



THE DISSEMINATION OF RESEARCH RESULTS AMONG AGRICULTURAL PRODUCERS.

ANSWERS TO A QUESTIONNAIRE ISSUED
BY THE EMPIRE MARKETING BOARD

WITH AN INTRODUCTION BY
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PREFACE.

MOST of the Empire Marketing Board's grants for research are designed to benefit the primary producer. It is, therefore, of direct interest to the Board to know how the results of the scientific investigations are in various countries conveyed to the land workers who put them into practice. The Board accordingly circulated to all Empire Governments in 1927 a questionnaire seeking information as to the methods adopted for making known the results of agricultural research. The questionnaire is printed in full on pages 11 and 12.

The answers to this questionnaire came in at intervals over a space of two years. They provide a body of information of the greatest interest; and the Board is greatly indebted to those who collected and transmitted them. The study of the material provided by the answers to this questionnaire has incidentally led to the collection of a good deal of subsidiary information, which, together with the original answers, will be of no little value for the further examination of the group of topics included under this general heading.

The Board have considered, in the light of the information thus collected, how they can most usefully contribute to the development of this vital service. It appears to them that they might usefully undertake occasional special studies of particular methods of conveying information and advice to working farmers, which have not as yet been widely developed within the Empire, and upon which the experience of foreign as well as of Empire countries might perhaps afford useful guidance. The replies received, for example, to question 12 (Broadcasting) and 13 (Films) in the questionnaire suggest that comparatively little has hitherto been done in Empire countries to explore these channels, and that they might repay further special study. In view of this possibility and of the slight information elicited by the questionnaire under these headings, the answers to these and certain other questions have been omitted from this book.

Special thanks are due to Sir Daniel Hall, who kindly undertook the task of examining the material collected and has written the introduction.

INTRODUCTION.

BEFORE one can address oneself to the question of the means by which information respecting the results obtained by research can be disseminated among the primary agricultural producers, it is desirable to discriminate a little between the various senses in which the term research is used, both in the questionnaire and in the answers received.

1. Research proper is concerned with the discovery of knowledge *per se*, knowledge which may have an economic bearing, as when it deals with a subject of immediate economic importance like the nutrition of a plant, but the pursuit of which has been prompted by the desire to extend man's understanding of a particular set of natural phenomena. In this type of research, the economic applications are a secondary consideration and often arise only indirectly. For example when Hellriegel and Wilfarth demonstrated that leguminous plants obtain nitrogen from the atmosphere by the action of bacteria residing in the nodules on their roots, they made a discovery of immense importance to agricultural science. But from the point of view of its application they only explained the secular practice of growing a leguminous crop in the rotation as a preparation for wheat. Further direct applications of the discovery have been few and perhaps not of great economic importance, but none the less the possession of this knowledge has influenced all the advice subsequently given to farmers on the conservation of soil fertility, on rotations, and on green manuring.

It may almost be said that an acquaintance with the results of research proper is of no use to the farmer, who needs only to be supplied with some of the deductions and consequences. No one thinks of disseminating medical research among the general public. It is addressed to the practitioners, and reaches the public as rules of health or as treatment. Without pushing the analogy too far it may be agreed that the farming public need not be made acquainted with the current work of research stations proper. The justification for introducing them to it comes from the special character of the farming industry—that it is split up among a large body of individuals. In a large organised industry there is always a definite intermediate stage between research and its application, i.e. the building up,

often by tedious and minute investigation, of a working process from the principle discovered in the laboratory. For example, when Dewar and Jones discovered Nickel Carbonyl as a gas, they arrived at a means whereby nickel could be cleanly separated from the other metals like iron and cobalt with which it is accompanied in nature. But to pass from this fundamental discovery to a commercial process for refining nickel took Mond and his associates years of work and (it is reputed) the expenditure of over a million pounds. In agricultural research the discoverer has fulfilled his purpose if he has arrived at a principle; he is rarely interested in the details whereby it can be translated into practice, for which again he may not have the facilities. Since there are no great corporations to undertake the investigation intermediate between the laboratory and the farm, the research worker may by direct communication succeed in firing the imagination of some enterprising farmer who will work out a practicable application of the principle.

The results obtained by the experiment stations should, however, reach the staff of instructors who deal directly with the farmers. As these instructors are scattered and busy men it is of importance to organise some means of keeping them in touch with developments of their subject. Hence the value of an annual meeting of staff—organisers, instructors and advisers, preferably at the experiment station, when the investigators expound both their own and parallel work on a particular subject, one subject perhaps being taken each year. It is in this way that research can best be made available for the farmer, and again that the investigator can receive criticism and stimulus.

2. In another category from research proper, even though the boundary line may often be difficult to draw, comes investigation directly aimed at the solution of some practical problem. This may often involve long and complicated work, but it is addressed to a particular public only and is of no value to farmers generally. To give a recent example, the coffee growers of Kenya have of late years suffered much from the invasions of a "mealy bug," which weakens the plant by sucking the sap, and covers leaves and berries with a dirty exudation. An appropriate ladybird was discovered which would keep the mealy bug in check, which may be regarded as a normal application of a well-recognised principle. But it then began to be found that the bushes were run over by a species of ant which drove off the ladybirds. The prevalence of this ant was itself

a new phenomenon, hitherto it had been held in check by a species of predatory ant. But as this latter species makes its nests in the soil it was disturbed and driven away by the continuous cultivation to which a coffee plantation is subject. The next stage in the fight was the discovery that a paper band smeared with a particular creosote preparation could not be crossed by the ants but did not deny access to the ladybirds and their larvæ. As long as the banding was properly maintained and weeds were not allowed to establish a bridge for the ants the double protection was effective. Then the creosote preparation failed to act and further enquiry showed that different material was being supplied, though regarded as identical by the trade. Further investigation was required to characterise the effective material and to discover the active principle, which is apparently not present in the tar from all coals.

This very interesting sequence of investigation is addressed only to a very small section of cultivators and can only be utilised by them; it is an example of the very special investigations required by particular industries.

3. In the last category may be placed the general information about improved farming which the ordinary cultivator or stock-keeper requires. Research is not involved; the men in question, and they constitute the great majority of practical producers, fail in that they are not utilising common knowledge, scientific or practical. South Australia supplies a good example. Of 3,500 farmers in that State more than 1,500 reaped less than half the average yield of the State, while almost the same number obtained more than twice the same average. The failures were largely due to neglect of the two most thoroughly accepted principles of wheat growing in South Australia—bare fallowing and the use of superphosphate.

With, then, the bulk of farmers in any country, the problem is how to bring home to them not so much the results of recent research but the common facts upon which their calling is based—practical, scientific and economic. This is the task of the educational service, and if the educational service is effective very little need be done to ensure that it will pass on all the practicable results of recent research.

The answers to the questionnaire also serve to suggest that there are three classes of producers, who have to be considered separately though they tend to merge into one another.

In the first class we may place the plantation industries growing a single crop on a large scale, often with a considerable backing of technical knowledge and capital. In this class we may include the growers of sugar, copra, rubber, tea, coffee, fruit, vines and various fibres. The managers of these industries require highly specialised information proceeding from investigation. They are receptive of such information and are generally ready to utilise it. From the point of view both of investigation and of the dissemination of information they can best be served when the individuals will associate and assist in the maintenance and direction of a special experiment station devoted to their industry only, however closely this station may be associated with or administered by the Department of Agriculture.

The second class embraces the great mass of primary producers—generally mixed farmers cultivating more than one crop and keeping stock. Their operations may be large or small. When large they approximate to the plantation producers, but undoubtedly, even in the Empire, single family farms with occasional help predominate, and they are the chief primary producers of the world. Looked at broadly these men are not picked for their competence and are not practising an art, to the improvement of which they are applying their intelligence; they are living, instinctively and irrationally. There are good, bad and indifferent farmers among them, just as they vary in the way they live up to their religious professions, or carry out their duties as fathers of families. What the bad ones lack is not so much technical knowledge as character, energy, and developed intelligence. Hence it follows that the factor determining their quality as farmers will be their general education as human beings. Let us remember that the remarkable development of Danish agriculture followed, not an organised scheme of technical instruction, but the development of the People's High Schools, with their ethical and historical basis.

With this proviso, the application of which is outside the ambit of this questionnaire, it is yet possible to gather some general ideas of the methods leading to success in diffusing information among the general class of farmers. Putting aside the organisation of instruction of young persons by formal methods—courses, winter schools, colleges of agriculture, etc., there is agreement that effective work among adults comes with personal contacts. The best agency

is the visit of the instructor or technical expert, call him what you will, to the farm, to discuss with the occupier what the latter is doing. Numbers and distances form the obstacle to the indefinite extension of this method ; next best appears to be the visits of the farmer to demonstration and experimental farms or plots. In this connexion it is very desirable that the officers who design such should discriminate clearly between experiment and demonstration. In the main the educational effort should aim at demonstration, the trials should be simple and deal only with proved facts and should work in with the routine of the farming ; results should be apparent to the eye, weighing and recording should be reduced to a minimum. Co-operative experiments with farmers should be most carefully thought out and entered upon with caution. An experimental farm represents a higher stage in the organisation and should be regarded more as an outdoor laboratory for the benefit of the staff of instructors and experts than as a direct means of giving information to the farmers, though for reasons already advanced visits of farmers should be encouraged to the experimental farm as to the research station.

The less intimate the personal contacts, the less effective the education will be. Lectures, Broadcasting, Films, Bulletins and Journals all suffer from this disability. English experience, which is paralleled by the Bureau system of South Australia, shows that meetings for discussion provide a greater stimulus than the pure lecture, even though questions follow the latter. The point is that any educational effort in which the students are led to play a part ; in which they are active participators, leads to more permanent results than other forms of instruction in which they are passive receivers of information. The train has proved a useful means of propaganda in certain countries, but there seems to have been no trial within the Empire of an analogous method, employed, as I am told, in France. The instructor is provided with a car and a motor van ; the latter can be thrown open to exhibit the specimens and illustrations bearing on the instructor's subject, and is also equipped with a projection apparatus. The instructor stops at a given village, demonstrates to visitors and looks round some of the farms, then gives his lecture in the evening.

Little is said in the replies to the questionnaire about one method which is proving very effective, the organisation of recording societies, when a group of farmers is constituted to keep records of milk yield,

cow or pig rations, etc. The discussion of the accumulated results by the instructor can be made very fruitful of improvements in individual practice.

In a last class, of increasing importance in the Empire, come the non-European cultivators in tropical countries, dealing as a rule with very small areas of land by traditional methods. Here a complete break with European types of instruction is required ; demonstration of the improved crop or variety, or practice of cultivation, or implement, alone is effective. Agreement has not yet been reached as to whether the work is best entrusted to the administration or to a special agricultural staff, and how the non-European instructors, who are generally the immediate medium of communication, are to be trained and controlled. Two points, however, emerge. It is necessary that the instructor should make very sure that any change he proposes in the customary procedure will result in better crops. Local agriculture is as a rule the product of a long experience and is calculated to meet conditions which the European instructor may for some time fail to recognise.

A second point of importance is that this type of agriculture, since its methods are crystallised in something approaching a ritual, is much more level in its results than European agriculture, i.e. there is not the wide difference previously noted between the performance of one man and his neighbour. It is in consequence a wise economy of efforts to concentrate the instruction upon one prominent man in each village or family group, trusting to the other members of the community by degrees following his example.

In conclusion I should like to emphasise the value of a collection from time to time, like the present, of the experience of the agricultural staffs of the various parts of the Empire, setting out the methods of reaching the primary producers that have been found to work. While it is not suggested that any one method can be transplanted from one set of conditions to another, it is certain that information of what has answered in one place may stimulate an instructor in another area to adapt the principle to his particular circumstances.

A. D. HALL.

QUESTIONNAIRE.

(1) *Testing of Results under Local Conditions.*

In addition to, or in connection with the research stations proper, what organisation is there for testing and demonstrating under local conditions results obtained by scientific research—and how does it mainly work, e.g. by experimental or demonstration farms and plots of its own ; by making arrangements with local farmers for trying out new ideas ; or by what other methods ?

(2) *Visits to Experimental Farms.*

Is there any organised system of visits by local producers to such experimental or demonstration farms ; or, vice versa, of lecture tours by the persons in charge of farms ?

(3) *Connexion with Agricultural Education.*

How is any organisation of the kind indicated in (1) above connected with the ordinary system of agricultural education ?

(4) *Agricultural Instruction.*

What provision is made for the agricultural instruction of primary producers (*a*) at school, (*b*) afterwards ? A brief description might be given of any organised system of courses, classes, lectures, and demonstrations, whether provided at one or more fixed centres, or by peripatetic lectures and also an indication of any special measures intended to enable teachers to keep abreast of scientific progress.

(5) *Effect of Organisation.*

How far is the organisation effective in arousing the interest of producers in improved methods based on scientific knowledge.

(6) *Agricultural Instructors.*

Please give the number of agricultural instructors or inspectors and describe their duties in the matter of disseminating knowledge of scientific methods (in so far as this question is not already covered by the fourth question above). Are any special measures taken to enable them to keep abreast of scientific progress, e.g. by providing them with occasional " refresher " courses at agricultural colleges ?

(7) Co-operative Societies.

To what extent do co-operative societies or other voluntary agencies act as educational influences in the dissemination of scientific knowledge ?

(8) Bureau System.

To what extent is there a system of regular discussion among farmers of agricultural problems ; do farmers' clubs or agricultural bureaux for such discussions exist ?

(9) Official Agricultural Journal or Journals.

What is their circulation ? To what extent is an attempt made to popularise these journals and convey information in simple popular language ?

(10) Unofficial Co-operative and Private Agricultural Journals.

Please supply a list of the principal papers with some estimate of their circulation, educational value and general character, from the point of view under discussion.

(11) Special Leaflets.

To what extent are special leaflets prepared by Agricultural Departments and Experimental Stations for circulation amongst primary producers ? Are the leaflets widely read and acted upon by farmers and small cultivators ?

(12) Broadcasting.

Is any use made of broadcasting and wireless talks ?

(13) Films.

Is any use made of educational films ?

(14) Agricultural Shows.

To what extent are agricultural shows, farm trains and travelling exhibits used to explain and demonstrate scientific research and its application in practice ?

(15) Bibliography.

Please give a bibliography of the most important popular books and leaflets written in simple language describing the results of scientific research, or the most up-to-date methods based upon scientific knowledge, which have achieved a wide circulation, with the names of the authors.

ANSWERS TO QUESTIONNAIRE
(Questions 1 to 8).

The countries have been grouped as shown below :—

- A. British Isles.
- B. Overseas Dominions.
- C. India.
- D. Colonies in the Indian Ocean and Fiji.
- E. Eastern and Central African Colonies and Southern Rhodesia.
- F. West African Colonies.
- G. Mediterranean Colonies and Palestine.
- H. West Indies and British Guiana.

A number of countries replied that the terms of the questionnaire did not apply to their conditions. There are in consequence no answers from Northern Rhodesia, Bechuanaland, Swaziland, Basutoland, Gambia or the Western Pacific Islands.

Certain overseas governments attached preliminary statements to their answers in the light of which they desired the information they provided to be read. These preliminary statements are here reproduced under the heading "General."

In one or two instances, it has been necessary to summarise the information. With these few exceptions, the answers have been copied as received.

GENERAL.

NORTHERN IRELAND.

General.

Agricultural conditions in Northern Ireland are in many respects very different from those in other parts of the United Kingdom and in arranging a graduated system of agricultural education the Ministry of Agriculture has had always to keep in view the special requirements of a country in which small farms predominate. The system of agricultural education in countries such as England and Scotland could not, therefore, afford a model for Northern Ireland and it has been necessary to develop a special scheme of agricultural instruction suitable for Northern Ireland conditions.

Every grade of instruction is provided for. The Winter Agricultural Class is attended by the farmer's son who cannot be spared from his father's farm except in the winter months and who has definitely made up his mind to follow his father's calling. A more advanced but still practical course is provided at Greenmount Agricultural and Horticultural College, while the Agricultural Faculty of Queen's University, Belfast, provides a higher course of agricultural education leading to the degree of Bachelor of Agriculture.

At the outset the Ministry decided to raise the general condition of farming by schemes for the direct improvement of livestock, tillage, horticulture, poultry-keeping, dairying and creamery management. This very comprehensive programme included, as outstanding features, the subsidising of high-class sires, experiments of a commercial rather than a scientific character, scientific investigations and the organisation of our farmers and of the marketing of our produce in Great Britain.

In Northern Ireland the whole system of agricultural education is thus essentially a unified structure in which the various schemes administered by the Local Authorities—the County Committees of Agriculture—are directed and co-ordinated by the Ministry as the central body.

The foundation of the system is research and experimental work and the basic principles of co-ordination and continuity have been adopted and maintained throughout the structure. Seven Research Divisions have been established as under—in order of formation :—

Chemical and Animal Nutrition Division, Queen's University, Belfast.

Seed Testing and Plant Diseases Division, Queen's University, Belfast.

Plant Breeding Division, Stormont.

Poultry Division, Stormont.

Animal Diseases Division, Stormont.

Crop and Animal Husbandry Division, Queen's University Belfast.

Dairy Bacteriology Division, Queen's University, Belfast.

The facilities provided by these research divisions have recently been augmented by the acquisition of a Research and Experimental Farm. In the past it has been a relatively simple matter to conduct manurial and crop experiments on small farms of the type predominating in Northern Ireland, but in investigations relating to Animal Nutrition the problem is very different indeed. Seventy per cent. of the farms in Northern Ireland, are less than 30 acres in extent and it will be readily appreciated that the practical difficulties of conducting anything more than demonstration work on animal nutrition are, under such conditions, very considerable. Some idea of the importance of the development of work on animal nutrition may be gathered from the fact that upwards of 75 per cent. of the agricultural income of Northern Ireland is derived from livestock and stock products. The possession of a large control farm for experimental work on nutrition is therefore, essential. The farm, or as it is called, the Agricultural Research Institute, owes its origin to a memorandum presented by the Ulster Farmers' Union to the Prime Minister. In that memorandum the need for such facilities was emphasised : it was pointed out that extraordinary progress had been made in crop production following the work of the Agricultural Departments in Ireland, and it was argued that if the necessary facilities were provided it should be possible to make equally rapid, if not more rapid, progress on the animal side. The outcome of the negotiations was an agreement to establish a research and experimental farm of

500 acres at Hillsborough, County Down, out of funds provided partly by a Government grant and partly by allocation of portion of the grant for the relief of agricultural rates.

The arrangements with regard to the control and development of the work of the Institute are probably unique in the relation of Government Departments and the farming community.

The control of the farm and of the funds has, by Act of Parliament, been vested in a Board of Trustees, consisting of 9 persons, 3 nominated by the Ministry of Agriculture, 3 by the Ulster Farmers' Union, 1 by the Ulster Agricultural Organisations Society and 2 by the Agricultural Faculty of Queen's University, Belfast, namely, the Head of the Crop and Animal Husbandry Department and the Head of the Agricultural Chemistry Department, who act as joint Directors, the former taking charge of the management, and the latter of the research and experimental work of the farm.

Linked up with the work of the Research Divisions and carrying the results obtained into every phase of the agricultural industry are (a) the Winter Agricultural classes for farmers' sons; (b) the Greenmount Agricultural and Horticultural College, which provides a more extended practical course for men; (c) the Agricultural Faculty of Queen's University, Belfast, which is open to students either direct from the farm and Winter Class or from Greenmount; (d) County classes for women, corresponding to the Winter Agricultural Classes for men, but at which dairying and poultry-keeping are taught; (e) the North-West Agricultural School, Strabane, providing short courses of instruction for farmers' daughters who return to their homes after eleven weeks at the School; and (f) the Ulster Dairy School, Cookstown, also a residential Institution for girls, where the instruction given is similar to that at the North-West School, but where facilities are available for more extended training, enabling selected pupils to qualify as teachers of dairying, poultry-keeping and household management.

SOUTH AFRICA.

General.

In order to gain a better idea of the way in which Agricultural Education and Extension work is dealt with in the Union, it is necessary to understand the organisation of the Department of Agriculture.

The Union Department is comprised of five Divisions—Animal Industry, Plant Industry, Chemistry, Agricultural Education and Extension, and Agricultural Economics and Markets. Four of these Divisions are organised primarily, in fact almost entirely, as Research Divisions, but that of Agricultural Education and Extension is the one responsible for all technical education falling within the scope of the Department—education in this instance embracing the work of instruction of the farming community. Until comparatively recently extension work in any particular subject of Agriculture was arranged by the Division dealing with this subject. This system, however, disclosed many weaknesses and in order to prevent overlapping and undue expenditure and the waste of time of the officers concerned it was decided a few years ago to make one Division responsible for the organisation of all this type of work ; one might broadly say that the duties of four of the Divisions are to find out new facts and the work of the Agricultural Education and Extension Division that of communicating these facts to the Farming Public.

