to themselves is as follows; (*a*) two class kitchens equipped for 56 students, with a pantry attached, and also a small dining room for lessons in table-setting and waiting (*b*) class laundry for 24 students (*c*) hand-sewing room for 30 students (*d*) dressmaking and millinery rooms (*e*) house-decoration room (*f*) offices for instructors, store rooms (*g*) model apartments consisting of two bedrooms, bath room, dining room, living room, kitchen, and pantries, intended to afford facilities for practical work in housekeeping.

The School is admirably planned and equipped. In liberality of space, number of rooms, excellence and ingenuity of fittings and appliances, the standards appeared to us to be altogether beyond the customary standards in England. Cooking is taught by coal-fire, gas, and electricity, and by the "fireless cooker." The last consists of a chest in three compartments, each containing a vessel packed in cushions of asbestos wool or a similar non-conductor. A chicken put into boiling water is cooked in one of these vessels in six hours. Each student in the kitchen has a small gas stove before her on the bench, and, in the bench also, a private drawer for smaller utensils, and a second drawer and a small cupboard, which she shares with her neighbour, for utensils of larger size. The pantry, which is beautifully tiled, contains a large refrigerator constructed of opalescent glass framed in nickelled metal. The laundry is fitted

* See previously pp. 12, 20.

with fixed tubs of glazed earthenware and a drying cupboard. There are wringers and a mangle, but no other washing machinery. Irons are heated by electricity for convenience,* but there is a stove for teaching purposes. The house-decoration room contains samples of wall papers, carpets, and fabrics. The model apartments are, in effect, a self-contained flat of attractive design. The Deputation were kindly invited by Miss Fisher, Acting Head of the School of Household Science, to take luncheon there. All arrangements, preparation of food, menu, decoration, serving, and waiting were carried out by students of the School, and were in a marked degree creditable.

The staff of the School consists of the Acting Head, who is also Assistant Professor of Household Science, an Instructor in Sewing and Dressmaking, and two Instructors and an Assistant in Household Science.

There are two main courses of instruction. (1) A two years' course for professional housekeepers. (2) A one year's course for "home-makers."

(1) Candidates for admission to the housekeeper's course must not be less than 23 years of age, and they must have good health and a fair knowledge of English and Mathematics. Not more than 12 students are trained in the School at one time. The first year's work is similar to that of the Home-makers (see below). Any student who, after three months in the School, is considered to be unsuitable, is asked to withdraw. The second year is devoted to special work bearing on housekeeping for large numbers from a business point of view, and it includes much practical work, such as marketing and taking charge of stock rooms. Each student spends one month in the Women's Hall of Residence in order to gain practical experience under the Housekeeper, who provides for several hundred people at each meal. "The

* In England it would probably be considered unpractical to accustom students to cook and heat by electricity. But it must be remembered that electric power is much cheaper in Canada, and is being increasingly used there for domestic purposes.

Professional Housekeeper's Certificate," awarded in connexion with this course, is not granted until the candidate has completed six months' successful work as a housekeeper at an institution. The certificates awarded do not qualify for teaching.

(2) The "Home-maker's course" seeks to train girls for the duties of the home. It is therefore planned "to give the student a good foundation in the different branches of ordinary household work, supplemented by those scientific studies which have a bearing on the subjects of cookery, laundry, hygiene, &c. Above all, it is desired to awaken a girl's interest in the wider questions of sound bodies, wholesome dwellings, and comfortable lives." Candidates for admission to this course must be not less than 18 years of age. The subjects taught are Cookery, Dairying, English, Home-nursing, Horticulture, Household furnishing, Household management, Sanitation, Laundry, Household handicraft, Millinery, Needlework, Physical training, Poultry, Practical Housekeeping in the Apartment (one week), and as much science as has a useful bearing on these subjects. The certificates awarded do not qualify for teaching.

There are, in addition, shorter courses, (*a*) for Teachers. Instruction is given in simple cookery and needlework with the object of helping teachers to arouse an interest in household study amongst their pupils. (*b*) for students who cannot stay in the College longer than three months. The training given is almost wholly practical, and three such courses are given yearly. Candidates must be not less than 18 years of age. No certificate is awarded.