It might here be stated that in addition to the Division of Agricultural Education and Extension there are two Colleges of Agriculture in the Union, one associated with the Transvaal University College at Pretoria and the other with the University of Stellenbosch. In the case of the former the Staff is utilised for inspection work when available and in the case of the latter a definite portion of the Union is allotted to the Stellenbosch Elsenburg College of Agriculture, i.e. the Western Cape Province.

MALAYA.

General.

The area of influence of the Department of Agriculture is primarily in the Federated Malay States and Straits Settlements. The results of agricultural research carried out by the Department must be equally applicable to the Unfederated Malay States, which comprise the State of Johore on the South and the States of Kedah, Kelantan and Trengganu on the north. Furthermore, it is most important that the results of agricultural research should be given prominence in the Unfederated Malay States, for these territories are inhabited by a large Malay population who live by agriculture. At the present

time, the Department lend a European Officer to Johore, and a Malay Officer is seconded for service under the Kedah Government. This arrangement leaves the two large States of Kelantan and Trengganu unrepresented by an Officer of the Department, so that the results of scientific research are less applied owing to lack of local organisation.

The problem of agricultural education is complicated by the number of nationalities engaged in agriculture. European enterprise is mostly concerned with the plantation rubber and coconut industries: Malays are not only owners of small plantations of rubber, which in the aggregate amount to a considerable area, but are the cultivators of padi in addition to numerous minor crops. Chinese are land owners of considerable importance and there is no branch of agricultural enterprise in Malaya which holds forth any prospect of commercial success which is not undertaken by this nationality. The principal crop grown by them is rubber, but they have undertaken and are largely instrumental towards the success of important minor industries such as pineapple cultivation and canning, gambier and tapioca. Other nationalities engaged in agriculture include Javanese, Indians and Japanese. Many of these nationalities are unable to speak any other but their own language. The Chinese are of various tongues and frequently can communicate to one another only in Malay or in the Chinese written character. It will be seen, therefore, that the peculiar difficulty of agricultural education in Malaya is the variety of languages spoken, and this difficulty must be met by means which are particularly adapted only to such conditions as obtain in this country.

FIJI.

General.

The conditions in this Colony are distinctly peculiar, and the ordinary methods of disseminating information such as could be used in England or in Canada where the population is largely homogeneous, would hardly apply.

The principal crop is *Sugar Cane*, which is controlled by one company. In this case the company has its own research officers

and experimental grounds, and is in a position to disseminate through its plantation managers any information considered to be of practical value by the research staff.

The second crop in importance is *Coconuts*, the product of which is made into Copra. A considerable portion, perhaps 40 per cent., of the Copra is made by Fijian natives, and the balance is made by Europeans and the small remainder by half-castes. Coconut planters are frequently isolated, either through being on a remote island or through lack of roads and telephone communication. On account of these conditions there has been a general lack of co-operation among planters, and it has been difficult, therefore, to organise any co-operative effort through which new ideas and methods could be disseminated. The best planters, however, have their own libraries and are able to keep abreast of developments in coconut plantation work elsewhere.

The crop that is third in importance is *Bananas*, nearly all of which are grown by native Fijians.

A crop that is in the experimental stage is *Cotton*, most of which is grown by East Indians. There is an experimental station for the development of better strains, and the results of this station are disseminated in the form of better seed and by personal visits of the Cotton Specialist among the growers.

NYASALAND.

General.

In Nyasaland the Department of Agriculture has to deal with two distinct classes of primary producers—the European and the Native—and methods of arousing interest in the result of scientific investigations that appeal to the one class are as a rule quite unsuited for the other.

The European planter in this country demands in particular the assistance that can be given by a crop specialist who visits his estate, spends one or two days with him, and gives him practical advice on the spot regarding his main crop. The planter is anxious to receive help of this nature and, compared with farmers in older countries, shows a greater readiness to adopt the recommendations

made for his guidance. The Department of Agriculture does not show a crop specialist on its staff list, but the Agricultural Chemist has made a thorough study of the culture of tobacco in all its phases, and the combination in one officer of Chemist and Tobacco Specialist has proved very satisfactory as an emergency measure to meet the more urgent needs of the European planting community.

Much importance is also attached by the European planter to the services of scientific specialists, for example, to the work of the Entomologist.

In the case of the Native, the best results have been obtained by limiting the districts covered by the European District Agriculturists and Supervisors to an area that can be frequently toured and by supplying these officers with an adequate staff of native instructors. Supervision and training of these men is one of the most important duties of the European officer. Small experimental plots are maintained by District Agriculturists and Supervisors and greatly strengthen their work, but care has to be exercised to ensure that attention to the plots does not interfere with district travelling.

The District Agriculturist must have a sound knowledge of agriculture in general and in addition he must possess personal qualities, such as patience and tact, if his work is to meet with success ; it is also essential that he should not endeavour to trust to his own influence alone, but that he should obtain the assistance of the District Administration staff and of the Native Chiefs and Village Headmen.

The replies to the questionnaire reveal the fact that inadequate attention is paid to at least some of the methods of agricultural propaganda that have proved successful in countries in which the organisation of the agricultural services has reached a high standard of efficiency. Owing to local conditions the adoption of some of these methods is impracticable ; others, though well suited to the country, cannot be put into practice to the extent that is desirable, owing to the fact that the officers on whom the work would have to fall are fully occupied with other and more pressing duties. The country is not sufficiently advanced to support an agricultural college, nor does its revenue at present permit of the establishment of a separate organisation for agricultural research work.

NIGERIA.

General.

The Director of Agriculture in Nigeria writes (October 1927) :—

“ In considering the answers below to the various questions in the ‘ questionnaire,’ some important relevant ways in which Nigeria and similar colonies differ from the Dominions must be borne in mind.

“ Nigeria is, to an extreme degree, a country of very small small-holders. Each male adult, or each family, farms some 3–5 acres, sometimes less, very seldom more. The total population is roughly 20,000,000.

“ Here fully trained qualified workers must always be relatively very few in proportion to the number of farmers, much fewer than in England or the Dominions. This is not a temporary condition : it is inherent in the nature of the country. The country’s industry is primary production, mainly of agricultural products ; the sources from which Government revenues can be drawn without undue hardship and without undue restrictions on production and trade are very limited, i.e. Government revenue must always be relatively low per head of population. On the other hand, fully trained and qualified extension workers will always be expensive ; at present they are entirely European, and all experience goes to show that it is better to have one European of the best type, personally and technically, than two cheaper ones. Eventually no doubt Africans will be educated and trained so as to be able to do such work. On the whole, including cost of education, they will probably cost Government nearly as much as Europeans do. But even if they were cheaper they will not be available for many years. It will be noted that India has as yet, or had until 1921, when I left India, produced very few men really capable of entirely independent good work of this kind. Quite good Indian research workers have been produced in numbers ; but in agricultural ‘ Extension work ’ the best Indians still definitely need direction and guidance. In Nigeria, then, the farmers are relatively very numerous, and the highly qualified experienced reliable extension workers will always be relatively few.

“ On the other hand, African assistants of limited education, training and general ability can be had relatively very cheaply. If such men are specifically trained and retrained each year for a specific

'cut-and-dried' operation, and if they are used and supervised in the right way, by a man who knows how to use them, then it is remarkable what they can do. Here the fully qualified worker costs Government about £1,000 a year, the cheapest 'literate' assistant costs £20 a year. It will be seen that these conditions are all totally different to those in England and the Dominions.

"At present, and for many years to come, there is no need in Nigeria to attempt to 'teach the farmer generally to farm better,' i.e. to teach him to make numerous minor and complicated or difficult improvements in his farming: there are as yet great advances that can be made by leading the farmer to take up definite simple changes, each of which can stand on its own merits, without forming a part of 'better farming generally'—such things as new crops and new varieties of existing crops, proper fermentation of cocoa, making farmyard manure by using bedding, ploughing, use of green manures. Such improvements as these, if they are really completely sound from the point of view of the individual farmer, give such greatly increased profit, for such slightly increased effort, that they need no very extensive or elaborate advertising.

"Nigerian native farmers are not temperamentally opposed to trying a new idea, in the sense that many English farmers are said to be, or were said to be a few years ago. They are often restricted by considerations of an economic nature, though these may not always be considerations that can be expressed in terms of capital, or percentage return on capital. But apart from, and even in spite of, such considerations, there is always a number of men in any particular area of the country, who are surprisingly ready to give a fair trial to any new idea, if they are approached in the right way. If this is only a statement of opinion, it is at least the opinion of the majority of this Department.

"There is in each and every part of the country an hereditary art of farming which seems more complete, detailed and local than the corresponding local farming technique and ideas in England. Thus, excepting where his instructions rest on definite experimental investigations and proof, the would-be instructor in 'better farming' is attempting a difficult and dangerous task—he may be right, but he may well be wrong. This is doubtless true in England, but it goes much further in a country like Nigeria. There is here at present

far less opportunity to improve the worst farmers simply by teaching them the minutiae of the practice of the best farmers in the same district.

“ In view of the above facts, it is my opinion that to approach this subject in a country like Nigeria from the position of ‘ So and so is done in England, America, and the Dominions, what of the same kind can be done in Nigeria ? ’ is to approach it along a path where one must walk very warily. Without very clear thinking by everyone concerned, this line of thought is liable to become ‘ So-and-so is done in England, America, and the Dominions, therefore, *for this reason*, it is right and necessary to do the same or something very similar in Nigeria.’ The latter idea is a false and dangerous one, which will lead to thinking of means as though they were ends, and hence to a waste of effort. One must not forget the tempting nature of these methods which enable the worker to report that ‘ so many persons visited the farm, so many attended demonstrations, etc., etc. ’, and which encourage senior officials and the public to estimate ‘ progress ’ by the same simple numerical criterion. In countries like Nigeria such kinds of work are very easy and may be (not necessarily are) very useless.

“ My own personal opinion is that in Nigeria, in its present state of development, and during at least the next ten or fifteen years, the right method in extension work is to help a small number of the best farmers to farm better, and in the main to leave the ‘ herd ’ to follow them ; to make conditions such that the ‘ herd ’ can follow, but not to try to reach the ‘ herd ’ directly. Many of the methods about which questions are asked in the questionnaire, or something superficially similar to those methods may be used here with a totally different object, i.e. solely as a preliminary measure to enable us to find, select and get in touch with a relatively small number of the exceptionally intelligent and enterprising farmers. (It must be remembered that in this country such natural leaders are not usually bigger farmers than the others, and do not always occupy any official or quasi-official positions of leadership, they differ from the rest only in brains and character.)

“ It will, I trust, be realised that, although I naturally believe that the policy we are working on (i.e. concentration on the most enterprising individuals) is the right one for Nigeria at the present time and in our present local conditions, yet I have no desire to suggest

that it is universally applicable to all other colonies—not even to all colonies which may seem to be very similar to Nigeria. The only dogma that I wish to state is that in such colonies one should first consider the local conditions and problems and then consider what use can be made of the methods mentioned in the questionnaire ; one should not approach the matter from the opposite direction, regarding those methods as desirable in themselves.

“ Less important points that must not be overlooked are the following :—

- “ (a) For the purposes of this questionnaire, the history of the Nigerian Agricultural Department dates from 1921.
- “ (b) In Southern Nigeria a real practical policy, plan and organisation, of general education has only been formulated, and begun to be put into practice, in the last year or so.
- “ (c) In Northern Nigeria the real practical effort in the direction of education is represented by one training college which (though efficient) is of relatively minute proportions, and which has been in existence only a few years, and has turned out only one (? two) batch of teachers, who have only been teaching for two years or so.

QUESTION I: TESTING OF RESULTS UNDER LOCAL CONDITIONS.

ENGLAND AND WALES.

Q. 1.—Very occasionally research institutes themselves arrange to test out their results under local conditions on institutional farms referred to below or on private farms.

The first link in the chain between the research institute and the farmer is the advisory or local investigational officer. These advisory officers test out under local conditions on the farms at their advisory centres or on private farms in their provinces the results obtained by research institutes.

Advisory centres are usually university departments of agriculture or agricultural colleges. Quite apart from the advisory service, results obtained by scientific research are tested on the farms attached to university departments of agriculture and agricultural colleges and also at farm institutes. The farm institutes are established by county councils; in one or two cases the county council runs a demonstration farm as a separate thing, without a farm institute attached. Including these cases, the total number of county demonstration farms is 22. In other counties, and also to a less extent in "farm institute" counties, experimental and demonstration plots are arranged. In some cases these are under the control of the county council; in others the work is carried out on ordinary farms by arrangement with local farmers.

On the marketing side assistance in the form of money grants has been given to certain grading and packing stations which consent to act as demonstration centres or to test on a commercial scale a new method, principle, or machine.

SCOTLAND.

Q. 1.—The responsibility for testing and demonstrating the results of scientific research generally is mainly undertaken by the three Colleges of Agriculture, the activities of which cover the whole country, each college serving a certain area. In addition to the

tests and demonstrations carried out on the experimental farms, of which each college has one, local tests and demonstrations of the results of scientific research are carried out by arrangement with individual farmers on farms and plots throughout the college areas under the supervision of the County Agricultural Organisers on the staff of the colleges.

Close co-operation exists between the colleges and the various research institutes in the country, e.g. simultaneous tests are sometimes carried out on each of the experimental farms of the Colleges in conjunction with an institute. Each institute has also either a farm or some land on which the results of scientific research pertaining to the special work of the Institute may be tested. The Institutes may also make arrangements directly with individual farmers for testing new ideas.

NORTHERN IRELAND.

Q. 1.—The County staffs are not a number of separate units, but are one team, working out a definite policy, continuous and co-ordinated with the work of the Research Divisions. The County Agricultural Instructors meet in conference with the Research Staff and the Ministry's Inspectors at regular intervals. At their first meeting each year they have before them a draft scheme of experiments. The crop variety trials, for example, are drawn up by the Head of the Plant Breeding Division in such a way as to fit in with the work of his Division and provide him with the necessary practical information. Similarly, the manurial and feeding experiments are drawn up by the Chemical and Animal Nutrition Division, and so on. The proposals are discussed freely in the light of local conditions and difficulties, and when agreement is reached they become official experiments which each Instructor must carry out. All the county experimental work is regularly and closely inspected by the Ministry, and each member of the research staff concerned makes it his business to visit, as occasion demands, the Instructors' field experiments which concern him. In this manner close personal touch is maintained between the County Instructors and the research staff and the research worker is enabled to secure within a relatively short period a number of repeated experiments carried out under varying conditions of soil and season. As a rule, field trials in the Counties are confined to duplicate plots. It is considered that 10 or 12 centres,

each with duplicate plots and continued over a period of years provide a much sounder idea of the extent to which the results are applicable over the North of Ireland than would be the case with one or two experiments designed on the chequer board plan.

Each County Instructor publishes his own results in his annual report to his Committee. Before the date of publication he receives a statement showing the results obtained at all the other centres. This statement is for his own information and enables him to exercise the necessary caution in writing up his results. When the whole series of experiments are completed they are dealt with by the research division responsible for them. The close co-operation which is thus maintained between the research staffs and the County Staffs enhances greatly the efficiency of their advisory work and enables the research staff to maintain an effective contact with the producer.

IRISH FREE STATE.

Q. 1.—The principal schemes adopted by the Department of Agriculture are administered through the Committee of Agriculture in each county of the Irish Free State, who employ Itinerant Instructors in Agriculture, Poultry-keeping, Butter-making, Horticulture and Bee-keeping. The work of the Instructors in Agriculture under this head may be divided as follows :—

- (1) Experimental plots.
- (2) Demonstration plots.
- (3) Extension plots.
- (4) Live Stock Experiments.

These tests are located with suitable farmers in each county or district, and, in selecting sites, preference is usually given to localities in which Agricultural Classes (referred to under 4) have been held during the preceding winter.

Experimental Plots.

Though the Department suggest the carrying out of certain experiments, the Instructor is at liberty to include such additional tests as local conditions appear to render advisable, provided he does not arrange for a greater number of experiments than he can efficiently supervise. Where variety tests are carried out, the Instructors are

required to include all the varieties specified by the Department, but they may also include any other varieties which have been grown locally and found to give satisfactory results.

Demonstration Plots.

These plots, which as far as possible are located on prominent sites near main roads, are intended to serve as object lessons to farmers in the cultivation, manuring and seeding of land, etc.

Both the Experimental and Demonstration Plots are conspicuously labelled, and public meetings are, as far as practicable, arranged thereat during the summer months, thereby affording the Instructors an opportunity of discussing the varieties, manurial mixtures, methods of cultivation, etc., with neighbouring farmers.

Extension Plots.

With a view to encouraging the use and distribution of pedigree seed oats and barley, etc., "extension plots" of pure line strains are laid down in certain districts with suitable farmers. The seed is supplied at a fixed price to the grower on condition, (1) that the cultivation and harvesting of the crop are carried out under the supervision of the local Agricultural Instructor, and (2) that the produce is sold at a reasonable price to other farmers in the district for seed purposes.

Horticultural Plots.

The Horticultural Instructors in each county also select a number of plots situated near public roads for the purpose of demonstrating the culture of vegetables and fruit. Bees are kept in connection with many of these plots, and the Instructors from time to time give lectures and demonstrations at the plots to farmers, etc., on such subjects as grafting, pruning, bee diseases, etc.

Live Stock Feeding Experiments (Pigs, Calves and Cattle in Stalls).

These experiments are conducted by the Agricultural Instructors on suitable farms, the main objects being (1) to demonstrate and compare the values of certain standard feeding stuffs, particularly home grown as against imported, and (2) to test any new foods placed on the market. Though certain specific tests are at times prescribed by the Department, the Instructors are at liberty to

arrange any experiments which may be of local interest, and to include such feeding stuffs as the needs and problems of their own particular districts suggest. In the selection of farms where these experiments are to be carried out, care is taken to ensure that proper facilities exist for the correct weighing of the animals included, and subsidies at the rate of 10s. per animal are allowed as compensation to the farmers concerned for any trouble involved.

At their three provincial Agricultural Schools, the Department also carry out field and stock-feeding experiments.

CANADA.

Q. 1.—The Illustration Stations of the Dominion Experimental Farms have the largest organisation testing and demonstrating under local conditions, results obtained by Scientific Research.

The Cereal Division of the Central Experimental Farm also conducts work in testing varieties of cereals on individual and privately owned farms in various parts of Canada.

The Poultry Division is also doing much work along this line, viz. having farmers adopt certain methods on their own farms in comparison with older established methods. Other Divisions, although not organised in extension trials of this kind, yet give tremendous service to individual farmers enquiring as to advanced methods.

WESTERN AUSTRALIA.

Q. 1.—No research station. Testing and demonstration of scientific results are carried out on the State Farms and on private farms under Departmental supervision.

SOUTH AUSTRALIA.

Q. 1.—In South Australia, Government Experimental Farms are availed of to determine what is rational practice in the districts in which the Farms are placed. Results obtained are then extended to demonstration plots on private farms. These results are also brought under the notice of farmers in printed publications and in the course of public lectures.

TASMANIA.

Q. 1.—The method in Tasmania is almost wholly by making arrangements with local farmers for trying out new ideas.

VICTORIA.

Q. 1.—The Department has two State Farms and three sub-stations, at which the greater portion of the work is devoted to testing and demonstration of results obtained by scientific research.

In addition, there are some 30 or 40 demonstration plots being conducted co-operatively with farmers on their own farms. The demonstrations are in the main confined to variety trials with wheat, oats, potatoes, tobacco, maize, broom corn, and to manurial tests of these crops, demonstrations of pasture top-dressing, etc.

The farmer works according to a plan provided by the Department, and departmental officers make periodical inspections throughout the year. He is nominated in all cases by a local agricultural organisation, through which the Department works.

The seeding and harvesting of the crops are done under supervision, and once a year or oftener a public field day is held at the plots at which local farmers attend. These demonstration plots are very popular in Victoria, and the Department has more demand for them than can be met by the funds and staff at present available.

The average payment made to farmers for this work is £20 per annum, and the average size of the plots is from 5 to 10 acres.

As far as possible all demonstration plots are located on public highways to assist in publicity, and special attention is given to labelling the plots to attract the attention of passers-by, and to facilitate inspection.

NEW SOUTH WALES.

Q. 1.—The results of scientific research are tested and demonstrated at the Hawkesbury Agricultural College, seventeen experiment farms and two viticultural nurseries which are under the control of the Department, and also on experiment plots which are established on private farms. The total number of experiment plots which are being conducted on private farms totalled 670 during the year 1926, covering an area of 3,357 acres. The institutions controlled by the

Department are located in various districts, and it is possible to carry out at one or more of them, experiments relating to the agricultural, horticultural and livestock industries in which farmers are interested.

In order to meet every condition and to demonstrate to farmers the advantages of improved methods, experiments are conducted in co-operation with farmers. For these experiments the Department supplies seed and fertilisers, the farmer providing land, implements and labour.

In addition, various specifics and preparations are examined in the scientific branches and are subsequently tested out in the field either on departmental or private farms, but always under the supervision of the Department's officers.

QUEENSLAND.

Q. 1.—The Queensland Department of Agriculture and Stock, having its head office in Brisbane and whence its activities are directed, copes with Agricultural instruction as follows :—

- (a) By direct instruction to the farmers, by personal visits to the farm made by an Instructor in Agriculture or his Assistants in the person of Assistant Instructors or Field Officers; usually this is combined with demonstration work of an experimental or seed propagation nature. In this way new varieties are tested out under various soil and climatical conditions and their conduct duly recorded.
- (b) By the use of State Farms for stud breeding of animals in conjunction with tried and approved Agricultural operations. These more or less work in conjunction with operations under (a).

NEW ZEALAND.

Q. 1.—The research staff of the Plant Research Station works in the closest co-operation with the extension staff of the Fields Division of the New Zealand Department of Agriculture. The Dominion is divided into four districts for purposes of administration and each of these districts is under the control of a superintendent. Each superintendent makes the necessary arrangements for testing out in his district the findings and ideas of the research staff. Such

testing out under local conditions is carried out in two ways (a) testing out at farms controlled by the New Zealand Department of Agriculture and (b) on farms in private occupation ; the owners of such farms working on a co-operative basis with the extension staff. As far as is possible the interests of co-operating farmers are safeguarded from actual loss.

SOUTH AFRICA.

Q. 1.—The testing of results under local conditions is really the work of the Research Division and the demonstrating of these results that of the Division of Education and Extension. The testing work is done at Experimental Stations ; on private farms ; on demonstration plots which are hired by the Department and in association with Farmers' Associations. In this respect it might be mentioned that a considerable number of purely Extension Officers have been appointed during the past few years to act as a connecting link between the Department and the farmers. It is the prime duty of these Extension Officers firstly to organise the farmers in their area into units which will make extension work easy and secondly in consultation with the Farmers' Organisations to arrange for tests or demonstrations to be undertaken in their areas.

INDIA.

Q. 1.—In addition to research stations proper, there are in India Government seed and demonstration farms. As the name connotes, they are used for the propagation and distribution of pure strains of seed and for demonstrating the improved methods of farming evolved on the experimental stations. The number of such farms in any one province is necessarily limited by the staff and money available. But in addition to these Government farms the provincial departments of agriculture in India have promoted the establishment of thousands of private seed farms. On these farms improved seed supplied by Government is propagated by the owner for distribution to cultivators. These private seed farms serve to some extent the purpose of demonstration farms, in so far as the owners demonstrate thereon the superiority of improved strains of seed. The owners are in some cases members of the local agricultural associations and as such they co-operate with their department of agriculture in demonstrating also other agricultural improvements

such as improved agricultural implements and methods of tillage, the use of artificial fertilisers, etc. In some cases improvements effected by the department are demonstrated in the villages by leading landholders working under the guidance of the department. These landholders use the manure or implement, as the case may be, on a plot of land belonging to themselves and cultivated under village conditions. An improvement thus demonstrated by the people for the people hits the cultivator in the eye, so to speak.

Some provincial departments of agriculture take on lease for a period of five years or so, small areas of about 15 to 20 acres and demonstrate on these small farms the improved varieties of crops, manures, implements, etc., which they recommend. These demonstration farms are cultivated direct by the department and they aim at showing a profit.

CEYLON.

Q. 1.—The results of experimental work on the Central Research Station and in the Research Laboratories at the Headquarters of the Department of Agriculture are regularly placed before agriculturists at the bi-monthly meetings of the Estates Products Committee of the Board of Agriculture, which is held under the Chairmanship of the Director of Agriculture. These results are fully discussed and all such discussions are open to the Press. Estate owners experiment along lines indicated by the results of scientific investigations, and considerable changes in practice—particularly in soil treatment and in the control measures against pests and diseases—have resulted as the outcome of these discussions. The results of experimental work on the Provincial and minor experiment stations and farms are similarly reported to the Food Products Committee of the Board of Agriculture. The minor experiment stations deal chiefly with food products, either for dry land cultivation or for irrigated lands. The results of scientific investigations in paddy (rice) cultivation are demonstrated on special stations and upon the lands of cultivators, as are also demonstrations with manures. Special attention has been given to the production and testing under scientific control of pure-line strains of paddy. No such seed is distributed to growers—except to large growers who are prepared to make experimental trials and who realize that their trials are purely of an experimental character—until it has been tested in district stations and found to be suited to those districts. In Ceylon climatic and

soil conditions vary considerably and particular types of paddy suited to one district are not suited to other districts and in consequence detailed testing under scientific control is made in experiment stations situated in areas where large tracts of cultivation exist. Certain arrangements have been made for the growing of seed on privately owned farms and this system of private seed farms will be developed as further supplies of pure-line seed become available. Demonstrations in respect of the treatment of pests and diseases are given on the plantations themselves and demonstrations in the budding of rubber have been given at experiment stations and upon estates selected by local agricultural associations.

The number of Experiment Stations will be as follows when effect has been given to proposals already sanctioned :—

Central Research Station—one.

Provincial Agricultural Stations—six.

Minor Agricultural Stations—nineteen.

Paddy Experiment Stations—twenty-four.

MAURITIUS.

Q. 1.—Much of the work of testing results is carried out on estates in Mauritius. Thus, in relation to cane varieties, new canes after trial at Department Experiment Stations are tested on plots on estates ; while experiments to test conclusions arrived at on cultivating and manuring canes are similarly carried out on estates. Similarly much experiment work is carried out on estates to test conclusions in relation to plant disease.

SEYCHELLES.

Q. 1.—A certain number of experiments were made on crown lands to show effects of terracing and manuring coconut plantations some 10 years ago and the methods employed have been adopted by planters. At the Botanic Station and Hermitage Estate, plots are devoted to the trial of new perfume and other plants. Among the perfume plants newly introduced and successfully set out the following may be mentioned :—

Palmarosa and ginger grass from India ; Peppermint from England through Kew Gardens ; Citronellas from Ceylon, Java and Cochin ; Ginger from Washington and Cochin. Ylang

Ylang, Patchouli and Indian ginger had been introduced from Mauritius and Reunion prior to the establishment of the Botanic Gardens. Cinnamon from Ceylon had been introduced by Monsieur Poivre in 1762 but had been strangely mistaken up to 1904 for Cassia Cinnamon.

The various methods of distilling by steam and direct fire are now familiar to all planters. During the war a Chinaman made cheap wooden stills which allowed new factories being built without up-to-date and costly factories. Since then the Deroy stills are those that are preferred.

MALAYA.

Q. 1.—Some years ago the Department adopted a system of testing the results of scientific research under local conditions by making arrangements with cultivators to establish small trial plots on their land. This system proved most unsatisfactory, the difficulty being the exercise of proper control. The distribution of tested planting material to cultivators is also fraught with difficulties. One of these difficulties is that an improved type appears to exercise a fascination over the native cultivator, with the result that, instead of planting out the whole of the material given to him for this purpose, he is apt to give part away to his friends so that the original supply becomes far too subdivided and is lost. This applies in particular to early work of distribution of improved padi; but at the present time considerable advance has been made in this direction. The system adopted at the present time is for testing under local conditions either on district experimental stations or on land hired for the purpose and under the close supervision and absolute control of officers of the Department. Such local experimental stations serve the dual purpose of testing and multiplication. It is only when this multiplication has been effected, that distribution is allowed on a large scale.

FIJI.

Q. 1.—Chiefly by making arrangements with local farmers for trying out new ideas.

SOUTHERN RHODESIA.

Q. 1.—A very considerable proportion of the farmers of the Colony are quick to investigate on their own farms improved methods of any kind which as a result of research on the Government farms or

experiment stations or in the laboratories of the Department of Agriculture are recommended to them by the technical advisers of the Department.

In the case of maize growers, the Maize Association which represents and watches over the interests of these producers, organizes competitions which have for their object the solution of some of the problems connected with maize production.

The technical officers of the Department of Agriculture encourage farmers to try new and approved methods of stock and land management and when such are undertaken keep close touch by means of personal visits to the farm and advice on each step of the investigation. In addition, in certain cases free issues of seed or fertilizer are made to farmers who are testing on a field scale soil methods or treatments recommended by the Department.

Constant tours of farms in all parts of the Colony and frequent attendances at meetings of Farmers' Associations are made by all technical officers of the Department of Agriculture and thus the latest advances in scientific and practical agricultural knowledge are brought to the notice of primary producers.

KENYA.

Q. 1.—In native areas, demonstration plots are established in locations in charge of Agricultural Instructors (Natives) and under the supervision of Agricultural Officers.

In European areas, manorial and varietal trials and demonstration plots are established, also plant selection and soil cultivation experiments are conducted but not on a properly organized scale.

NYASALAND.

Q. 1.—The Empire Cotton Growing Corporation maintains an important sub-station for the purpose of testing promising varieties or cultural methods developed at the main station. Subsidiary experimental work is undertaken in various parts of the country by District Agricultural Officers of the Department and by Agricultural Supervisors attached to the Native Tobacco Board.

From time to time the co-operation of planters is secured for fertilizer experiments, varietal trials, and the test on a field scale of measures for the control of pests and diseases. Supervision by officers of the Department is an important feature of this work.

UGANDA.

Q. 1.—Experimental plantations are carried on by the Government which are primarily used for testing results, demonstration purposes and the introduction of new crops.

European planters are encouraged to try out new ideas, particularly in the case of coffee and rubber which are their main crops.

TANGANYIKA.

Q. 1.—So far, nothing in the nature of fundamental agricultural research has been carried out in this territory. The re-establishment of the Amani Research Institute has, however, now (1927) been accomplished and it will function in the near future as a research institution of the first order, making enquiries into the basic constitution, properties and activities of the soil and the plant. The results obtained will be passed on to non-native planters and native farmers through the experimentation and teaching of the Agricultural Department.

Agricultural enquiry in the territory has in the past been confined mainly to investigations at experimental stations regarding the plants and their varieties best suited to the country, times of planting, and treatment during growth. The Entomologist, the only officer of a technical kind attached to the Agricultural Department until recently has investigated the pests which attack the principal crops of the territory and the means of dealing with them, and has given advice both in formal reports and the public press as to the measures to be taken against them, both by planters and farmers and by the State. The results of all these investigations appear regularly in the Annual Agricultural Reports.

This work is already being extended by means of co-operative field experiments with planters (particularly for coffee in the Northern Province) and through Agricultural Sub-stations, partly or entirely supported by Native Council funds, in which the better and improved

crops and their kinds, already tried in the main Agricultural Stations, undergo local trial and planting for increase if they are successful. It will be further extended by the appointment of an Agricultural Economist, a Mycologist, and an Assistant Entomologist for whom provision has been made in the estimates of the Agricultural Department.

NIGERIA.

Q. 1.—(a) There are at present eight stations which are primarily experiment stations and incidentally serve the purpose of demonstration stations. This number includes the two stations at which there are also laboratories and which are the research officers' permanent headquarters. Each experiment station has a permanent staff of three qualified European scientific agriculturists, who are responsible for both experimental work and for all kinds of extension work. Each farm provides 100–150 acres of experimental fields, divided into quarter acre plots. A new station of this kind is to be opened next year (1928) and the number will be gradually increased.

(b) At the next stage beyond these farms, demonstrations are made only on the land of individual farmers and by the farmers themselves with such assistance and supervision—often very close—as is necessary. For one subject, where the practices to be demonstrated are relatively complicated and can hardly be split into simpler parts, “demonstration farmers” have actually been given little farms carved out of our farms, to be theirs at least for several years—this as a first stage in demonstration. The specific method adopted in each subject of demonstration is chosen according to the subject: only one generalisation is laid down—that small “outside” demonstration plots, managed directly by officials or employees of Government, are to be regarded as the worst possible method, and one only to be adopted as a very last resort. We are not likely ever to have to resort to that.

GOLD COAST.

*Q. 1.—*Demonstration farms are provided, sometimes confined to one crop, but generally used for a number of crops. Farmers are encouraged to try for themselves new crops or new varieties by *(a)* a bonus system and *(b)* the free distribution of plants and seed.

Experimental work is carried out on farms with the active co-operation of the farmers. Children are taught the value of trial and experimental plots in the gardens attached to many of the schools and particularly at the Trade Schools.

SIERRA LEONE.

Q. 1.—Crops are tested out or experimented with at the main Experimental Farm, Njala.

In each of the Provinces there are demonstration farms in charge of Government Officers where the results are demonstrated ; also in the case of Chiefdoms where the Chiefs are more enlightened demonstration plots are started for the Chiefdom under the control of Government Agricultural Officers.

MALTA.

Q. 1.—We have no Research Stations, and the very limited staff of the Department is too overworked to be able to engage in much research work. There is only a very small and wholly inadequate Experimental Farm. A project to establish a properly equipped Experimental Farm, under a scientific Curator, has been in abeyance for some years.

CYPRUS.

Q. 1.—Demonstrational and experimental plots are established by the Department for this purpose, and there is also an experimental farm.

PALESTINE.

Q. 1.—The Department of Agricultural and Forests controls :—

- (a) Agricultural stations and forest nurseries at Acre and Beisan ; horticultural stations and nurseries at Jerusalem, Jericho and Beisan and a Stud Farm at Acre with district loose boxes at Jerusalem, Gaza, Nazareth and Nablus.
- (b) The Palestine Zionist Executive maintains an experimental station and laboratories at Tel-Aviv and a demonstration farm at Jebata (near Nazareth).
- (c) Fertilizer demonstrations are organized by the Chili Nitrate Federation on the lands of local farmers with the assistance of the Department of Agriculture.

BRITISH GUIANA.

Q. 1.—No system of this kind has existed in the past. Experimental plots mainly of Sugar Cane and Rice have been maintained at the headquarters of the Department from which cuttings and seed have been distributed.

TRINIDAD.

Q. 1.—(a) *Sugar Cane and related crops.*—The Department of Agriculture has maintained, since 1920, St. Augustine Experiment Station of about 150 acres for the raising and testing of Trinidad canes, comparative trials with standard and newly imported canes, methods of cane cultivation, including modes of tillage, manuring, etc., trials of cover crops and of crops of possible value in a sugar rotation.

(b) *Cacao.*—The Department has charge of an estate, about 1,500 acres, known as River Estate. This was purchased by the Government in 1897 as a derelict sugar estate and has been developed by the Department from a value of about £6,000 (purchase price) to about £25,000, the cost of development having been defrayed from its own revenue. Experimental work is carried out, and the results obtained, here or from other sources, applied on an estate scale.

(c) *Fruit.*—During the last five years 30 acres have been developed as commercial demonstration plots at River and St. Augustine for citrus and to a minor degree pineapples. Bananas (50–80 acres) were formerly dealt with in a similar manner until the war caused the withdrawal of shipping facilities.

(d) *Other Crops.*—Work on Cotton, Cassava, Food crops, Forage plants, etc., is also carried on at the same Departmental Stations.

(e) *Live Stock.*—There is a Government Stock Farm about 350 acres in Trinidad and a branch farm in Tobago. At both Stud animals are kept, horses, donkeys, bulls, pigs, goats, poultry, etc. The Trinidad farm also supplies milk to Government Institutions, etc. It has effected improvements in local methods for handling dairy stock and in supplying forage partly by the use of new introductions.

GRENADA.

Q. 1.—Grenada possesses a Botanic Garden and Experimental or demonstration plots under the control of the Agricultural Department.

Estates field experiments are also conducted on the advice of the Agricultural Department. All are naturally on a small scale.

ST. VINCENT.

Q. 1.—We have no Research Station in the Island. There is an Experiment Station which is used largely for raising seed of pure strain cotton for estate use. Various plot experiments are carried out, new varieties of various economic crops are raised and tested, and manurial experiments, etc., are conducted. Local farmers often co-operate in experimental work.

BARBADOS.

Q. 1.—The work of the local Agricultural Experiment Station being almost entirely that of the raising of new seedling sugar canes, the only testing of results of research work is the testing of new seedling cane varieties in various selected plots in different parts of the Colony representing the different types of soil out cropping.

The cultivation of catch crops, green dressings, cover crops and newly-introduced minor crops has from time to time been introduced and tested by making arrangements with individuals or small groups of local producers.

ST. LUCIA.

Q. 1.—The Government maintains an Experimental Station for demonstrations under local conditions.

It is mainly worked by plots arranged at the Experiment Station, but in some cases arrangements are made with planters to try out results in different localities.

JAMAICA.

Q. 1.—Plant Diseases.—A staff of 18 inspectors is employed by the Department of Science and Agriculture to supervise the treatment of Panama Disease of Bananas, Budrot of Coconuts, Blackweevil Borer of Bananas, etc. Local demonstrations of methods of treating plant diseases and insect pests are carried out on Estates, also under Agricultural Instructors for the use of small cultivators.

Animal Diseases.—One Government Veterinary Surgeon and such Inspectors as may be required from time to time to control contagious diseases of animals, also to organize the proper use of dipping tanks for the destruction of ticks and to spread the use of vaccines against “ Black Leg ” and “ Anthrax ” also Tuberculin Testing of Cattle.

Sugar Cane.—Manurial and Varietal Experiments are carried out on Estates under the Superintendent of Agriculture. The Department organises nurseries from which selected canes are issued to planters all over the island.

General.—Two Demonstration Farms and an Experiment Station are maintained at Hope near Kingston and at “ Grove Place ” in Manchester where a public Stud Farm is maintained.

LEEWARD ISLANDS.

Q. 1.—The chief industries of the Leeward Islands Colony are :—

(a) Sugar. (b) Cotton. (c) Citrus.

Work in connection with these industries may be summarised as follows :—

(a) Advantage is taken of well organized exchanges to introduce the best varieties of canes, grown in other islands for experimental purposes, due precaution being taken as to incidence of disease—fungoid or otherwise. In any case a rigid quarantine is maintained and new varieties can only be imported under the sanction of the Governor after obtaining the advice of the Agricultural Department.

Any field planted with such imported variety must be registered by the local Agricultural Department and is subjected to regular visits by the officers of the Department to determine the freedom or otherwise from imported insect or fungoid pests.

Experimental plots of the best varieties are maintained in the presidencies concerned (Antigua, St. Kitts, Montserrat) on individual estates, the yield per acre ascertained and the juice, sugar contents and other data determined in the laboratories under the control of the Federal Department of Agriculture. The results of these experiments are published annually in pamphlet form (400 copies issued) which are circulated both in the Colony and externally.

The Agricultural Departments are also concerned in the breeding—by hybridization—of new varieties of seedling canes—some of which have proved of considerable utility.

(b) *Cotton Industry*.—The type of cotton grown in the Leeward Islands Colony is Sea Island cotton. In every presidency concerned (with the exception of Dominica—which is not a cotton growing island) the most careful attention is paid to seed selection. Each presidency grows a specific type and no seed is released for general cultivation from the Agricultural Department unless it conforms to type requirements. The greatest care is taken to ensure uniformity and to prevent rogueing or subversion. As a result of this policy the Leeward Islands Colony and the British West Indies in general can claim to possess the finest grade of Sea Island cotton existing.

DOMINICA.

Q. 1.—The Agricultural Department has a large Experimental Station for testing and demonstration purposes. Arrangements are also made with planters for testing and field trial of varieties—principally limes.

ST. KITTS-NEVIS.

Q. 1.—Economic experiments with minor crops are carried out at the Experiment Station at La Guerite, St. Kitts, and at the Experiment Station in Nevis. Sugar cane variety experiments and cotton selection are also conducted at La Guerite. Variety experiments with sugar cane have also been conducted on estates in St. Kitts and Nevis for many years.

BERMUDA.

Q. 1.—Arrangements are frequently made with local farmers and gardeners for testing new ideas. No demonstration farms or plots are maintained, but considerable experimental work, principally with potatoes and other vegetables, is carried on at the station.

QUESTION 2 : VISITS TO EXPERIMENTAL FARMS.

ENGLAND AND WALES.

Q. 2.—Organised visits of farmers to research institutes are frequently arranged. Lectures are also given by workers at research institutes and by advisory officers to meetings of farmers, etc. ; in this connection, there is a special scheme in existence of lectures to farmers on the results of research administered by the Ministry of Agriculture in which the counties, the National Farmers' Union and research institutes co-operate.

There are also organised visits of local producers to experimental and demonstration farms of university departments of agriculture, colleges and farm institutes. The persons in charge of these farms also lecture in the counties, although it cannot perhaps be said that lecture tours are organised.

SCOTLAND.