In admitting students to any of the courses, preference is given to candidates from the rural districts of the Province of Quebec, the Maritime Provinces, or Eastern Ontario. Tuition is free to residents in the Province of Quebec; other Canadians pay £15 a year, non-Canadians £20. There is a laboratory fee of £2. The fee for the short courses is £5, but these also are free to students

belonging to the farming community of the Province of Quebec.*

The Department of Home Economics, Guelph, (Ontario Agricultural College).

The Department occupies the first floor and most of the ground floor of the Macdonald Institute, a massive building erected in 1905, the gift of Sir William Macdonald, in which instruction is also given in Nature Study and Manual Training. The equipment, though excellent, is not so elaborate as at St. Anne's. On the other hand, it would appear that the students are of better quality than those at St. Anne's, and that the conditions of entrance are more severe. We were indebted to Miss Watson, who directs the Department, for a very clear and interesting explanation of its work which she gave us at the time of our inspection. Miss Watson is assisted by a special staff of eight persons, namely, Instructors (3) in Normal Methods, Domestic Science, and Domestic Art ; Lecturers (2) in Physiology, Home Nursing, &c. ; Demonstrators (3) in Domestic Science, Laundry and Household Administration, and Domestic Art.

The accommodation includes (*a*) two class kitchens equipped for 24 students (*b*) practice kitchen for 16 (*c*) small dining room for lessons in table-setting and waiting (*d*) pantry, cold storage rooms, offices, etc. (*e*) lecture rooms (*f*) class laundry for 12 students (*g*) dress-making room for 14 students (*h*) sewing and millinery room for 18 students (*j*) model apartments, comprising two bedrooms, bath-room, living room, kitchen, and pantries, for practical work in housekeeping. The ordinary College departments supply scientific instruction. There is a library in the Institute intended specially for Home Economics students.

Adjacent to the Institute is Macdonald Hall, a large building in Elizabethan style, erected in 1904 at a cost of about £20,000 by Sir William Macdonald. The Hall is

* For further particulars as to the School of Household Science, see the Macdonald College Announcement for the current year.

the women students' residence. It contains rooms for 110 students, and also a gymnasium, dining room, reception room, and parlour. The proximity of Hall and Institute has proved highly advantageous in the organisation of practical training in housekeeping.

The courses of instruction provided by the Department are of two kinds (A) Professional (B) Non-professional.

(A) The two Professional Courses each occupy two years.

(1) *Normal Course for Teachers.* Candidates for admission come from the high schools ; they must be at least 18 years of age, and must have passed the Junior Matriculation, or Junior Leaving Examination, of the Province of Ontario. The object of the course is "to lay a thorough foundation for the special work of teaching Domestic Science in the schools of our country. The Institute cannot make the teacher ; it furnishes opportunities and favourable conditions to earnest students ; the rest lies with the student. Any woman entering upon it should have a healthy body and sound mind and a high moral purpose." A Teacher's Certificate in Domestic Science is awarded in connexion with the course.

(2) *The Housekeeper Course.* The course is designed to aid those women who desire to become professional housekeepers. Only a few such students are received ; at the time of our visit the number was less than 12. Candidates for admission should be about 30 years of age, of fair education and sound health, and should have had considerable experience in practical housework. The first year's work is the same as that for the Normal Course. The second year is devoted to training in institution management, and with this object each student is associated for a period with the management of the Women's Hall of Residence. At the end of the second year, a certificate is given to students who satisfy the prescribed tests, but the final

certificate is not granted until proof is given of six months' successful experience as housekeeper of an institution.

(B) The Home-maker Course is the chief of the non-professional courses. It occupies one year, and is intended for young women with little or no experience in household affairs. Candidates for admission must be at least 17 years of age, and have passed the High School Entrance Examination or must satisfy a similar test. A Diploma is awarded. The following are the subjects of the course:—

Physiology and Hygiene	1 period	weekly		
Plain Cooking	6	,,	,,	
Foods	1	,,	,,	
Sanitation	1	,,	,,	
Household Administration	2	,,	,,	
Dietetics	1	,,	,,	1 term
Child Study	1	,,	,,	1 ,,
Home Ethics	Lectures.			
Art at Home	2 periods	weekly		
Home Nursing and Emergencies	1 period	,,		2 terms
Laundry	3 periods	,,		,,
Sewing	4	,,	,,	
Practice Work	7	,,	,,	
English	2	,,	,,	

There are also three courses annually in Domestic Science, each occupying three months; two courses annually in Advanced Sewing, of similar duration; and certain optional courses. These shorter courses are popular with those who are about to marry.

The following details in connexion with the Home-makers' course were specially noted. (*a*) An excellent series of printed cards informing the student of the necessary materials and the exact process to be followed in every kind of house-cleaning. (*b*) Simple system of household accounts. It consists of a day book for entering money received, items of expenditure, and balance in hand, in parallel columns, and a scheme of

alphabetical headings under which expenditure is classified. The system is practical and free from technicalities. (*c*) Only plain cooking is taught, "nothing beyond a Christmas cake or extra good pie." (*d*) Students are made acquainted with as much simple labour-saving machinery as possible. (*e*) The co-operation of the Hall of Residence is essential to the success of the course. Every student gains there a week's practical experience in housekeeping. (*f*) Students who shirk the prescribed house-cleaning duties make good their neglect during hours of leisure.

The tuition fees for all regular Home Economics Courses are £3 a term for Ontario students, and double that amount for all others admitted.*

Concluding Observations.

It will be noted that in general aim and character the courses of instruction in Household Science at Macdonald College and at Guelph are very similar. As far as we could judge, the courses are well suited to Canadian conditions, and are such as to promote the standards of efficiency in home management. The whole problem, it seemed to us, is treated more seriously and thoroughly in Canada than in England. No doubt the relative simplicity of the Canadian social order facilitates treatment, for owing to that simplicity the same general type of domestic training answers the needs of the majority of women. But in England, although all kinds of domestic training may have the same basis, the wide differences in economic status and social habit imply the existence of very different kinds of domestic function among women; and the courses of domestic training provided must recognise these differences and be influenced by them, if they are to commend themselves. If the reaction from a type of education for girls, which was originally devised in imitation of masculine requirements, is to produce a good effect, those Universities which include work of the kind within their mission must give far more attention

* For further particulars as to the Department of Home Economics, see the Calendar of the Ontario Agricultural College for the current year.

than hitherto to this question of domestic training. They must be prepared to put thought and energy into their schemes, and to provide a training which ministers to a definite and felt want in society. The mere multiplication of sporadic courses in cookery, laundry, dress-making, and hygiene, is no substitute for systematic and intelligent training. Courses in single subjects may answer a useful purpose at one end of the scale, just as the elaborate and highly scientific course in Home Science and Household Economics recently instituted at King's College, London, is believed to render most valuable service at the other end. But throughout the country there are a great many girls of good intelligence who, after leaving a secondary or high school, would probably welcome a training differently planned. For them the ideal "Home-makers" course has yet to be devised, although the fact that several institutions are doing good work is not overlooked. The ideal course, it seems to us, would occupy one year ; it would be given in University surroundings ; it would treat the basic or practical subjects with thoroughness, but it would not attempt more than a few ; it would be inspired by a more liberal and intellectual spirit than is commonly found in courses of domestic training; by utilising the resources of the University or College, it would include Literature, Art, Music, or Science in the scheme of studies ; it would pay particular attention not merely to the so-called "practical" side of home management, but also to those aspects of equal importance which deal with principles of taste and with refinement ; and, in brief, it would carry forward and deepen the general education and culture of the student, while associating with it a training for the tasks of adult womanhood. It is obvious that no course of this kind could be given with success unless the teaching staff commanded, in a measure at present not usual, technical competence and cultivation of mind. The qualifications wanted in the teacher who directs such a course are not so much manual dexterity or a narrow expertness, as a strong and cultivated intelligence, a grasp of the best methods, and a wide social experience.

Home-makers' courses, if given under University conditions, would quickly win popularity, and we believe that many girls would take advantage of them, even if they intended also to equip themselves for professional careers.