Q. 2.—There is no organised scheme under which farmers regularly visit research stations or demonstration farms, but these stations are frequently visited by parties of students from the Agricultural Colleges and of members of Agricultural Associations and similar organisations, and special demonstrations are advertised at suitable seasons. Persons in charge of experimental farms and other research workers do not make regular lecture tours but, as will be seen from subsequent replies, they are frequently invited to address gatherings of farmers and meetings of discussion clubs.

NORTHERN IRELAND.

Q. 2.—From time to time, during the summer and autumn, visits are paid by parties of farmers to the Ulster Dairy School Farm, Cookstown, the North West Agricultural School Farm, Strabane, and the Agricultural Research Institute, Hillsborough. On the occasion of such visits one of the Ministry's Inspectors attends to demonstrate and explain the nature of the experimental work in progress. Such visits are each year becoming more numerous and are the means of bringing up-to-date information directly to the very class of producer likely to benefit most by it.

IRISH FREE STATE.

Q. 2.—The Department have a number of Agricultural Schools with farms attached thereto, on which experiments and demonstrations are carried out. Arrangements are made from time to time for the visits of parties of farmers to study the experiments and demonstrations, and agricultural practices generally carried out at these farms.

CANADA.

Q. 2.—The Central Experimental Farm at Ottawa and the 24 branch farms scattered throughout Canada, systematically encourage farmers' organisations of all kinds to visit their nearest Experimental Farm at least once each year as a group and as often as possible individually. Large numbers of these specially organised group excursions visit all the Experimental Farms and Stations each year.

The Superintendents of the Experimental Farms, or their Assistants go out frequently during the winter for the purpose of giving lectures to farmers' gatherings in different parts of the Dominion. Many of the Superintendents now have projection lanterns and lantern slides for the purpose of illustrating their lectures. The Officers from the Central Farm at Ottawa conduct as much of this kind of lecture work as time and circumstances will permit.

A Bureau of lantern slides is maintained at the central farm for the use of Agricultural organisations of all kinds. These are sent out to farmers' groups, horticultural societies and other organisations who wish to make use of them. An explanatory manuscript accompanies each set of slides and a full evening's instruction is provided. These sets of slides are used very generously by farmers' groups, agricultural classes, etc. Some forty sets of slides on seven different subjects are maintained at the present time.

WESTERN AUSTRALIA.

Q. 2.—Field days on Experimental Farms.

SOUTH AUSTRALIA.

Q. 2.—All our farms have a regular Annual Visiting Day, the day being selected at the most suitable time of the year to bring results under the notice of farmers. In addition to this, farmers visit the Experimental Farms whenever they please on due notice being given to the managers.

TASMANIA.

Q. 2.—Field days are held on areas of interest.

VICTORIA.

Q. 2.—Visits to Experimental Farms and demonstration plots are organised.

- (1) On the Government farms guide lecturers are provided for ordinary inspections by visiting farmers and others.
- (2) Special field days are arranged. Special trains at reduced fares are run, and a large staff of lecturers assist in a public demonstration of the work. The average attendance to the State farms and sub-stations on special field days is about 600 each. Members of local farmers' organisations assist in managing the crowd.

NEW SOUTH WALES.

Q. 2.—At the Experiment Farms a day is set apart each year known as "Farmers' Day," when arrangements are made for farmers to visit the Experiment Farms and see the results of the experiments. In addition to this, farmers visit the Experiment Farm from time to time, either singly or in parties. They avail themselves very largely of these facilities, many farmers visiting the different Experiment Farms during the course of the year.

Furthermore, Field Days are held in connection with the experiment plots on private farms, and the Agricultural Instructors arrange to deliver lectures both at the plots and to various organisations in the district.

QUEENSLAND.

Q. 2.—Chambers of Commerce, Agricultural Societies, Local Producers' Associations, groups of farmers and individuals are encouraged to visit institutions of the character outlined in reply to Question 1 (b) and in many instances avail themselves freely of such.

At the Sugar Experiment Stations, the Wheat Experiment Farm at Roma, and at selected orchards, "field days" are held from time to time, for the purpose of showing to as many farmers as possible at one time the methods adopted at the particular institute

visited. The attendance at some of these "field days" goes into hundreds of farmers, many of whom have travelled over a hundred miles for the purpose of being present.

Owing to distances between farms and farming centres in this State and in many instances to inconvenience connected with transport to and from such centres, it is found inadvisable to conduct organised lectures in such and preference is accordingly given to farm visits by Instructors who are able in this manner to appraise the conditions under which individual farmers are labouring and advise accordingly. This has proved to be the most satisfactory method of instruction.

During the last two years, the Department has made considerable use of the 4QG Radio Station for the purpose of broadcasting lectures on agricultural matters.

NEW ZEALAND.

Q. 2.—Annual Field Days are arranged at Government Experimental Farms where experimental work is undertaken.

SOUTH AFRICA.

Q. 2.—The various stations at which experimental and demonstration work are carried out encourage not only visits by individual farmers but also groups of farmers, and regular days are set aside at suitable times in the year for inspecting the work at these stations. Lecture tours are arranged by the Agricultural Schools and Experimental Stations within their respective areas. This work has grown to enormous dimensions as the following figures will show :—

During the year ended 30th June, 1928, the four Agricultural Schools Glen, Grootfontein, Cedara and Potchefstroom arranged 1,656 lectures and demonstrations with an approximate attendance of 67,160 farmers.

INDIA.

Q. 2.—Yes. Arrangements are occasionally made to bring cultivators to see Government farms. Cultivators living in the neighbourhood of such farms frequently visit them of their own accord.

The extension staff in charge of demonstration work in different parts of India delivered last year (i.e. 1927) about a thousand lectures illustrated by lantern slides. Mere words, however, do not appeal

very strongly to the bucolic mind of the Indian peasant. He is slow in grasping a point and somewhat suspicious of the intentions of Government officials even. Every effort is therefore made to teach by example rather than by precept, to demonstrate improvements in his own village and under village conditions.

CEYLON.

Q. 2.—Visits to experiment stations are organised from time to time; but steps are now in hand to make these visits more regular and frequent. Arrangements are being made for visits of members of Co-operative Societies to such stations and similarly visits of school children to the paddy seed stations are being organised. Lecture tours by persons in charge of farms have not been arranged.

MAURITIUS.

Q. 2.—There is no organised system of visits to experiment stations, but planters frequently visit the experiment stations and close touch is maintained in this way with the planting body, who are also frequently visited by technical officers.

SEYCHELLES.

Q. 2.—All experiments and researches are freely shown to planters who are invited to call on Tuesdays at the Botanic Station. The whole of this day is reserved for visitors who are taken round by the Director himself. On other days planters consult him in the town office or at the laboratory which is at the New Hospital on Hermitage estate. The Director of Agriculture is the valuator of estates for loan purposes and this affords him fresh opportunities of being in touch with all planters of the Colony. He is also ex-officio member of the Committee of the Planters' Association where all questions affecting the agricultural progress of this Colony are discussed every fortnight.

MALAYA.

Q. 2.—Although there is no organised system of visits by local producers to experimental or demonstration farms, it has been the policy of the Department to encourage visits of planters or of parties of native cultivators to the experimental stations. It should be

explained that under the administrative heads of each district are a number of headmen who are personally in touch with all the native cultivators in their sub-districts. From time to time parties of such headmen have been conducted round the Government Experimental Stations and encouraged to take away such planting material as they consider suitable for the particular conditions obtaining in the area under their jurisdiction. The main experimental station has a visiting day once a month but any planter may visit it by arrangement on other occasions. The system has also been tried with some success of inviting the headmen of one State to visit parties of headmen of other States with the main object of broadening their minds by the interchange of ideas. Such visits have been arranged by the Department in conjunction with the District Officers and have always included visits to experimental and demonstration stations under the Department of Agriculture.

FIJI.

Q. 2.—The only experimental farm is a recently organised one for developing new cotton strains. The local producers of cotton in the Sigatoka River Valley, which is one of the most important cotton centres, are able to visit the farm periodically. Arrangements are now being made to carry on co-operatively with the Methodist Mission at their principal Agricultural Training School for natives and Indians at Navuso, a small experimental farm of 20 acres in the first instance, which will be visited by those living in the somewhat extensive Rewa River Valley. There are no lecture tours.

SOUTHERN RHODESIA.

Q. 2.—Farmers are encouraged by every means possible to pay frequent visits to the Government experimental and demonstration farms and to the research laboratories. Further, as circumstances permit or seem to render it advisable, special days are set apart for gatherings of farmers at these centres, when addresses and demonstrations are given by the appropriate technical officers. The lessons learnt at these farms and stations are not taken to the farmer by means of visits by the farm or station managers but by the Head-quarter staff of technical officers, referred to in the reply to Question 1, and by the District Advisory Officers when such exist.

Large educational exhibits dealing with all sections of the work of the Department of Agriculture are annually made at the Agricultural Shows which are held in the Colony and here again the technical officers concerned attend in person to give advice and information about the exhibits and to lecture and demonstrate.

KENYA.

Q. 2.—From time to time, on such occasions as Conventions, Agricultural Shows and Meetings, farmers are invited to the experiment stations. Officers touring districts lecture at the request of the Farmers' Association.

NYASALAND.

Q. 2.—There is no organised system of visits by local producers to the experimental station of the Empire Cotton Growing Corporation, but most of the Europeans interested in cotton have visited this station, largely as the result of personal invitations.

It is only recently that experimental work with tobacco has received the serious attention of the Department. Visits are from time to time made to our tobacco plots by growers. An organised system of inspection would not be likely to prove successful owing to the distances that would have to be travelled and the fact that planters are engaged in urgent work on their own farms at the time that the experimental plots are of special interest.

The lecture tours undertaken by the District Agricultural Officers are referred to under Question 6.

UGANDA.

Q. 2.—Visitors are encouraged at all times at the various plantations. Twice a year groups of chiefs and others make up organised parties to the main stations, when the work being done there is carefully explained and the results shewn.

TANGANYIKA.

Q. 2.—There is an organised system of visits by natives to the Experimental Stations and Agricultural Sub-Stations for the purpose of demonstrating improved varieties and practices. Visits by non-native farmers are invited.

NIGERIA.

Q. 2.—(a) Visits of ordinary farmers are arranged for the purpose of the first introduction to the public of some one specific new thing or practice that has been tested on the experimental farm, e.g. visits of groups of farmers, each group from a different district, were arranged at one farm a few weeks back. Each party stopped two days. The object was to find a few men in each district who would try rotational green manuring. Those few who seemed most keenly and genuinely interested were asked each to make an experiment and each has already been visited once or twice by an African assistant, and as many as possible by the European officer. The efforts of those few farmers will be the real public demonstration, the visits were only a preliminary measure to enable us to select demonstrators. A similar plan has been followed several times, and will be used more and more in the near future. I think that in such a colony as Nigeria the difference between the "expert visiting the farmer" and "the farmer visiting the expert," is of quite a different order to what it is in England or the Dominions. For general purposes the former has far more value here.

(b) Emirs, chiefs and district heads visit our farms not simply for the object mentioned under (a) above but generally to "see what we are doing." In one part of the country where agricultural associations are possible and appropriate, the members of the associations also visit the farm. We hope this practice will grow, but we are not attempting to force the pace. The proportion of such "superior people" who are genuinely interested, who can take the point of view of the small farmer (for such people are frequently not really farmers at all or at best are the very exceptional comparatively large farmers), who are able to appreciate the difference between research and demonstration, and who, finally, are able to understand the explanation of what, of the things they see, is essential and what is incidental—men satisfying all these conditions are scarce. Again "the selected individual" policy is followed: it is the agricultural officer's business to make a personal friend of a keen man even though he be not a very important personage, and to encourage such a one to make frequent and informal visits—the man who is not really keen comes officially, at most once a year, rather as a duty; and we leave it at that, even though he be a very important local personage.

GOLD COAST.

Q. 2.—Experimental stations and plots are always open to visits from producers. The chiefs frequently take parties of their people ; and schoolmasters their pupils. The officer in charge explains the points of interest in connection with the work in progress. Agricultural officers are constantly travelling through the producing areas, holding meetings of farmers, talking on agricultural matters and giving demonstrations on farms.

SIERRA LEONE.

Q. 2.—Periodic visits of chiefs and people are arranged through political officers to visit the experimental and demonstration farms, also the Provincial Superintendents of Agriculture whilst on tour talk to and advise chiefs and people.

MALTA.

Q. 2.—Farmers visit the existing farm frequently when crops are growing. Demonstrations and technical assistance on the treatment of plant-diseases and insect-pests, as well as on the cultivation of vines on American stock are regularly given by the Plant Pathologist and by two Instructors in Viticulture, either at the Experimental farm or, much more frequently, at the farmers' and growers' own grounds in both islands. Leaflets are regularly published and distributed to growers on important current topics.

CYPRUS.

Q. 2.—There is no organised system of visits by local producers to the experimental and demonstrational plots, which are, however, visited from time to time by individual farmers. Lectures are advertised and delivered in the various centres throughout the year and the local farmers are visited by officials of the Agricultural Department, who give instruction and demonstrations on the spot.

PALESTINE.

Q. 2.—Peripatetic instruction is afforded to farmers by the field services of the Department.

BRITISH GUIANA.

Q. 2.—None hitherto organised.

TRINIDAD.

Q. 2.—Visits of the Agricultural Societies (Parent Society and Six District Societies) are encouraged, as also of individual planters and others. The Department has not a large enough staff for lecture tours and other desirable forms of extension work, but all the qualified officers give lectures and practical field demonstrations to the Agricultural Societies, etc., usually by request.

There are also seven Agricultural Advisers who travel about and give practical advice to the smaller cultivator on their own holdings, at District Agricultural Societies and elsewhere.

GRENADA.

Q. 2.—The local Agricultural Officer is in charge of the plots under the control of the Agricultural Department and his duties comprise also those of travelling agricultural adviser.

ST. VINCENT.

Q. 2.—There are no organised visits by local farmers to the Experiment Station. It is always open and can be visited by planters or persons interested at any time. It is conveniently situated near the principal town in the Colony.

BARBADOS.

Q. 2.—No.

ST. LUCIA.

Q. 2.—No organised system, but local producers visit the Experiment Station whenever they like, and get information and see demonstrations as required.

JAMAICA.

Q. 2.—Visits to these two Government Farms are paid almost daily by planters, penkeepers and small cultivators. Public sales of cattle on the two farms afford favourable opportunities for demonstration of new methods of management.

LEEWARD ISLANDS.

Q. 2.—No definite organised system but planters avail themselves of visiting the stations and experimental plots.

DOMINICA.

Q. 2.—There is no organised system of visits by planters to the Experiment Station, but planters having occasion to come to Roseau, usually visit the Department and discuss matters of interest, and pay a visit to the trial plots. Occasionally the Committee of the local Agricultural and Commercial Society make a tour of inspection.

ST. KITTS-NEVIS.

Q. 2.—Planters pay occasional visits to the Experiment Station but there is no organised system of visits.

BERMUDA.

Q. 2.—No organised system exists relative to visits to the Station by farmers, except occasional meetings and the annual three-day exhibition which is held at the Station. Farmers who visit the Station are always cordially received. The concluding part of this question is answered under (4).

QUESTION 3 : CONNEXION WITH AGRICULTURAL EDUCATION.

ENGLAND AND WALES.

Q. 3.—The experimental and demonstrational organisation referred to in (1) and (2) above is a part of the system of agricultural education. Higher education is conducted at the agricultural colleges and university departments of agriculture; county councils run short courses of instruction at farm institutes and conduct other forms of agricultural education, such as organised day courses, evening classes, etc.

SCOTLAND.

Q. 3.—The Colleges of Agriculture, who are mainly responsible for the work referred to under (1), are also almost wholly responsible for the general work of agricultural education.

NORTHERN IRELAND.

Q. 3.—The County staffs being responsible for the carrying out of field trials and for the teaching of the winter classes, the results of the experiments, carried out locally are embodied as part of the information imparted in the teaching. In many cases the field trials are carried out on the farms of the pupils attending the classes. The evening lectures to farmers, given by the Instructors, and the demonstrations held by them from time to time and attended by local farmers, are a further and very effective means of bringing producers into touch with such information.

IRISH FREE STATE.

Q. 3.—See reply to question 1.

CANADA.

Q. 3.—Agricultural education is largely a provincial matter. Organizations of the Experimental Farm indicated above are not thus closely connected.

WESTERN AUSTRALIA.

Q. 3.—No.

SOUTH AUSTRALIA.

Q. 3.—The Managers and Lecturers referred to in the reply to Question 1 are all members of the Department of Agriculture in this State.

TASMANIA.

Q. 3.—Nil.

VICTORIA.

Q. 3.—At the Central Research Farm, Werribee, the students taking the Degree Course in Agricultural Science take up residence for one year. The sub-station at Longernong College is located at the Agricultural College there, and the work carried out by the Department is utilized by the teaching staff for demonstration purposes. Regular visits of agricultural students from the agricultural colleges and the School of Primary Agriculture, Burnley, are made to the Central Research Farm, Werribee. Farmers' and teachers' classes are from time to time conducted at the State Farms, and groups of inspectors of closer settlement and irrigation supervisors of other State Departments also attend.

NEW SOUTH WALES.

Q. 3.—The results of experiments carried out, as indicated in the reply to (1), are published in the Agricultural Gazette, and in other publications of the Department, and these are made available to all those who are interested in agricultural education, and also to farmers generally.

QUEENSLAND.

Q. 3.—See answer to question 2.

Mainly by lecturettes given and demonstrations conducted at Government Institutions, experimental plots and private farms.

NEW ZEALAND.

Q. 3.—Agricultural Educational Institutions, such as the Agricultural Colleges, maintain close contact with the experimental work of the Department of Agriculture and the results of such experimental

work as is undertaken by these institutions are made available to the Department of Agriculture. The dissemination of results from each source so that each of the organizations indicated may have an *immediate* knowledge of the results of the experimental work of the other, is, however, not yet on an organized basis but is rather on a basis of personal contact between officers. The results in each case are, however, published and the results are therefore available to all bodies interested.

SOUTH AFRICA.

Q. 3.—It will be seen from the statement above that extension work among farmers is not only closely linked with Agricultural Education but is, in fact, part and parcel of the same organization within the Department.

INDIA.

Q. 3.—The Agricultural Colleges have farms for (1) teaching, (2) experiment and (3) research. The staff for teaching and research purposes is common, and the students are taught the methods of demonstration and propaganda work carried out in their respective provinces. They are taken on tour, too, to see some of the Government seed and demonstration farms, private seed farms and demonstration plots in their province.

CEYLON.

Q. 3.—Copies of the agricultural magazines containing the results of scientific investigations are issued free. Those issued in English are sent to the secondary schools and those issued in the vernaculars to all elementary schools which have registered school gardens attached to them. Some of the secondary schools have recently started classes in the agricultural sciences and the students in these classes make organized visits from time to time to any experiment stations in their vicinity.

MAURITIUS.

Q. 3.—See replies to questions 1 and 2.

SEYCHELLES.

Q. 3.—Agricultural education is a dead letter, as it is considered useless to teach agriculture in ordinary schools from want of a proper staff and secondary education is not yet advanced enough in the

colony to start an agricultural college. Lectures are occasionally delivered by the Director of Agriculture when there is a need for them.

MALAYA.

Q. 3.—The only connection between the experimental stations and agricultural education is as indicated in the reply to question 2.

FIJI.

Q. 3.—There is no system of agricultural education in the colony for Europeans or half-castes. For the natives and for the East Indians there are several schools of some importance, where an elementary training in practical agriculture is given. One link will be the experimental station at Navuso, which is also a training school (*vide* reply to question 2).

SOUTHERN RHODESIA.

Q. 3.—Agricultural education in the form of Schools, Colleges and Faculties of Agriculture at Universities has not yet been established. On the Government Tobacco Experiment Station a number of Rhodesian born youths are accepted annually as apprentices to undergo a two-year course of instruction in all phases of tobacco production, with some instruction, too, in general stock and crop management. It is anticipated that this form of agricultural education will shortly be extended.

KENYA.

Q. 3.—With native producers the demonstration plots in two reserves are linked with the Agricultural Institutions, and boys trained at these places are in charge of such plots. In two other reserves where no special Institution exists, the plots are run in connection with the effort to improve native production.

NYASALAND.

Q. 3.—Measures are now under consideration for co-operation the Department of Education and the Department of Agriculture in the training of teachers in agriculture.

UGANDA.

Q. 3.—The subject of agricultural education is now (1927) being dealt with in a systematic manner, through the recently created Department of Education. The Superintendent of Agricultural Education is a member of the Department of Agriculture, who works in the closest touch with the Education Department. The Superintendent of Agricultural Education's Office is in the Agricultural Laboratory so that there is a very intimate connection between the scientific workers and the educational work. The Superintendent of Agricultural Education is also in general charge of the field experimental work in Buganda Province and, therefore, is able to pass on immediately the knowledge gained from the experimental plantations.