University College, Reading, is well fitted to undertake a Home-makers' course of the kind described. Its buildings include small but well-designed premises for domestic training; and these premises are situated in close proximity to the new St. Andrew's Hall of Residence for women. It might be arranged that in this Hall, following the precedents found at Guelph and at Macdonald College, the students should gain their practical experience in housekeeping. The fact that the College includes Faculties of Letters and Science, and Departments of Fine Art and Music, would facilitate the introduction of a suitable and varied element of general culture into the curriculum. A curriculum could without difficulty be organised so as to include a number of options and a core of essentials. It would probably be wise, in view of the restricted scope of the present premises available for domestic training, to limit strictly the number of students to be admitted to the course. Two other points of importance should be mentioned. (1) In the event of such a course being undertaken, an Advisory Committee of ladies should be constituted in connexion with it. This Committee should include representative Headmistresses, and other ladies able to speak with special authority on this branch of women's education. (2) The other point is one which has several times been emphasised in the pages of this Report. It is that no scheme of the kind indicated can be usefully attempted unless the teaching resources are adequate. As stated above, these resources must include both technical competence, social experience, and cultivation of mind.

C.

Note on Residence Systems for Students.

It is well known that University College, Reading, possesses an ampler provision of residential halls for students than is found at any of the other new Universities and University Colleges. The existence of this provision, which has become a distinguishing feature in the life and character of the College, may be ascribed to several causes. In the first place, the College at Reading, as already observed (p. 92), is not situated at the heart of a great city or urban district, constituting an almost exclusive source for the supply of students. Large numbers of its students come from the counties around, from other parts of the kingdom, from the dominions beyond the sea, and from foreign countries. For such students, both men and women, suitable residential arrangements are indispensable, and the idea of a group of halls, situated at an easy distance from University College on the one hand and the open country on the other, is less difficult of accomplishment in Reading than in a great city with far-extended suburbs. In the second place, the College has consistently acted upon the principle that University education is the product mainly of two things: the right kind of teaching and the right kind of corporate association and corporate life. It was the latter aspect of the question which the late Lord Wantage had in mind when, speaking as President of the College in 1896, he said: "We have an object worthy of the highest consideration—it is to establish a College with the qualities and character of a University." "In endeavouring to carry out his views" said Lady Wantage at the opening of Wantage Hall in 1908 "my object has been not only to provide a commodious residence for the hitherto scattered students, but by bringing them together under one roof to create a true corporate life, and to promote what may be called a university spirit." It may be said, briefly, that these ideas have inspired and determined residential policy at Reading. Lastly, the College has most fortunately been

enabled, while still young, to carry these ideas into effect. Wantage Hall, the gift and foundation of Lady Wantage, is probably the most admirably designed residential hall for University men outside Oxford and Cambridge. There is a second hall for men (St. Patrick's) which it is hoped, may before long be rebuilt on a more commodious scale. Of the two halls for women, one (St. George's) is a specially designed building erected some years ago, while the other (St. Andrew's) is about to move into new and larger premises, situated in delightful grounds. Altogether the four halls will provide by Easter, 1911, accommodation for more than 200 students, the proportions of men and women students being approximately equal. All the halls are situated near to the College Recreation Ground. Further, a considerable body of students reside in private houses, controlled and supervised by the College. Two characteristics of the residential halls may be particularly noted. First, that the cost of living is cheaper and the character of the life on a simpler scale than at the ancient Universities; the other that all teaching is given exclusively at University College. Care has been taken to guard against any risk of the development of the halls into minor and competitive teaching institutions.

The residence systems for students in Canada and in the United States did not appear to us to present many features of importance which might profitably be incorporated into policy at home. The general effect of our inquiries and inspections was to strengthen our belief in the soundness of the policy adopted at Reading, both in regard to its general aim, and in regard to its execution in detail. We were impressed by the opinion, which we encountered everywhere but particularly in the larger institutions, that the question of the residence of students and their corporate life outside hours of instruction is of grave and growing importance. The idea that a University need only carry on teaching and research, leaving its students to live as they please, is no longer held by practical men. Such an idea could not survive

the admission of women students to the University as well as men, nor is it applicable to Universities which count their students not by hundreds but by thousands. Unless this side also of University education receives the care and attention which is its due, resultant evil must be the penalty of neglect. Upon this aspect of the question American testimony is decisive.*

The Macdonald and Guelph Colleges are purely residential. The women's hall of residence at Guelph, known as Macdonald Hall, provides for 110 students, and is an admirable building. The system is one of study bedrooms with a common dining hall. The building includes a spacious gymnasium. At McGill University, we inspected the Royal Victoria College for women, which is both a hall of residence and a teaching institution. There is a small hall of residence for men, and more provision is contemplated. We inspected the men students' Union House, which has about 600 subscribing members. The building is practically a club-house, and is well designed for its purpose. At Toronto, new university residences were opened in the session 1908-9. Three buildings, forming three sides of a quadrangle, were erected, each able to receive 50 students, the accommodation being partly in single rooms, and partly in suites consisting of a sitting room and two bedrooms. We inspected several rooms and were favourably impressed by them. In each house there is also a common room. A member of the teaching staff resides in each house, but the principle of student self-government is developed as far as possible. Meals are not taken in the residence houses, but in a common dining hall.