TANGANYIKA.

Q. 3.—The connection of the kind is being established through the medium of school gardens, which are used by the Education Department to assist school instruction in agriculture under the advice of the Department of Agriculture. The school gardens are serving as centres for demonstration and seed-multiplication, in the same way as agricultural sub-stations.

NIGERIA.

Q. 3.—As yet "no." School classes come to the farms occasionally and are welcomed and "shown round." Again no attempt has been made to force the pace yet; it is doubtful whether such visits do any good at present: they may be more useful later—see answer to question 4.

GOLD COAST.

Q. 3.—The arrangements in force for applying the results of agricultural research to gardens at elementary schools, and the plots at the trade schools, are dealt with in the answer to question 4.

SIERRA LEONE.

Q. 3.—At the Experimental Farm, Njala, is stationed a European Agricultural Instructor. He trains agricultural apprentices for appointment as agricultural assistants, instructors, etc., and also teaches agriculture to the senior boys of the Agricultural Training College at Njala.

MALTA.

Q. 3.—There is no ordinary system of agricultural education.

CYPRUS.

Q. 3.—The students of the Agricultural School visit and work on the experimental and demonstrational plots.

PALESTINE.

Q. 3.—The Palestine Zionist Executive experiment stations co-operate with the Department and schemes of field research are co-ordinated.

BRITISH GUIANA.

Q. 3.—No.

TRINIDAD.

Q. 3.—Dealt with under (4).

GRENADA.

Q. 3.—The local agricultural officer is in charge of the plots under the control of the Agricultural Department and his duties comprise also those of travelling agricultural adviser.

ST. VINCENT.

Q. 3.—Some years ago the Experiment Station was an Agricultural School, but it is not so now (1927).

BARBADOS.

Q. 3.—There is no connection.

ST. LUCIA.

Q. 3.—Teachers come to the Station for practical demonstrations.

JAMAICA.

Q. 3.—The Government Farm School at Hope is in intimate contact with the Hope Experiment Station and the Government Stock Farm.

LEEWARD ISLANDS.

Q. 3.—In each presidency there are Agricultural Societies—at the monthly meetings of which agricultural matters are discussed. Supplementary meetings are also held on the occasion of visits of the Imperial Commissioner of Agriculture for the West Indies and also members of the Imperial College of Tropical Agriculture.

DOMINICA.

Q. 3.—In no way beyond the fact that officers of the Department visit the elementary schools, and lecture the senior pupils.

ST. KITTS-NEVIS.

Q. 3.—No connection exists at present.

BERMUDA.

Q. 3.—“ The ordinary system of agricultural education ” in schools is confined chiefly to work through the Agricultural Clubs mentioned in (4).

QUESTION 4 : AGRICULTURAL INSTRUCTION.

ENGLAND AND WALES.

Q. 4.—(a) No schools are devoted entirely to agriculture. All schools in rural districts are expected to have an agricultural bias in their teaching, and a great many of them have school gardens. A few secondary schools include the elements of agriculture and of the agricultural sciences in their curricula, and one or two have opportunities for practical work.

(b) Adult education consists of :—

- (i) University and College courses for degree or diploma.
- (ii) Shorter University and College courses.
- (iii) Courses at Farm Schools and Institutes.
- (iv) Courses and classes organised by the County Councils.
- (v) Occasional vacation courses for secondary and elementary school teachers.
- (vi) Local day and evening courses in agriculture, poultry-keeping, bee-keeping, farriery, horticulture, manual processes, etc.
- (vii) Migratory dairy schools.
- (viii) Field experiments and demonstrations, fruit-growing stations, demonstration gardens, and trial allotments, which are maintained in some counties.
- (ix) Close touch between the County Council agricultural staffs, the College and University staffs, the advisory officers and the staffs of the Research Institutes.

SCOTLAND.

Q. 4.—(a) Nature study and gardening are taught in nearly all rural schools. Some elder pupils in a few schools have elementary instruction in agricultural science.

(b) Higher instruction is mainly carried out by the three Agricultural Colleges, which are attached to the Universities of Aberdeen, Edinburgh and Glasgow, each of which is responsible for the agricultural education of its province. They provide degree courses and shorter (diploma) courses. Intra and extra mural instruction is

given. There is a Dairy and Poultry School at Kilmarnock, a School of Rural Domestic Economy near Aberdeen, and Veterinary Colleges at Edinburgh and Glasgow.

(c) There is a staff of extension instructors at each college. These travel, lecture and demonstrate throughout their respective areas. Conferences of instructors are held from time to time, at which lectures are given by research workers and visits are paid to research stations and experimental farms.

NORTHERN IRELAND.

Q. 4.—The principal arrangements are :—

- (a) Winter agricultural classes for farmers' sons.
- (b) Greenmount Agricultural and Horticultural College, which provides a more extended practical course for men.
- (c) County classes for women.
- (d) North-West Agricultural School at Strabane giving short courses of 11 weeks' duration for farmers' daughters.
- (e) The Ulster Dairy School, Cookstown (a residential school for girls).
- (f) The Faculty of Agriculture, Queen's University, which is open to students either direct from the farm and winter class or from Greenmount.

Details of these arrangements are given below.

Winter Agricultural Classes.

These classes are carried on each year from November to March. They are held at different centres annually and the pupils attend on two afternoons per week for four hours each day, assisting with the routine work of their farms during the remainder of the time. The classes are conducted by itinerant instructors in Agriculture and Horticulture and the teaching is of a type which enables the pupils to apply the information forthwith in the working of their holdings.

Greenmount Agricultural and Horticultural College.

The course of Instruction at this institution occupies a session of 10 months, beginning in October of each year. The students take part in all the routine work of the College Farm, including dairy, poultry and market garden work.

The instruction given is essentially practical and suited to farmers' sons who intend to return to their farms at the end of the session. Whilst the great majority of the students are of that category, some of the more ambitious proceed to the Agricultural Faculty of the Queen's University, Belfast, usually taking advantage of the generous scholarships provided by the Ministry.

Each County Committee of Agriculture in Northern Ireland provides a number of scholarships, enabling farmers' sons from the County to attend for one session at the college, free of charge. These scholarships are usually secured by pupils who have attended the winter agricultural classes already referred to.

Agricultural Faculty, Queen's University, Belfast.

This is the final link in the chain of endeavour to provide a complete, thorough and comprehensive system of agricultural education. The Faculty connects up the work of all the Research divisions—the teaching and lecturing is mainly in the hands of the heads of the research divisions and their assistants—and the students are thus brought into the most intimate touch with the research work in progress. The staffs of the County Committees of Agriculture—*itinerant instructors and agricultural organizers*—are recruited from the students who have completed successfully their four years' training at and obtained the degree of the Faculty (B.Agr.) and many of the graduates are devoting themselves to research work in various forms of agricultural activity and in industrial organizations connected with agriculture.

With regard to the women to whose lot it falls to take part in the work of the farm, the need for instruction is as great in their case as it is in the case of the farmers and their sons, and the Ministry lays special stress on this side of their work. Corresponding to the provision made for men, graduated instruction is provided in poultry-keeping, dairying and domestic house-keeping by a staff of *itinerant teachers*, who bring to their doors such instruction as experience shows to be necessary.

At the *North-West Agricultural School* girls who can be spared from their homes attend short courses of instruction in dairying, poultry-keeping and rural housewifery. The primary object of the school is to fit the girls to return to their homes prepared to discharge their

duties with increased efficiency. The school has residential accommodation for 24 girls and each term lasts for 11 weeks, so that four lots of girls pass through the school each year.

Applicants for admission must be over 17 and less than 35 years of age and must produce evidence of good health and character. They must also satisfy the Ministry that they have received a general education sufficient to enable them to take advantage of the course but otherwise there is no qualifying examination for admission.

Pupils are not ordinarily admitted for more than one term. They are not trained with the object of qualifying them to become teachers or specialists, although where a pupil at the school possesses outstanding ability and desires to take up teaching work she may proceed to the Ulster Dairy School, Cookstown, where facilities exist for such training.

Each County Committee of Agriculture in Northern Ireland provides a number of scholarships enabling candidates from their County to obtain free training for one term at the school and the demand for these scholarships is such that each year the school has been filled to its maximum Capacity by scholarship holders and there is usually a waiting list of candidates for admission.

The Ulster Dairy School, Cookstown.

This is also a residential Institution for girls and the courses of instruction are essentially similar to but are more comprehensive than those at the North-West School. The Ulster Dairy School has accommodation for 50 pupils and each term lasts for 11 weeks. Free scholarships are not provided at the Ulster Dairy School—the candidates must pay a nominal fee for the course. Attendance at the County Classes in dairying and poultry-keeping, or at the North-West School constitutes an excellent preparation for the training at the Ulster Dairy School and preference is given to applicants who have received such preliminary instruction.

The demand for admission to the Ulster Dairy School is far in excess of the accommodation available and there is a considerable waiting list of candidates desirous of taking advantage of the course.

Whilst the main object of the Ulster Dairy School is to train girls in up-to-date methods and thus make them more proficient when they return to their homes, those showing marked ability are given additional instruction extending over a longer period to enable them

to qualify as teachers and specialists. Girls possessing special aptitude pass into a senior course which occupies a year ; at the expiration of that period they may be placed for a further year on approved poultry farms to acquire experience of commercial methods and practical work on up-to-date lines. If such girls pass all the examinations during the school period and the final examination after their year on the commercial poultry farm they are qualified as teachers and are eligible for posts in connection with the Ministry's schemes or under the County Committees of Agriculture. Provision is also made for special training where girls desire to qualify as creamery dairy-maids and buttermakers.

The Itinerant Instructors in Dairying and Poultry-keeping employed by the County Committees and the teachers of those subjects in the agricultural schools under the Ministry's control have, almost without exception, received their training at the Ulster Dairy School. Another indication of the value of the instruction there provided is afforded by the fact that there is a steady demand for girls trained at the Ulster Dairy School to take charge of the management of commercial poultry farms and dairies, a demand which frequently exceeds the supply.

The Ulster Dairy School fulfils a very important function in the Ministry's scheme of agricultural education and its influence is reflected more and more each year in the general improvement which is apparent in poultry and dairy production throughout Northern Ireland.

Organisation of Experimental Work.

The aim of the Ministry's research and experimental work is, quite definitely, applied. Its object is not to investigate fundamental or, as they are now called, long-range problems, which may or may not in the speculative future be applicable to farming practice, but to concentrate on problems as they exist on the farm and find an economic solution which will be applicable to the peculiar agricultural conditions obtaining in Northern Ireland. It will accordingly be understood that the methods adopted to disseminate the results of scientific research among primary producers in this area are such as to bring the research worker into the closest possible touch with farming problems, and also to link up, in a harmonious working arrangement, the county staffs with the research divisions.

IRISH FREE STATE.

Q. 4.—The question of provision for the agricultural instruction of primary producers *at* schools, primary, secondary and otherwise, is a matter coming within the scope of the Department of Education.

As regards provision for such producers *after* school, the Department's scheme of winter agricultural classes provides specially for those young men who, although actively engaged at farm work, can nevertheless be spared from the farm for four or five hours on two or three days each week during the slack season of the winter. The classes held under this scheme are conducted by the County Instructors in Agriculture. Each class receives from approximately 100 to 160 hours' instruction, extending over a period of from 12 to 20 weeks. Each Instructor usually conducts two classes weekly at different centres, the same course being given, as a rule, at each centre. The teaching is confined, as far as possible, to subjects capable of direct application to farm work, and is illustrated by practical demonstrations. In addition to agriculture proper, and horticulture, lessons are also given in veterinary hygiene and poultry-keeping, in cases where teachers of these subjects are available.

The measures taken to enable the teachers (Agricultural Instructors) to keep abreast of scientific progress are referred to under (VI).

Under the Department's Schemes No. 10 (Instruction in Poultry-keeping) and No. 12 (Instruction in Butter-making), the Instructors in the subjects mentioned conduct classes or courses of instruction for the benefit of farmers' daughters. Courses are held at various centres in each county during the year, the duration of each course being from 10 to 20 days.

Courses for the training of Supervisors of Cow Testing Associations are also arranged by the Department.

The above courses refer to production, but the Department also arrange for courses of instruction in the preparation for market, and the marketing of farm produce, including butter, eggs, poultry, pork, wool, etc.

The Department at present possess three provincial schools in rural areas which provide instruction in the several branches of practical farming for young men intending to follow the farming profession in Ireland. The course pursued at these schools includes technical instruction in the classroom, and is, in general, of such a

nature as to continue the general education of the pupils. Pupils are required to take part, under supervision, in all operations of farm and garden. The Department, moreover, grant subsidies to three private collegiate schools, which provide courses in agricultural education for boys.

The Department also conduct a school (Munster Institute) intended mainly for the preparation of girls for active participation in home-life in rural districts. The course of training includes the practice of dairy work ; the treatment of milk and the making of butter on a large and on a small scale with the most modern machinery and implements, as well as with the appliances generally used in farm dairies ; instruction in the feeding and management of cows, calves, and pigs ; in the keeping of small gardens ; and in the manipulation and care of bees ; instruction in poultry-keeping, including breeds and their suitability for different purposes and different localities, housing, feeding, and management ; grading and packing of eggs, hatching and rearing of chickens, fattening, killing, plucking, trussing, and preparation for market ; trap nesting and keeping of laying records ; instruction in domestic work, embracing plain cookery, plain needlework, laundry work, and home nursing. The normal course is of about one year's duration, but pupils who show special promise are selected for further training with a view to becoming qualified as teachers of butter-making and poultry-keeping either in residential schools or in connection with itinerant work in the counties.

Nine private schools of rural domestic economy are assisted by the Department by means of subsidies. Most of these schools are situated in the poorest and most congested farming districts, mainly in the west of Ireland.

From time to time, the Department arrange for the holding of lecture-tours by a member of their technical staff, on veterinary subjects, in rural centres.

In addition to the ordinary schemes adopted by the Department of Agriculture throughout the Irish Free State, the Department have also in operation in the poorer districts, special schemes applicable to such districts.

The special schemes are administered directly by the Department through the medium of local officers.

CANADA.

Q. 4.—As above stated, agricultural education is left largely to the Provincial Governments. Nevertheless, the experimental farms co-operate freely in assisting the colleges in educational work. Briefly agricultural instruction in Canada may be summarized as follows :—

Agriculture is taught in a number of the high schools in the various provinces. Agricultural colleges are located in many provinces of the Dominion, as at Truro, N.S., Ste. Anne de la Pocatière, Que., Oka, Que., Macdonald College, Que., Kemptville, Ont., Guelph, Ont., Winnipeg, Man., Saskatoon, Sask., Edmonton, Alta., and Vancouver, B.C. There are, in addition, the Boys' Training Schools at Bomanville, Ont., a special Agricultural Class at the High School, Renfrew, Ont., and several schools of agriculture in Alberta.

Short courses in agriculture are also given at many high schools and also by agricultural representatives in their various districts. "Better Farming Trains" are also run in different parts of Canada where lectures are given, models displayed and information disseminated in various ways. Mention might be made also of the dairy schools, the instruction given to judges of live stock and seed grain each year and the teachers' classes at the various agricultural colleges.

WESTERN AUSTRALIA.

Q. 4.—(a) No agricultural instruction in primary and secondary schools.

- (b) (i) Farmers' short course at Muresk Agricultural College.
- (ii) Dairy short course.

SOUTH AUSTRALIA.

Q. 4.—There are several agricultural high schools in South Australia. These are attended by boys who have completed their primary education and wish to continue in the country. There is also an agricultural college where more advanced agriculture is taught. The requirements of adults are met by lectures given in various centres of the State. A limited number of them are admitted to a short course given during the winter holidays of the Agricultural College.

TASMANIA.

Q. 4.—Practically none. (a) A high school, where there is an agricultural course, gives boys and girls between the ages of 12 to 16 a smattering of first principles. (b) None save occasional lectures by an officer of the Agricultural Department working in conjunction with the Agricultural Bureau.

VICTORIA.

Q. 4.—(1) There are a number of agricultural high schools in the country districts, at which courses of instruction are available to sons of primary producers. Students completing primary courses at the State schools may proceed to the agricultural high schools for secondary education.

(2) Courses in agriculture are provided in all technical schools throughout the State.

(3) There are two State colleges of agriculture where instruction in theory and practice of agriculture is given. These are really vocational training colleges.

(4) Chair of Agriculture, Melbourne University. This course is for the degree of Bachelor of Agricultural Science.

Classes for farmers are held during the winter vacation at the Agricultural Colleges of Dookie and Longernong; also refresher courses at the Melbourne University. Some high schools also conduct farmers' classes.

Better Farming Trains.

The Department of Agriculture for the past three years, in co-operation with the State Railway Department, has organised a special train, elaborately equipped with educational exhibits and staffed with expert lecturers, which tours the State continually. The train is really a travelling technical college on wheels, and the greatest care has been exercised in its make up. It consists of 17 cars, and carries 27 lecturers, including three women instructors in domestic economy and baby welfare. So far (July, 1928) 200,000 people have attended the various demonstrations given by the train in the 21 tours it has undertaken.

NEW SOUTH WALES.

Q. 4.—With regard to agricultural instruction at schools, the Acting Under-Secretary of the Department of Education reports as follows :—

“ I have to state that no provision is made by this Department for the instruction of primary producers, that is assuming that the inquiry relates to men actively engaged in agricultural pursuits. There are, however, 15 rural schools where the course of instruction is specially related to the needs of children who may follow rural occupations. Two agricultural high schools are also in operation (one at Glenfield and one at Yanco), where, in addition to proceeding with their general education up to the intermediate certificate stage, boys are given an extensive training in farm work.

“ I am to add that under the Technical Education Branch of this Department a course in elementary agriculture is provided and courses in sheep and wool. While in some instances teachers in the latter subject may work according to a certain itinerary, the Department has no peripatetic lectures as suggested in the questionnaire.

“ So far as the Department of Agriculture is concerned courses of instruction are given at the Hawkesbury Agricultural College and certain experiment farms. At the Hawkesbury Agricultural College there is an Agriculture Diploma Course, covering a period of three years, and a Dairy Diploma Course, occupying a period of two years, these courses carrying the academic distinctions H.D.A. and H.D.D. respectively. Short courses of 12 months in the orchard, and six months in the dairy, piggery and poultry sections are also conducted at that institution. In addition, a winter school course embracing a variety of agricultural subjects, and occupying about one month, as well as a summer school for apiarists, extending over three weeks, is also held at the college. Instruction in mixed farming is given at the Wagga and Bathurst Experiment Farms. The course at these two farms occupies a period of two years and a certificate is issued to the successful students. A special 12 months' course in sheep and wheat is available at the Trangie Experiment Farm, for advanced students.

“ In addition, a practical course of training in general farm work is given at Farm Apprentice Schools at Cowra, Wollongbar, Grafton, Yanco and Glen Innes.

“ For the purpose of educating primary producers, the Department has established the Agricultural Bureau System. The Agricultural Bureau is composed of farmers. Branches are established in each small rural centre and regular meetings held. At these meetings papers are read by farmers on matters of rural interest, and frequently officers of the Department attend and give short addresses, or conduct demonstrations on subjects relative to agriculture, live stock, etc. These officers also give lectures and demonstrations under the auspices of other organisations of primary producers, such as the Farmers’ and Settlers’ Association and Primary Producers’ Union, etc. At the present time the membership of the Agricultural Bureau is approximately 12,000.

“ The Department recently inaugurated a better farming train. This train consists of 22 cars, and space is provided in which exhibits relative to the various sections of agriculture are shown. These comprise such subjects as agriculture, stock diseases, dairying, fruit-growing, sheep and wool, poultry farming, plant diseases, plant pests, etc. The train stays from one to two days at each town and addresses are given to farmers by officers of the staff.

QUEENSLAND.

Q. 4.—A certain amount of elementary education is given on agricultural subjects by a teacher of agriculture connected with the Department of Public Instruction.

A special branch of the ordinary State Educational System is the rural school, a number of which are established in the chief farming districts of the State. At these special instruction is given on agricultural matters.

The Queensland Agricultural College and High School at Gatton is a secondary, residential school worked on the same lines as other agricultural colleges throughout the world.

The Department of Agriculture and Stock co-operates with the rural schools in the direction of instruction in pig raising and poultry keeping, and at numbers of these schools organisers have pig clubs. It is possible that operations might be extended later in the direction of calf clubs for the instruction of school children in dairy stock matters. For a number of years Juvenile Corn Growing Competitions were carried out by the Department of Agriculture and Stock throughout the maize growing areas of the State.

Classes for farmers, including tractor schools, are conducted at the Queensland Agricultural College and High School at Gatton during the college vacation. These classes include instruction (theoretical and practical), in matters pertaining to agriculture, dairying, stock-feeding, etc.