In the Universities of the United States, we came into contact with the dormitory system and the fraternity house system. Both systems represent an attempt to provide students with an alternative more comfortable than the frequently unsatisfactory boarding-houses and

* Cp. "The Re-organization of our Colleges" by Clarence F. Birdseye, (New York, The Baker and Taylor Company).

lodgings. The aim has been to introduce into their residential experience at the University the element of home life and corporate association. The dormitory system represents the contribution of the university authorities to the solution of the problem of residence. Large buildings are erected in which students have their private rooms for study and sleeping, meals being taken in a University hall, in which several hundred men can dine simultaneously. This system prevails at Harvard and Yale (where there are no fraternity houses). President Lowell of Harvard informed us that more university dormitories were needed, and that Americans were increasingly disposed to recognise the merits of the English collegiate system, and to regret the haphazard residential arrangements which vast numbers of university men in America are obliged to accept. Yet the problem of building sufficient university dormitories is formidable, since "a modern dormitory to house 100 students costs from $100,000 to $200,000, or even more."*

The fraternity houses not only illustrate the American passion for organisation and for ritual, but they serve as a reminder that, if Universities neglect the residential problem, the students themselves (in modern as in mediæval Universities) may find solutions for it, which in their turn may produce difficulties as well as gains. The fraternities are a remarkable feature in American university life. A fraternity is a private fellowship or club, usually known by the names of two or three letters of the Greek alphabet, which may have branches or lodges in many Universities. Frequently they establish houses of residence for their members; such houses are numerous at Cornell† and Wisconsin, most of them being for men though some are for women. The fraternity buys or builds a house: the usual number of students living in one such house is about 30; and the management is exclusively in the

* "The Re-organization of our Colleges." Birdseye. p. 98.

† We were informed that at Cornell about 600 men live in fraternity houses, while the rest, constituting the great majority (2,500—3,000), live in boarding houses and rooms.

hands of the students themselves. Some of these houses are costly undertakings, and may represent an expenditure of £10,000 or £12,000. The bulk of the capital is supplied by the old members, or *alumni*, of the fraternity, who continue to take part in its affairs long after they have left the University. "The spread of the movement has been wonderful and inevitable. There are about 370 Colleges and Universities which contain chapters of some fraternities, and in many of these institutions the houses of the fraternities are among the finest in the town. Millions of dollars have been thus invested."*

We inspected two of the chief fraternity houses at Cornell University. The houses were admirably designed and more than comfortably furnished. They might be best described as luxurious club houses. It is easy to understand that the fraternity tie can become a very strong one, and that these institutions by reason of their attractiveness, their secret ritual, and their limited membership, are often characterized by an intense vitality. Nevertheless, though the fraternity system has both good points and warm defenders, it is not surprising that it should be the object of much criticism. The fraternity houses, it is often said, are the lounging places of cliques. Men who live in them are seldom strenuous either in athletics or in studies. They are too comfortable and too much concerned with the narrow circle of fraternity interests. Despite its best intentions, we are told, the fraternity system tends to withdraw men from the wider interests of the University, and even to make them antagonistic to its spirit and unity. It is by no means certain that the increasing strength of these organisations may not hereafter prove a formidable embarrassment to the Universities which harbour them. Whether these defects and risks outweigh the obvious attractions of the system from the point of view of comfort and of substituting some form of organised corporate life for the casual associations of the lodging-house—often the sole alternative—we are not able to say. But the fraternity system deserves attention, if only because

* "The Reorganisation of our Colleges." Birdseye, pp. 99-100.

it shews that the corporate and residential welfare of students cannot be left to take care of itself without unforeseen and probably embarrassing consequences resulting.