NEW ZEALAND.

Q. 4.—(a) Agricultural classes, by means of which sound agricultural knowledge is imparted to boys as a part of their educational training, are recognized as a very important feature at numerous high schools in rural districts. The value of such initial training is becoming increasingly recognised and the facilities being offered in this direction are extending rapidly.

(b) (1) After leaving school provision is made for the further training of those intending to take up farming pursuits. Such facilities are afforded by the Ruakura Farm Training College at Hamilton, and the course is so arranged that the bias of the training is towards the practical rather than the theoretical.

(2) For those desirous of taking up scientific agriculture as a profession, two institutions exist. One is the Massey Agricultural College at Palmerston North in the North Island, and the other the Canterbury Agricultural College at Lincoln, Canterbury, in the South Island.

(3) The New Zealand Department of Agriculture arranges annually what are known as Winter Farm Schools. Specialist officers deliver a number of suitable illustrated lectures at one farming centre to those interested for one or two days and then move on to another centre where the lectures are repeated and so on.

(c) New Zealand maintains very close contact with scientific progress abroad. Such contact is maintained through affiliation with such institutions as the Imperial Bureaux of Mycology and Entomology; through frequent correspondence with plant breeding stations in Great Britain and elsewhere, and with Kew Gardens, etc., etc. Further, the New Zealand Government maintains a Scientific Liaison Officer as a permanent member of the staff of the High Commissioner for New Zealand, London.

SOUTH AFRICA.

Q. 4.—During recent years considerable advance has been made in the inclusion of a certain amount of elementary agricultural teaching in the primary and secondary schools in the Union. For those pupils who wish to take up farming as their life's work, five schools of agriculture provide a one year's course, mostly theoretical, for students who have passed standard 8. The Union Departments of Education also conduct what are known as vocational schools at which the course of instruction is mainly agriculture. In addition to the regular curriculum, short courses of instruction are held at the agricultural schools during the long vacations for farmers, their wives, sons and daughters and also for teachers in the primary and secondary schools. These courses are very well attended. At the four schools of agriculture the short courses were attended by 13,071 persons in 1927.

INDIA.

Q. 4.—There are two types of agricultural schools on trial in India. There are 10 special agricultural schools where the training given is purely vocational. The object of such schools is to provide for the sons of cultivators a course of instruction in the principles of agriculture with special reference to the agriculture of the tract in which the school is situated. The subjects of instruction are agricultural science (both theory and practice), veterinary work and manual training, and the course lasts for two years. Instruction is in the vernacular, but English is also taught. As such vocational agricultural schools have not appealed to the people, the number is not likely to be increased to any extent.

The other system of agricultural training consists in the introduction of agriculture including elementary civics, hygiene, sanitation, physical geography and the principles of co-operation in the curriculum of the existing vernacular middle schools which are under the control of the education department. The teachers for these schools are trained at the agricultural colleges, where a special one-year course is provided for them. The practical work of the schools is carried out in some cases in gardens and in others on small farms of 3-4 acres. The main object in view is to impress on the child mind the dignity of manual labour and to create among the sons of agriculturists, while at school, a love for agriculture as a vocation and

the desire to understand and appreciate the elementary principles underlying the various farm operations. This kind of education is proving very attractive and is expanding, more especially in the Punjab.

Besides the regular training in the schools mentioned above, arrangements are made in some provinces for training adult cultivators by means of short courses given at the agricultural colleges or on the experimental farms.

CEYLON.

Q. 4.—Agricultural education is provided through the medium of school gardens attached to elementary schools. This school garden movement has been considerably developed in Ceylon and has worked satisfactorily. These school gardens vary in size between $\frac{1}{4}$ acre and 1 acre and are divided into sections devoted to the cultivation of ornamental, economic and fruit plants. They are registered by the Department of Agriculture and the necessary tools are either supplied by that Department from funds voted by the Central Government or from funds sanctioned by local educational authorities. The Department of Agriculture also has an annual appropriation for the maintenance of tools and implements, for awards and certificates and for their inspection. This inspection is now being performed by the agricultural instructors of their respective ranges, who also act as judges for the various competitions which have been organized as the result of voluntary contributions and donations made by citizens interested in the movement. A handbook for teachers on school garden work is in course of preparation (January, 1928) as it is desired to co-ordinate more closely the work in the school garden with the work in the schools. The code for elementary schools is now being overhauled with a view to bringing the work in the school in closer touch with the surroundings of the school, and a handbook for teachers has been drawn up by the Department of Agriculture and approved by the Education Department and the Board of Education. The total number of registered school gardens attached to Government schools was 689 at the end of 1926, and 64 assisted schools also had school gardens attached to them. These assisted schools receive grants of Rs.50/- or Rs.75/- per annum according to their size if their work is found on inspection to be satisfactory. Special courses of training for teachers in elementary schools are provided in the vocational farm schools and vocation classes have

also been organized. Two Farm Schools have so far been established and two more are in course of establishment whilst two others have recently been sanctioned by Government. These schools provide for two-year courses in English, and other shorter courses in the vernaculars are now being organized for the sons of farmers.

Provision for agricultural instruction to adult farmers is made through agricultural instructors and inspectors for plant pests and diseases. These officers visit farms regularly to assist farmers in their difficulties and also give lectures and addresses at meetings of co-operative societies and at meetings held by the Revenue Officers. Special lantern lectures are also given and at these lectures the distribution of illustrated leaflets in the vernaculars takes place.

MAURITIUS.

Q. 4.—Agricultural education for intending planters and for technical men in sugar factories is provided at the Mauritius Agricultural College which accepts pupils from Secondary schools from the age of 17; at the Royal College no agricultural teaching is given but boys are trained on the modern side in the sciences underlying agriculture. At the other secondary schools in the colony so far as is known, no agricultural teaching is given though elementary science is taught. In primary schools nature study is included in the curriculum for higher standards. The teaching in this respect is now under revision by the Agricultural and Schools Departments. School gardens are maintained at about 20 schools and their number is being extended. School gardens are regularly visited and inspected by the agricultural instructor, who gives instruction on this subject.

A system of agricultural apprenticeships has been in existence for some years which has given fair results. A scheme for the establishment of a farm school to be recruited from the bursary class of the elementary schools has recently been approved, and from this apprentices will in future be selected. Regular courses of lectures are given to elementary school teachers and to teachers in training at the training college. The form of instruction has recently been recast in this connection. For estates employees regular courses of lectures are delivered at the agricultural college. New results are communicated to planters at meetings of representative agricultural bodies. In connection with this a large number of special committees are maintained dealing with various aspects of agricultural industry.

SEYCHELLES.

Q. 4.—Agricultural education is a dead letter, as it is considered useless to teach agriculture in ordinary schools from want of a proper staff and secondary education is not yet advanced enough in the colony to start an agricultural college. Lectures are occasionally delivered by the Director of Agriculture when there is a need for them.

MALAYA.

Q. 4.—(a) At School.—The vernacular schools in the Federated Malay States and Straits Settlements include school gardening in their curriculum. This work is under the Education Department although assistance is given by the Department of Agriculture, the field officers of which make periodical visits to the school gardens advising the head teachers on the work, and supplying seed (and other planting material. The Education Department has a training college for vernacular teachers in which school gardening with practical work is taught. This work is carried out by an agricultural instructor attached to the school. He is qualified in teaching and is an officer of the Education Department, not of the Department of Agriculture.

(b) Afterwards.—The only agricultural instruction after the school age is that supplied by the Department of Agriculture for the training of its Malay subordinate officers. A small school conducted by a qualified European officer is attached to the Department and all Malay officers on joining the Department undergo a two years' course of instruction in Chemistry, Botany, Agriculture, Agricultural Economics, Mycology and Entomology.

The Government has recently (1927) approved a scheme for the founding of a school of agriculture which will replace the departmental instruction detailed above. The school is to be situated on a Government Experiment Station. The pupils will not be confined to Government officers only, as hitherto, but it is hoped to attract the sons of well-to-do agriculturists to undergo a course of training which will help them to assist in the management of their parents' property. Field demonstrations are given by the field officers to Asiatic cultivators on the control of pests and diseases of importance.

FIJI.

Q. 4.—For Europeans there is no system of agricultural instruction either in school or afterwards, the colony being too small to maintain an agricultural school or college. At all of the native provincial schools a certain amount of agricultural instruction is given, and also at the several mission schools.

SOUTHERN RHODESIA.

Q. 4.—The replies to this question have been given in the answers to question 1, question 2 and question 3.

KENYA.

Q. 4.—It is anticipated that many natives will in future receive agricultural instruction at village schools and thereafter in secondary schools. Special instruction for those desirous of following the subject more fully are to be provided at the Agricultural Department institutions.

European instructors address barazas or meetings of natives. Only natives employed by the Department have received refresher courses at the Laboratories.

NYASALAND.

Q. 4.—(a) *Instruction in Schools.*

European Children.—With but few exceptions, European children are sent out of the country before they reach the age of nine and are educated abroad.

Native Children.—Instruction in agriculture has for some time past been given in a number of the missionary schools. The recently established Board of Education is fully alive to the importance of agricultural education for a native population dependent almost entirely on agriculture and steps have already been taken to make the teaching of nature study and elementary agriculture—practical and theoretical—general throughout the country.

Course for Native Teachers.—The course of training outlined for native students qualifying to become teachers includes Native study and agriculture. “Retresher” courses in agriculture are provided at certain of the educational institutions of the missions.

(b) *Instruction of Adults.*

Europeans.—There is no Agricultural College for advanced instruction in agriculture, and the dissemination of scientific knowledge to the planters is carried out by advice given by scientific officers on their visits to estates, by occasional addresses at planters meetings, and by the issue of bulletins.

Natives.—Instruction is given to the adult native (and to children as well) by the District Agricultural Officers of the Department and the Agricultural Supervisors of the Native Tobacco Board (*vide* answer to question 6).

UGANDA.

Q. 4.—(a) The elementary vernacular schools are those at which the bulk of the primary producers will, eventually, receive their education. The syllabus for these schools provides twelve periods per week to be devoted to agriculture and hand work. The normal schools for the training of teachers for these elementary vernacular schools provide eleven periods a week for agriculture (10 hours practical and one hour theory). The Superintendent of Agricultural Education has devoted a large portion of his time to the planning of the agricultural work in these normal schools and each has its school garden in which the common food and economic crops are grown and in which simple experiments and demonstrations are conducted. Agriculture forms one of the vocational courses available at Makerere College. Students taking up this vocation specialize in it during their last two years; the course is given by members of the staff of the Department of Agriculture.

For many years pupils have been taken on the various Government plantations for practical instruction in the cultivation and preparation of economic crops; some of these men have afterwards been appointed as itinerant vernacular instructors, while others have returned to their own land to put into practice the lessons they have learnt.

(b) In Buganda Province the more intelligent and enterprising native cultivators are encouraged to keep in touch with the Bukalasa and Kampala plantations in order to acquaint themselves with improved methods and improved plant varieties, and, when possible they are also visited on their own land by members of the staff of the Agricultural Department.

TANGANYIKA.

Q. 4.—The present provision for agricultural instruction is as follows :—

(a) *At School.*—A university-trained agricultural officer is employed by the Department of Education to give agricultural tuition to natives undergoing training for posts of teachers at country schools. Such teachers will give agricultural instruction to pupils, most of whom will become producers and many of whom will be employed by the Department of Agriculture as instructors (see answer to question 6).

(b) *Afterwards.*—There is no organized instruction other than that described in the answer to question 6.

The course of tuition mentioned in (a) above comprises the training of the teacher to take charge of the school garden and to instruct his pupils in the general elementary principles of agriculture both in the class room and in the garden. Its duration is four years. It is supplemented by experiment and demonstration. The practical application of the principles taught is the keynote of the course and this comprises the management of the native gardens, methods of cultivation, the measurement of fields and of yields, the selection of good seeds, storage of seeds and the suitability of introduced varieties of crops to varying conditions ; in brief, practical elementary field husbandry and, in addition, elementary animal husbandry.

The above description applies purely to native producers ; no organized instruction of non-native producers at school is as yet required.

NIGERIA.

Q. 4.—Nothing has been done yet apart from the education and training of superior departmental African assistants in Southern Nigeria, which we consider we are doing efficiently and thoroughly. But the Education Department in Southern Nigeria is (1927) about

to establish two training colleges for teachers; and "School Gardening" or "Farming for Children" or "Nature Study adapted to local conditions"—whichever phrase is preferred—is to be a major subject in these colleges and thereafter in the village schools. In order to render possible and to ensure co-operation between the two departments, the training colleges are being placed alongside agricultural experiment stations. Apart from this only enough has been done to demonstrate locally.

(a) That it is worse than useless to try to teach such a subject in ordinary schools while there is no one in the country whose business it is to work out what can be taught (and what cannot) and how it can be taught, to train teachers, and, above all, to help them afterwards when they are teaching.

(b) That this subject—such elements of farming or gardening or natural history of farm plants and animals as can be taught to children—is a matter for expert educationalists.

The object in the teaching is to be "to make farming interesting to children," not primarily to teach them "better farming." Subsequently short courses in better farming may be started at the departmental farms; but there are difficulties, one of which is that probably, if a short course is to be effective, it needs nine months, which is a long course for a youth whose final destiny is a three or four acre farm. If not this particular method, then some other means will eventually have to be found, to provide technical instruction in "better farming" for the sons (? and daughters) of farmers who have received a primary education of this rural type. But this is as yet a problem for the future. As yet nothing has been done or planned by way of agricultural education in Northern Nigeria.

GOLD COAST.

Q. 4.—(a) Children are taught the rudiments of agriculture in the elementary schools. The incorporation of the results at research stations referred to in answer to Question 3 are insured, in this instruction by courses in agriculture to teachers of elementary schools, which are held twice a year at a number of experiment stations. The methods shown during these courses at these experiment stations are put into practice in the school gardens. The importance of the classes of instruction in agriculture is recognized by a money grant to those teachers who pass the examinations held at the conclusion

of the two parts forming the course. Its importance is about to be emphasized by making agriculture a compulsory subject for the teacher's certificate.

An agricultural course for teachers is provided for under the supervision of a senior officer of the Agricultural Department at one of the training colleges for teachers and similar arrangements are contemplated for the other training colleges.

(b) At the trade schools for pupils selected from elementary schools, one section has agriculture as its main object. The services of agricultural officers are available for advice or help at any time, and the instructors attached to these schools are officers selected from the Department of Agriculture who are fully informed as to the results at the research stations.

The Department of Agriculture maintains a school for training its junior staff. A large farm is attached to the school where the results of research are applied to local problems. The training provided is thoroughly adapted to the needs of those who join the staff as junior officers as well as those who return to their homes and take up farming.

A reference has already been made to the talks and demonstrations given by travelling agricultural officers.

SIERRA LEONE.

Q. 4.—(a) At School.—Boys are selected from the Agricultural Training College and sent to open rural schools in towns and villages. The scheme has not been established long, consequently there are only very few of such schools in the Protectorate at present.

(b) *Afterwards.*—Nil at present. Except that on their farms instruction and advice are given by Provincial Superintendents of Agriculture and Native Agricultural Assistants.

MALTA.

Q. 4.—Nil.

CYPRUS.

Q. 4.—(a) There is an Agricultural School at Nicosia and in the ordinary schools the rudiments of agricultural knowledge are taught.

(b) This is done by means of peripatetic demonstrations and lectures dealing with the most urgent of the local agricultural problems (insect pests, cattle diseases, etc.) and with modern methods of cultivation. Short practical courses are given in dairying, sericulture, bee-keeping, etc. Lack of adequate staff and of funds renders difficult the dissemination of scientific knowledge on as large a scale as could be desired.

PALESTINE.

Q. 4.—(a) There are three agricultural schools in Palestine :—

- (i) An institute at Mikveh Israel, near Jaffa, under the auspices of the Alliance Israelite, which provides agricultural instruction and training to students between the ages of 14 and 20.
- (ii) An agricultural school for girls at Nahalal which affords primary agricultural training for students between the ages of 18 and 30.
- (iii) An agricultural school at Beit Gemal, near Jerusalem, conducted by the Salesian Brothers, which provides instruction for orphan boys up to the age of 20.

Child farms where agricultural and general instruction is provided for Jewish orphans, exist at three centres: Kfar Yeladin, near Nazareth, Meir Shfeya, near Haifa, and Ben Shemen, near Jaffa.

(b) No facilities exist at present in the country for advanced agricultural training. Consequently, students who can afford to do so proceed abroad, particularly to France and California, for higher agricultural education. Certain graduates of the Mikveh School are sent by the P.I.C.A. to France to complete their studies.

The Department has two agricultural schools under organization for Arabs and Jews respectively, for which funds have been made available from a bequest by the late Mr. Klie Kadoorie.

BRITISH GUIANA.

Q. 4.—(a) Limited instruction in elementary nature study and school gardening. A short course for school teachers on horticulture and related subjects has recently been inaugurated.

(b) An apprenticeship system exists which is worked in connection with the Botanic Gardens, the pupils being maintained at headquarters and given practical work in nurseries, experimental fields, etc.

TRINIDAD.

Q. 4.—In the elementary schools nature study and school gardening are taught. The work is supervised by the Agricultural Advisers. There is an annual competition for a medal and money prizes are awarded on the year's work as reported by the advisers, and a final inspection of all the best schools by the Superintendent of the Botanic Gardens.

As mentioned under (2) the same Agricultural Advisers work amongst the peasantry in their own districts. There is no organised system of agricultural education for adults, but a limited number are accepted for practical training at the experiment stations, River Estate, etc.

The Superintendent of the Gardens produced in 1924 a volume on "Gardening in the Tropics" specially written for use of school teachers in the colony.

In 1921 a course of practical instruction to school teachers was given by officers of the Department of Agriculture. The Education Department found difficulties in continuing this mode of instruction, but better arrangements for training teachers are shortly to be initiated which will make such instruction possible.

GRENADA.

Q. 4.—The Department of Agriculture in Grenada is amalgamated with that of Trinidad and the latter sends various technical officers in turn once every six weeks for a period of about two weeks. During these visits lectures are usually given to the Agricultural Society, and a conference held with the Agricultural Board.

ST. VINCENT.

Q. 4.—There is an Agricultural Instructor who is also foreman, experiment station. He visits estates and peasant plots and gives advice when necessary. The Agricultural Superintendent, and at times the Cotton Inspector, also do this. Chemistry, physics and botany are taught at the Grammar School.

BARBADOS.

Q. 4.—(a) There are agricultural science classes included in the syllabus of the primary schools. In these classes courses of lectures are given in elementary soil science, in local tillage operations ; in the cultivation, sowing, manuring and reaping of locally grown crops ; in elementary entomology with special reference to local economic pests ; in elementary mycology, with special reference to local economic fungoid diseases ; in the routine of a cane sugar factory.

In a few of the elementary schools there is instruction in the tillage operations for and the cultivation and care of economic crops, demonstrated practically in the case of certain kitchen garden crops grown in a garden attached to the school ; also in the collection and identification of certain of the economic insect pests.

Arrangements are being considered for the training of teachers in elementary schools in elementary agricultural science.

ST. LUCIA.

*Q. 4.—*Agricultural instruction in primary schools is conducted under the supervision of agricultural officers, who visit the schools, and give lectures and practical demonstrations. A garden plot for demonstration purposes is attached to each school. In addition a course of lectures is arranged and given by the principal Agricultural Officer to teachers, pupil teachers, planters and overseers every year.

JAMAICA.

*Q. 4.—*In elementary schools provision is made for " school gardens," In secondary schools agriculture has not been found to be a convenient subject for the curriculum.

The Jamaica Agricultural Society employs 16 instructors and a supervisor who are engaged in a comprehensive and ubiquitous system of agricultural propaganda and teaching, mainly through their contact with the 213 branch Agricultural Societies, which together comprise the Jamaica Agricultural Society.

“ The Journal,” a monthly publication of the Secretary is specially adapted for assisting this work and has a wide circulation among the members of the society.

LEEWARD ISLANDS.

Q. 4.—Agricultural science is taught at the Grammar Schools (secondary education) in Antigua and Dominica by properly trained masters. In the latter presidency a system of cadetships is in force—such cadets being apprenticed to the local Agricultural Department and subsequently drafted out as overseers or sub-managers of estates.

DOMINICA.

Q. 4.—The elementary principles of agriculture are taught to the senior pupils in the schools and gardens are provided for practical work.

The most promising of these pupils are eligible for entry into the Agricultural Department as pupils, where they are given a further two years' course of training.

Two travelling Agricultural Instructors are on the staff of the Agricultural Department for the purpose of instructing peasants in improved methods of cultivation.

ST. KITTS-NEVIS.

Q. 4.—None.

BERMUDA.

Q. 4.—(a) In connection with practically every school in the Colony there exists a boys' and girls' agricultural club of the character of clubs of similar name in Canada and the United States of America.

(b) Occasional farmers' meetings are held at which lectures and addresses in popular form are delivered.

QUESTION 5 : EFFECT OF ORGANIZATION.

ENGLAND AND WALES.

Q. 5.—The reports of research institutes and of advisory officers on this point are encouraging. The attitude of farmers towards scientific research has very much changed since the war. Farmers are anxious to obtain, and are paying much attention to, advice based on scientific knowledge.

The scheme of agricultural education has the full support of farming organizations, principally the National Farmers' Union. In most cases the county branches of the National Farmers' Union keep in close touch with the work of their county agricultural education committees.

SCOTLAND.

Q. 5.—Great improvements have been effected and some farmers are keenly interested. A great number, however, have to be incited to take notice of research and opportunities for instruction. Experience shows that farmers should be locally organised to take advantage of the help provided, and that instruction must not be too scientific or too restricted. Local winter short courses are good methods of reaching young farm workers and steadily increase the number of those sympathetic to the work of the colleges.

NORTHERN IRELAND.

Q. 5.—Each year furnishes additional evidence of the success of the organization described, in arousing the interest of producers in improved methods based on scientific knowledge. One of the most remarkable features of the progress made is the advance arising from the instruction of the youth of the farming population. The districts in which winter classes have been successfully carried out have benefited enormously from such work through the adoption of improved methods by the pupils and the cumulative effect of such examples on their neighbours.

IRISH FREE STATE.

Q. 5.—Most valuable practical results have followed the operations of both the Department and the County Committees of Agriculture. It may be mentioned in this connection that during the year 1926-27, advantage was taken of no less than 76,640 visits by the County Committees' Instructors, and there were 3,900 attendances at the lectures given by these officers. As a further indication of the progress achieved in this direction, the fact may be cited that there are at present (January, 1928) some 300 applicants for training in butter-making and poultry-keeping on the waiting list of one of the Department's educational institutes.

CANADA.

Q. 5.—The arousing of the interest of producers in improved methods based on scientific knowledge is in Canada all too slow. However, farmers of central and western Canada respond far more readily than do those in the older settled districts. This may be seen in the keener interest taken in and the greater demand for scientific work. The fact that new and improved methods, varieties, disease and insect control measures are keenly and generally adopted by western farmers is an example thereof. The fact that Marquis wheat, which was originated only a few years ago, has been generally adopted by the western farmers and dominates the spring wheat production of Canada is a further example.

WESTERN AUSTRALIA.

Q. 5.—Producers generally are very interested in improved methods.

SOUTH AUSTRALIA.

Q. 5.—If it had not been for the organization of producers under the Agricultural Bureau System—to be referred to later on in the reply to question 8—agricultural progress in South Australia would have been very slow. As matters stand, South Australian farmers are probably the most progressive in the Commonwealth.

TASMANIA.

Q. 5.—Has small value.

VICTORIA.

Q. 5.—The organization is considered most effective in arousing the interest of primary producers, and the Department has more demands for service than it can possibly cope with.

NEW SOUTH WALES.

Q. 5.—There has been very considerable improvement in agricultural methods based on the instruction given.

QUEENSLAND.

Q. 5.—Generally speaking, the farmer who has had the benefit of a good education has a broader outlook and is alive to the advantages of improved methods of cultivation—the use of pure bred stock; of pure seed of high productivity, and of modern machinery, in order to cheapen and improve the quality and quantity of produce raised. In the case of the farmer of foreign extraction and of those who have not had the benefit of a good education, the process of enlightenment is slow. Improvement is looked for through the medium of the younger generation who now enjoy exceptional facilities for agricultural education.

NEW ZEALAND.

Q. 5.—It is difficult to estimate to what extent the present organization is effective in arousing the interest of producers, but it may be stated unhesitatingly that the interest of the farming community is undoubtedly aroused to the value of improved methods as advocated by research institutions. This is abundantly evidenced by the ever-increasing demands made by primary producers for advice and guidance.

SOUTH AFRICA.

Q. 5.—It is, of course, very difficult to measure satisfactorily the results of extension work. The figures which have been given above, however, indicate the interest which is taken in this class of work by those engaged in agriculture.

INDIA.

Q. 5.—The extensive “extension” organization, embracing the activities of thousands of private seed farms, demonstration plots, co-operative societies, agricultural associations, supplemented by agricultural shows, lectures illustrated by lantern slides, ploughing matches and the distribution of popular literature, has been instrumental in bringing nearly nine million acres under improved varieties of crops. In the case of some crops such as sugar cane, the net profits of the cultivator have been increased by 50 to 100 per cent. by introducing the heavy-yielding new varieties bred at the Imperial Cane-breeding Station near Coimbatore in Madras Presidency. Assuming that the addition of profit obtained from the introduction of departmental varieties is on an average of £1 per acre—and it is certainly higher than that—it is estimated that the annual value of all the crops under improvement has been enhanced by nearly £9,000,000. Improved implements and the use of fertilizers have not taken on to the same extent, as they require capital or at least credit. There are, nevertheless, some hundreds of thousands of improved iron ploughs and other implements at work in India and many hundreds of thousands of iron cane mills. The varietal work on crops has paved the way for improvements in tillage and manuring. It has given the ryot an incentive to better methods of treating his land by showing him that there are varieties of crops which respond to more intensive methods of cultivation.

CEYLON.

Q. 5.—Estate superintendents are fully alive to the value of scientific investigation and research, and the number of enquiries received by the Department of Agriculture for assistance and advice is yearly increasing. There is a keen desire to secure a nomination on the Board of Agriculture, the meetings of its Committees are always attended by a number of visitors desirous of listening to the discussions, and agricultural associations frequently request for lectures by members of the scientific staff. The educational work amongst small growers—particularly in connection with pests and diseases of crops—has given encouraging results. They are beginning to realise the usefulness of plant sanitation and progressive agricultural methods. Similarly equally good results have been secured in some areas in improvement in the methods of paddy cultivation.

MAURITIUS.

Q. 5.—It can safely be said that interest is very fairly active especially among large planters.

SEYCHELLES.

Q. 5.—Progress is slow but owing to a few experienced planters who readily grasp the results of research work, knowledge is quickly disseminated and good examples followed by smaller settlers. It is thought that agricultural progress should be gradual following progress in other fields of educational work and that there is no need for the present for an agricultural college.

MALAYA.

Q. 5.—So far as European planters are concerned, the organization can be said to have been very effective. This is proved by the universal application on estates of approved methods for the control of pests and diseases; the utilization of cover crops introduced by the Department, and the continual modification of estate practice in accordance with results of investigations obtained by the Department. It is somewhat difficult to state how far the organization is effective in rousing the interest of native producers. It must be remembered that the majority of agriculturists in this country are illiterate, and very conservative, so that results are only obtained very gradually and are undeniably difficult to gauge. There has, however, been a marked increase during recent years in the number of enquiries received by the Department from Asiatic cultivators.

FIJI.

Q. 5.—Native agriculture and agriculture conducted by East Indians that is not under the immediate supervision of a European is still extremely primitive.

SOUTHERN RHODESIA.

Q. 5.—The response to the efforts of the Department of Agriculture, on the lines indicated above, is on the whole very gratifying and the standard of efficiency amongst adult farmers is making

distinct progress. There is, however, need for provision of a more thorough scientific and practical agricultural training for the youths of the country who desire to take up a farming career and this will probably before long be met by the establishment of a school or college of agriculture whereat all aspects of Rhodesian farming both in theory and practice can be studied.

KENYA.

Q. 5.—The European of Kenya is very interested in improved methods, but the Department is not entirely in a position to meet the demand for the detailed information the European producer requires.

NYASALAND.

Q. 5.—Results of the work of the technical officers and the district officers have been distinctly encouraging. The European planter desires and is willing to follow a larger measure of guidance than the Department of Agriculture can at present give. The native is naturally conservative and progress is bound to be slow, but on the whole it has been satisfactory. A striking result of the beneficial results of instruction is to be seen this year in the large increase in the number of tobacco fields belonging to natives that have been properly primed and topped with a view to obtaining quality rather than quantity.

UGANDA.

Q. 5.—The bulk of the producers are primitive peoples and the most important work is to teach elementary facts regarding rotations of crops, manuring, etc., as well as the principles underlying the cultivation and preparation of crops suitable for export.

TANGANYIKA.

Q. 5.—The effectiveness of the organization for imparting agricultural education in the school cannot as yet be measured, as it is still in its infancy. The instruction of producers in the field is becoming increasingly effective as experience of the needs and the conditions of the country among the officers of the Department of Agriculture, many of whom are of recent appointment, improves.

NIGERIA.

Q. 5.—In most parts of the country, we are more troubled at present by the farmer who says "Yes, I am doing so-and-so that you suggested and it pays, now tell me something else to do" than by apathy. In the areas and subjects where we are not in this state, the difficulties are due to restrictions on enterprise which arise out of the system of land tenure or the economic or the general structure of society, and are not due to the absence of progressive individuals. The extreme forms of the family structure of society and of communalism are great handicaps, for no slightest step can be taken unless everyone in the unit agrees, and it is always easier to agree "not to do" than "to do."

GOLD COAST.

Q. 5.—Owing to the illiterate condition of the majority of the producers, it is difficult to measure the effect of this organization. There are, however, distinct signs of improvement, especially during the last ten years, in the quality of cocoa, the chief product of the country, which must be largely due to the agricultural instruction given.

SIERRA LEONE.

Q. 5.—The natives of the Protectorate are illiterate and the scheme has not been in existence long enough under the conditions to give it a fair test. There is no doubt that the natives are taking considerably more interest of recent years in the development of agriculture. Agricultural enquiries and applications for seeds and plants increase yearly.

MALTA.

Q. 5.—The organization referred to in answer to question 2 has been very effective not only in the treatment of plant diseases, but also in the very quick reconstitution of vineyards.

CYPRUS.

Q. 5.—The farmer in Cyprus is almost exceptionally conservative and backward, and, as a rule, poor. It is, therefore, not easy to bring about the adoption of improved methods. There has, however, been a marked development of interest in modern scientific cultivation during the last few years, and this development is increasing.

PALESTINE.

Q. 5.—Some improvement in agricultural practice is to be noted in Arab districts as a result of demonstrations and propaganda by departmental officers. Progress is most marked, however, in the Jewish and German Colonies.

BRITISH GUIANA.

Q. 5.—Organization insufficient to achieve much result at present (1927).

TRINIDAD.

Q. 5.—With few exceptions the average cultivator does not respond readily to new and improved methods and progress is slow. There is progress, however, in many cases, and increasingly so with the better type of planter.

GRENADA.

Q. 5.—It is apparently effective. Planters and others usually welcome the visits of the officers of the Department to their properties.

ST. VINCENT.

Q. 5.—Difficult to say, but in recent years increased production in staples has steadily taken place.

BARBADOS.

Q. 5.—Improved methods are slowly adopted owing to intense conservatism and satisfaction with old methods among the older farmers. Improved methods are fairly easily adopted by younger farmers, in particular those who have received agricultural training in the schools.

ST. LUCIA.

Q. 5.—The lectures referred to in the answer to Question 4 are looked forward to by the teachers, and practical results are to be noticed after each course.

JAMAICA.

Q. 5.—Remarkable progress has been made in the past 20 years in the methods of agriculture in Jamaica. The use of implements, of green dressings and drainage has been greatly extended so as to increase the island's production. This has recently been seen in the record production of bananas for export.

LEEWARD ISLANDS.

Q. 5.—The Agricultural Departments are consulted in every way by planters—who readily avail themselves of their utility. Seeds and plants of every description are ordered through the local departments and the knowledge and experience at the disposal of these departments are relied upon and utilized to obtain the best type of seedling canes, citrus varieties, onions, pineapples and other local crops. That this course is necessary, is perfectly understood and acted upon by planters who realize that the Agricultural Departments serve as their safeguard against the introduction of insect and fungoid pests. Any new introduction is carefully followed up by the agricultural officers and all fields so planted in new types are inspected at intervals until a certificate of clean health can be issued.

Any seeds or plants introduced are automatically held up at the Customs for inspection by the Agricultural Officers concerned and not released until they have been carefully fumigated or disinfected.

It is the general experience that importers are so anxious to comply with the regulations that they notify the Departments concerned while the plants or seeds are still in bond.

It may be generally stated that throughout the Leeward Islands Colony the Agricultural Departments and the planting community work in fair harmony. The officers in charge are freely consulted and their advice acted upon, even though it may be against individual interests. Quarantine regulations exist and plants, fruit and seeds coming under their restriction are promptly destroyed or otherwise dealt with.

DOMINICA.

Q. 5.—By creating confidence in the Agricultural Department, which is shown by the way in which the Department is freely consulted.

ST. KITTS-NEVIS.

Q. 5.—By bringing to the notice of planters new seedling canes of merit and new types of cotton evolved at the station. Information concerning soils and fertilizers is also brought to their notice.

BERMUDA.

Q. 5.—The Department has the full confidence of the farmers, who are receptive of new ideas, if not always prompt to put them into effect. Rapid strides have been made of late in the control of plant diseases and pests, especially in the control of late blight (*Phytophthora infestans*) of the potato. Another decided gain has been that in connection with the improvement of lily bulbs, for practically all growers have acted on the advice of the Department, and with highly beneficial results. Improvement of live stock has been effected.

QUESTION 6 : AGRICULTURAL INSTRUCTORS.

ENGLAND AND WALES.

Q. 6.—There are at present (May, 1929) 352 whole-time instructors and instructresses employed by county agricultural education authorities. In addition, part-time instructors are employed in many cases to deal with such subjects as veterinary hygiene, bee-keeping, etc. In addition to their teaching duties, instructors carry out a large amount of advisory work amongst farmers.

Refresher courses at agricultural colleges and other centres are occasionally arranged for members of county staffs. Recently, for example, courses have been arranged dealing with agricultural engineering, poultry diseases and rabbit husbandry. It is usual to hold every two years a meeting of the whole of the agricultural organisers at a research institute, at which discussions take place on the results of recent research in particular subjects.

There is also an unofficial organisation, the Agricultural Education Association, at the meetings of which papers on scientific research in agriculture are read and discussed.

SCOTLAND.

Q. 6.—The total numbers of instructors employed in Scotland are as follows :—

County agricultural organizers and assistant organizers	39
Horticultural instructors	10
Instructresses in dairying and poultry-keeping	31
	<hr/>
	80
	<hr/>

NORTHERN IRELAND.

Q. 6.—The total staff of instructors and overseers employed in the Counties is 45, made up as follows :—

- 10 Agricultural instructors.
- 16 Agricultural overseers.
- 9 Horticultural instructors.
- 10 Instructors in poultry-keeping and dairying.

The agricultural overseers are placed in backward and mountainous districts, where the farms are small and poor and conditions generally are such that producers are largely cut off from the main current of agricultural activity. The overseers act in the capacity of agricultural advisers, demonstrators, and mentors generally to the producers in their districts and their work is having excellent results under very difficult conditions, particularly in connection with the improvement of live stock.

IRISH FREE STATE.

Q. 6.—Thirty-seven instructors in agriculture, 43 instructors in poultry-keeping and butter-making, and 36 instructors in horticulture and bee-keeping, are employed by the 27 County Committees of Agriculture. The instructors in agriculture are men who prior to appointment have had a thorough practical knowledge of farm work and have subsequently taken out a satisfactory course of theoretical training. Practically all the existing instructors in agriculture have taken out the full course in the Agricultural Faculty of the former Royal College of Science and been awarded the College Diploma (A.R.C.Sc.I.). A number of the recently appointed instructors have, in addition, received the Degree in Agricultural Science (B.Agr.Sc.) awarded in the Faculty of Agriculture in the National University of Ireland. The instructors in poultry-keeping and butter-making have been trained mainly at the Munster Institute (Cork), and the instructors in horticulture and bee-keeping have taken out the higher course of instruction in horticulture at the Albert Agricultural College Glasnevin, Dublin).

Various classes of instructors are also employed direct by the Department, e.g. 14 instructors in cow testing. The duties of these instructors include the organization and supervision of Cow Testing Associations, and work incidental thereto, such as the training and guidance of the local supervisors employed by the associations, the giving of lectures at meetings of dairy farmers, the advising of members of the associations relative to the purchase of dairy bulls, the keeping of breeding records, and, generally speaking, the grading up of the dairy herds in their respective districts.

With a view to keeping instructors in touch with modern progress in their respective spheres, tours in other countries, and central conferences and courses of lectures, are arranged periodically by the Department. Such measures afford the instructors opportunities of

meeting one another and of discussing problems or difficulties which may have arisen in the course of their work. Steps are also taken by means of circular communications to keep the instructors informed of any new features or developments in agriculture that may arise.

There are four agricultural overseers and 56 assistant agricultural overseers employed in connection with the special schemes administered in the poorer districts. These officers are given periodical lectures in poultry-keeping and bee-keeping, as well as on other matters which would be of benefit to the farmers in their districts.

Potato Industry.—Advice and instruction in the production of potatoes is afforded to local farmers by the itinerant instructors in agriculture, and also by the agricultural overseers, in the course of their ordinary duties. With a view, however, to the development of the potato industry in selected areas, the Department have at present a special staff of seven instructors who are engaged solely on duties connected with the growing, in these areas, of varieties of potatoes suitable for seed and ware purposes on the home market, and suitable also in connection with the establishment of an export trade.

Under the scheme of instruction in flax growing, eight instructors are at present employed by the Department. The duties of these officers include giving instruction to flax growers in the proper methods to adopt in the cultivation and retting of the flax crop. They also visit the flax mills in their respective districts and afford mill-owners and scutchers advice and instruction in the proper scutching and handling of the flax crop. Each instructor is, furthermore, required to supervise the laying down and cultivation of experimental plots in his district and all operations in connection with the handling, retting and scutching of the produce of the plots, and to furnish a report on the results obtained.

CANADA.

Q. 6.—Agricultural instructors are usually attached to agricultural education departments of the Provinces. The provinces also do considerable inspection work and have agricultural representatives doing instructional work.

The Federal Department has various inspectional systems, but these are not for instructional work primarily. The Dominion Experimental Farms have two classes of inspection: (1) plant

disease inspection toward the elimination and control of plant diseases towards the production of certified disease-free seed stock, and (2) inspectors of illustration stations, in order to see that the work is properly done and that accurate records are obtained for dissemination throughout the district. These men, however, are compelled to devote all their time to the illustration stations, although two meetings are held at each station each year for the benefit of the neighbouring farmers.

WESTERN AUSTRALIA.

Q. 6.—No answer given.

SOUTH AUSTRALIA.

Q. 6.—We have in South Australia seven country district agricultural instructors: four country district dairy instructors and six country orchard instructors. In addition to the above, there is for the State a Chief Agricultural Instructor, a Chief Dairy Instructor and a Chief Horticultural Instructor. The duties of these officers comprise visits to individual holdings, attendance at meetings of farmers, lectures in suitable centres and advice by correspondence whenever necessary.

TASMANIA.

Q. 6.—There are at present three agricultural instructors, three dairy, one veterinary, one chemist, two horticultural, one poultry and one biologist. In general terms all except agricultural instructors are administrative officers, whose services are called on occasionally for lecture purposes. The work of the agricultural instructors is imparting instruction in the field and through occasional lectures to Bureau members. No steps are at present taken other than their own reading of recent publications.

VICTORIA.

Q. 6.—There are 25 agricultural instructors. They visit the various districts, conduct demonstration plots, arrange inspection days at plots, act as guide lecturers, organise local competitive educational demonstrations such as crop and fallow and farm competitions conduct lecture tours, broadcast wireless talks, co-operate

with local organizations, such as Better Farming Associations, conduct propaganda through local press, give practical demonstrations of farming methods in the field ; visit private farms in response to requests for specific demonstrations ; and answer correspondence ; also six veterinarians, 15 stock inspectors, 81 dairy and 21 orchard supervisors, and 5 experts in plant and insect diseases whose duties include educational work.

NEW SOUTH WALES.

Q. 6.—The Department employs 19 agricultural instructors, of whom 12 have their headquarters in country districts. These officers supervise the experiments established with farmers, and also arrange meetings at which they give lectures on agricultural subjects. They also contribute articles to agricultural journals, and to the local press. In addition, the Department employs a staff of dairy instructors, fruit instructors, veterinary officers, etc., who visit various country centres from time to time for the purpose of giving instruction to farmers on subjects appertaining to their particular sections. These officers also deliver lectures, conduct demonstrations and contribute to agricultural journals as well as to the local press.

In order to enable these officers to keep abreast of the times, arrangements are made for them to meet in Conference at least once a year, members of the scientific staff also being present on such occasions.

QUEENSLAND.

Q. 6.—The Department's technical staff consists of nearly 240 officers and practically the basic duty of everyone on the staff is instruction, even though a large portion of their work may be in the nature of inspection.

The officers engaged in direct instructional work are usually recruited from agricultural colleges or universities. Their duties include paying visits to localities for the purpose of affording information to farmers on special subjects by means of lectures, addresses and demonstrations. They make farm to farm visits to afford instruction ; they furnish field reports on crops, crop improvement, and crop prospects ; they arrange for conducting, recording and reporting on experimental tests and field plot work generally.

NEW ZEALAND.

Q. 6.—Note.—In replying to this question the term “ Agricultural Instructors ” is interpreted to include all instructors and inspectors of the Department of Agriculture whose duties include the disseminating of knowledge in respect of all branches of primary production.

Fields Division.

Agricultural instructors to the number of 32 form the extension service of the Fields Division of the Department of Agriculture. These are respectively under the direct control of a Superintendent (see No. 1). The duties of such instructors are (1) to visit, give advice and offer suggestions to farmers in their sub-districts on all agricultural matters ; (2) to bring farmers in touch with the research work of the research stations ; (3) to report to the research stations the problems confronting farmers in their sub-districts ; to lay down and supervise experimental work and co-operate with the research staff in such work (see No. 1) ; and to deliver lectures and give demonstrations as desired for the guidance of farmers in their respective sub-districts.

No special facilities are afforded to such instructors to undergo “ refresher ” courses. However, conferences of instructors are arranged from time to time at which free discussion of all projects take place, the difficulties which arise are fully considered, and the application of the results of research to the peculiar requirements of each locality is determined. The results of all experimental work undertaken by the Department of Agriculture are of course made known to all members of the extension staff and they are kept in touch as closely as circumstances will permit with scientific agricultural progress abroad.

Livestock Division.

The personnel of the instructional staff of this division consists of :—

- 32 Veterinarians.
- 93 Inspectors of stock (lay).
- 4 Poultry instructors.
- 100 Meat inspectors (lay).
- 1 Instructor in swine husbandry.
- 1 Wool instructor.

Veterinarians.—Of the 32 veterinarians four are administration officers, being termed District Superintendents and having jurisdiction over the activities of the livestock division covering a large territory. There qualified veterinarians are laboratory officers who of necessity are frequently in the field in connection with the laboratory work on hand. Five veterinarians are wholly employed at meat inspection at Meat Export Freezing works and consequently are not called upon to impart instruction to the farming community except at rare intervals. Two veterinarians are engaged in research work in the field in close collaboration with the veterinary laboratory, particularly in connection with obscure troubles affecting dairy-cows such as mammitis, abortion and sterility.

The remaining 18 veterinarians while spending a certain amount of their time on the supervision of the work of the lay meat inspectors are also employed on field work. Their field duties include :—

- (1) Investigating outbreaks of troubles with live stock.
- (2) Giving veterinary advice to stock owners, but, in districts where a veterinary surgeon is in private practice, avoiding any encroachment on his sphere.
- (3) Applying tuberculin test to cattle.
- (4) Guiding lay inspectors of stock engaged in the inspection of live stock for disease, town-supply dairies and ordinary small slaughterhouses.
- (5) Attending at quarantine stations, inspecting all imported animals, also animals for export.
- (6) Dissemination of the principles of animal husbandry by addresses to farmers, correspondence, newspaper articles and wireless lectures.

There are no facilities for “ refresher ” courses, but the veterinarians are in close touch with research work carried out in the Dominion. They have an annual conference at which papers are read and there is an open discussion on matters affecting live stock in health and disease, prominence being given to any investigations in hand. Veterinarians from agricultural colleges also attend these conferences.

Inspectors of Stock.—The duties of inspectors of stock are largely inspectorial but they are frequently called on to give advice to

settlers on the feeding and management of live stock. In cases of disease the matter is referred to the Government Veterinarian under whom these inspectors carry out their work.

Inspectors of stock also have the administration of the statutes relating to noxious weeds and the rabbit pest. In the course of inspection advice is given to occupiers as to the best methods of control or eradication.

In conjunction with qualified veterinarians inspectors of stock administer that portion of the Dairy Industry Act which applies to the supply of milk for human consumption. Dairy herds and premises are inspected and advice given when necessary, and tests are made of the milk.

Poultry Instructors.—For the purpose of encouraging the poultry industry this division has under its direction a Chief Poultry Instructor and three poultry instructors who render assistance to those in the poultry industry, and advise prospective poultry keepers regarding their birds and the lay-out of poultry plants.

Instruction is given by correspondence, lectures, demonstrations, and personal visits.

Meat Inspectors.—The meat inspectors are engaged on work of inspection and can hardly be termed instructional officers, but their knowledge and experience have some educative influence and value at the works and abattoirs.

Instructor in Swine Husbandry.—The Department has only one officer appointed particularly to give advice in regard to pig-keeping. He deals with the feeding and management of pigs by lectures, visits and correspondence, but does not concern himself with ailments which come within the sphere of the veterinary profession.

Wool Instructor.—The wool instructor lectures to sheep farmers on the classing and handling of wool, and the preparation of wool for the market. Demonstrations are also given at shearing sheds during the shearing season. Advice is given concerning the lay-out and construction of sheep yards and wool sheds. The wool instructor also examines microscopically ram's wool for purity and furnishes reports to the flock owners.

Dairy Division.

Dairy Instructors.—There are 16 of these officers, eight being instructors in butter-making and eight instructors in cheese-making. Prior to joining the Department of Agriculture these men were all successful dairy factory managers. Their principal duty is to give instruction in the manufacture of butter and/or cheese at the various factories in their districts and their services are of great benefit in assisting managers to maintain a high standard of quality. Until recently no facilities have been available at agricultural colleges in New Zealand for providing these officers with “refresher” courses, but the latest publications are available for enabling them to keep in touch with modern methods as applied to dairy factory work.

Farm Dairy Instructors.—There are 40 of these officers employed by dairy companies. The Department subsidizes this service to the extent of one-half the officer's salary and virtually controls their work. The duties of these officers are to visit the milking sheds and dairies of the suppliers, examine the dairy appliances, general conditions, and surroundings, give advice where needed and by these means educate the suppliers to deliver to the factories milk and cream of the highest quality.

Horticulture Division.—The instructional staff of this division consists of the following :—

- 21 Orchard instructors.
- 1 Horticulturist.
- 1 Wine and vine instructor.
- 1 Instructor in tobacco culture.
- 1 Assistant instructor in tobacco culture.
- 8 Apiary instructors.

In addition to giving information and guidance to producers by means of personal visits, lectures, demonstrations and correspondence, these officers act as inspectors for the suppression of pests and diseases.

No special “refresher” courses are provided, but the officers are given every opportunity to keep in touch with the up-to-date knowledge and practice in their respective spheres.

SOUTH AFRICA.

Q. 6.—The Schools of Agriculture at Glen and Potchefstroom conduct special courses for the training of teachers of agricultural science in the primary and secondary schools and facilities are also provided at the two University Colleges referred to, viz. Pretoria and Stellenbosch. At these two latter institutions degree courses in Agriculture are given and large numbers of prospective teachers have been enrolled for these courses.

INDIA.

Q. 6.—The staff of the Provincial Agricultural Departments engaged on propaganda or extension work numbers about 1,000. These include agricultural inspectors, district officers, demonstrators and farm managers. The main duty of agricultural inspectors, district officers and demonstrators is to tour in the area in their charge with a view to getting into touch with the cultivators and inducing them to adopt the improved methods evolved on experimental farms. They organize and carry out practical demonstrations in the villages, collect and distribute improved seeds and attend local shows and fairs in the interests of their propaganda and demonstration work. The staff attached to Government seed and demonstration farms occasionally spend a portion of their time on tour.

In order to enable the district staff to keep abreast of scientific progress, provision has been made in some of the Provincial Agricultural Institutions for occasional refresher courses.

CEYLON.

Q. 6.—The Department now has 35 agricultural instructors, nine sub-inspectors for plant pests and two special inspectors for school gardens on its staff. The agricultural instructors and inspectors for school gardens are under the general supervision of the Divisional Agricultural Officers. About half of them now have charge of small experimental and demonstration stations. These stations deal with village products and provide for the testing of improved varieties of manures and for the trial of new products. The results of these trials are regularly printed or are discussed with meetings of cultivators. Agricultural instructors are also engaged in peripatetic visits to cultivations, to co-operative societies and especially to those cultivations entered for the various prize holding competitions which are

organized annually in all divisions. Sub-inspectors for plant pests and diseases are also regularly travelling to growers' lands for educational and inspection duties. Every effort is made to educate growers as to the damage done by declared pests and as to control measures which should be adopted. Special leaflets are regularly distributed and illustrated posters have been prepared and posted in village court houses, schools, etc. Inspectors of school gardens assist agricultural instructors in the inspection of school gardens and are utilized for inspection of gardens applying for registration and for special duties connected with the school garden work. These instructors and inspectors are brought together in conference regularly by the Divisional Agricultural Officers, when their work is reviewed and further extension of work outlined. Special conferences are also occasionally held, particularly when changes in technique for experimental work are under consideration.

MAURITIUS.

Q. 6.—There is at present one officer who functions entirely as an agricultural instructor. The Chief Agricultural Officer is in charge of this work and does a fair amount of itinerant instruction ; he has at present one assistant instructor trained at the Agricultural College and provision exists for two other men to be appointed shortly (November, 1927). In relation to the tobacco campaign four officers are seconded for special instructional duty in relation to this crop. In the Entomological and Botanical Divisions, the Entomologist and Botanist and two assistants pay frequent and regular visits to large and small properties ; they are further assisted by a staff of four inspectors and three assistant inspectors who combine supervision of the legislative control of pests and diseases with advice and instruction on questions relating to plant diseases. In the Veterinary Division the same remarks apply to the Government Veterinary Surgeon and his staff of four stock inspectors.

Refresher courses are provided annually for instructors and inspectors of plant and stock at the Agricultural College.

SEYCHELLES.

Q. 6.—There are besides three forest rangers, two agricultural inspectors attached to the Agricultural Department, one of whom acts as forest ranger as well. The two inspectors are each in charge

of a section of the colony and are five times a week visiting estates, showing insect pests and otherwise advising planters who are in need of information. The results of their work are co-ordinated and a sketch of the islands is drawn periodically showing progress of works of improvement.

MALAYA.

Q. 6.—As stated in the reply to Question 5, the Department has one European agricultural instructor together with one Malay assistant instructor for the training of Malay subordinate officers.

In addition the Department has a field division which consists of a Chief Field Officer stationed at headquarters and 10 European agricultural field officers stationed in various parts of the Malay Peninsula. They constitute the mouthpiece of the Department as far as the native cultivator is concerned. Their main duty is to inspect the holdings in their districts, to give advice on agricultural matters, and to issue instructions under the Agricultural Pests Enactment where such are deemed necessary. They also have charge of local demonstration and experimental stations. They are in close touch with headquarters and in that way are able to keep abreast of progress. Under these officers are approximately 50 Malay officers who have received the training detailed above. The Malay officers from time to time are sent to headquarters for conferences and short refresher courses at the Department School.

FIJI.

Q. 6.—There are six agricultural instructors, including one employed under the direction of the Coconut Committee. These instructors are largely concerned with improving native agriculture, and constitute the most effective piece of machinery that has yet been developed in this Colony for the general improvement of native and East Indian agriculture. In addition to being advisers, particularly to the natives, on many matters, they are also armed with legislative power that enables them to have their advice carried out on particular matters that the Government considers to be important. There are no refresher courses at agricultural colleges available for these instructors, and in fact, none of them are graduates of an agricultural college.

SOUTHERN RHODESIA.

Q. 6.—The technical staff of the Department of Agriculture consists of the following officers :—

- (a) Chief agriculturist, two assistant agriculturists and an agriculturist and horticulturist, a senior tobacco and cotton expert, two headquarter assistant tobacco advisers and ten district tobacco advisers.
- (b) One livestock adviser, one dairy expert and one assistant dairy expert.
- (c) One forest officer and three assistant forest officers.
- (d) One poultry expert and one assistant poultry expert.
- (e) One agricultural and irrigation engineer and three assistant engineers.
- (f) One chief chemist and three assistant agricultural chemists.
- (g) One chief entomologist and three assistant entomologists.
- (h) One mycologist.
- (i) One botanist.
- (j) One hydrographic engineer.
- (k) A director of veterinary research, an assistant research officer and lay assistants.
- (l) A chief veterinary surgeon, 11 district veterinary surgeons and 65 cattle inspectors.

Attached Staff.

- (m) One cotton adviser of the British Cotton Growing Corporation and one plant breeder engaged on cotton breeding work at the Cotton Growing Station, Gatooma.

On Experimental Stations and Demonstration Farms.

- (a) Salisbury Agricultural Experiment Station : manager and a young assistant.
- (b) Tobacco Experiment Station, Salisbury : manager and a young assistant.
- (c) Gwebi Demonstration Farm : manager, one assistant and one stockman.
- (d) Matoppo Demonstration Farm : manager and two assistants.
- (e) Two forest nurseries, each with a manager and an assistant.

At the important centres of Bulawayo and Gwelo small Municipal Crop Experiment Stations are maintained. The Government gives a grant-in-aid towards these and exercises supervision over all aspects of the work undertaken. The produce grown is the property of the Municipality and a Municipal employee acts as manager of the station and devotes part of his time to these duties.

Officers of the Department of Agriculture when taking long vacation leave are given additional "Study Leave" to be utilized for "refresher courses" or similar purposes.

KENYA.

Q. 6.—There are 14 European agricultural instructors of whom 10 are posted to native areas. These officers secure a circulation of literature, and from time to time are given instruction in England. One is at present securing some further training, and officers ask to pursue some line in which they are interested.

NYASALAND.

Q. 6.—Seven district European agriculturists, attached to the Department of Agriculture or the Native Tobacco Board, are engaged in the instruction of adult natives. These officers are responsible for the supervision of definite areas which they tour regularly, holding meetings in the villages and giving practical instruction in gardens belonging to natives. The size of the district allotted to each European officer varies according to local conditions, but experience has shown that, in the case of a crop such as tobacco, it should be limited to an area that can be toured in three weeks and that there should not be more than about 5,000 native producers. The district organization of the Native Tobacco Board in the Central Province gives very satisfactory results. One senior supervisor and three junior supervisors are concentrated in a comparatively limited area, the senior officer being in the centre. Each officer tours his section once each month in the crop season and is assisted by fifteen native instructors to whom specified villages are allotted. At the end of each month the native instructors assemble at the headquarters of the European under whom they serve, and who receives their reports, draws attention to defects in their work, and issues instructions

regarding their next month's work. The Tobacco Board controls the issue of tobacco seed in this area, thus ensuring the growth of a suitable variety and a general uniformity in the tobacco produced.

In the cotton area on the Lower River a similar organization exists, but a far larger area is covered by the district officer and the same concentration of effort is not possible. Cotton does not, however, need the close supervision that tobacco does.

Every opportunity is taken of enabling the district officers to keep in touch with scientific progress bearing on their work, but regular "refresher" courses cannot be provided owing to lack of facilities for this purpose. Arrangements are, however, made for the two district agricultural officers of the Department and the senior supervisors of the Native Tobacco Board to visit Zomba from time to time for consultation with the scientific officers of the Department. Recently one of the district agricultural officers was granted leave to take a year's course at the North Carolina Agricultural College and the other devoted a month of his leave to study at the Imperial Institute and at Kew.

UGANDA.

Q. 6.—Nine European agricultural officers, six European plantation managers, two European ploughing instructors and one European coffee officer are available for the dissemination of agricultural knowledge and practice in addition to the scientific staff of six Europeans.

The native staff comprises 14 overseers for general work, 115 cotton instructors, 17 coffee instructors, 15 ploughing instructors and 4 rice instructors. Occasional "refresher" courses are given to native instructors.

TANGANYIKA.

Q. 6.—The Department of Agriculture has 15 district agricultural officers, each of whom is stationed in charge of a defined region for directing its agricultural affairs in accordance with the policy of the head of the Department and always in agreement with the Administrative Officer in charge of the region. Each district agricultural officer has a number of African instructors in his charge (the total being 180); these are stationed in different parts of the region and their duties are to disseminate knowledge in accordance with the

specific instructions of the district agricultural officer and to inspect native fields under legislative enactments applying to particular crops. In addition, the Department possesses two European coffee officers employed to supervise native coffee fields for ensuring clean cultivation and care of the trees; and three European ploughing instructors to teach and demonstrate the use of the plough and the training of cattle therefor. No special measures have as yet been taken to enable these officers to keep abreast of scientific progress in the manner indicated.

NIGERIA.

Q. 6.—(a) Twenty-seven Europeans, about a dozen educated and trained Africans, and perhaps two hundred slightly educated Africans (many paid by Native Administrations) who are specially trained in the specific subjects with which they deal. The staff of Europeans will steadily but slowly, increase, and that of educated African assistants will rapidly increase in the near future.

(b) With the senior African, as with the European, agriculturists there is no sharp division between experimental work and education and organization. Some such men may be, indeed are, employed in experimental sowing or harvesting, at one time of the year, and out in the district as instructors or organizers at another. Others are deliberately changed backwards and forwards between the two kinds of work at longer intervals. The junior native assistants are brought into the farm, for special training in their specific subject once a year.

GOLD COAST.

*Q. 6.—*The Agricultural Department maintains a staff of 20 Provincial Superintendents, superintendents and assistant superintendents of agriculture, 3 travelling instructors and 44 junior African staff, all of whom are employed in agricultural work in country districts. They supervise the experiment stations, demonstration plots and farms of the Department and are responsible for inspecting plots established under the bonus system (see answer to Question 1) and travel through their districts visiting individual farms and holding meetings with farmers and giving demonstrations as referred to in answer to Question 4. In addition, six inspectors are employed

on plant sanitation work, whose duties consist at present of giving demonstrations to farmers of methods to be used for the eradication of diseases which have been declared harmful to cocoa trees.

Some officers take courses of instruction when on leave, and a general system of "refresher" courses is now being organized. Stations are provided with libraries containing modern standard works on agricultural subjects and agricultural journals are provided to keep them informed of modern progress.

SIERRA LEONE.

Q. 6.—One European agricultural instructor stationed at the Central Experimental Farm, Njala; three provincial superintendents of agriculture, one in charge of each province; nine agricultural assistants. The scheme is to have 18 agricultural assistants in charge of each district together with agricultural assistants in charge of special crops as oil palm, rice, cocoa, coconuts, coffee, etc.

All the above officers besides carrying out their administrative work also instruct farmers and planters in the districts and provinces.

MALTA.

Q. 6.—See answer to Question 2.

CYPRUS.

Q. 6.—The inspector of agriculture, three assistant inspectors, superintendent of school gardens, agricultural chemist, entomologist, vine expert and dairy expert deliver lectures in the agricultural school. These officers also travel in the districts delivering lectures, giving advice and looking after plots, etc. "Refresher" courses were started only in 1926.

PALESTINE.

Q. 6.—The technical staff of the agricultural service of the Department consists of:—

- 1 Director.
- 1 Deputy director.
- 2 Inspectors of agriculture and forests.
- 4 Sub-inspectors of agriculture and forests.

The Palestine Zionist Executive and the P.I.C.A. also employ qualified experts who act as instructors in the various Jewish colonies and settlements. The department issues leaflets on agricultural subjects in Arabic and Hebrew. Demonstrations are given at agricultural stations, nurseries and stud farms. The entomological service demonstrates the various methods of controlling pests and diseases.

BRITISH GUIANA.

Q. 6.—There are four whole time instructors and nine part time instructors. Most of these instructors have been recruited from the ranks of the apprentices referred to in 4 (*b*). These instructors keep in touch with the agricultural progress in various districts and give such advice to farmers as is within their knowledge. They are visited periodically by officers from headquarters, but no facilities have existed for giving them “refresher” courses. Agricultural education generally is being reorganized.

TRINIDAD.

Q. 6.—The number is seven; they are locally called advisers. They give advice and practical assistance, mainly on their holdings, to the smaller cultivators, deal with pests and diseases, supervise school gardens, inspect properties having loans from the Government Agricultural Bank, help (in one county) the Agricultural Credit Societies and generally act as local officers of the Department in their districts.

The Trinidad advisers come in monthly to the head office, and current problems, etc., are discussed with the director and senior members of the scientific staff. The Tobago adviser is brought over for one or two fortnightly visits a year to maintain touch.

GRENADA.

Q. 6.—Superintendent of agriculture, 1 (newly appointed—1927); agricultural instructor, 1.

Their duties include giving advice and assistance particularly to small cultivators, helping in dealing with plant diseases and pests and generally assisting in the work of the Department.

ST. VINCENT.

Q. 6.—Question partly covered by the answer to Question 4. As regards last sentence, there are no special measures.

BARBADOS.

Q. 6.—There are no agricultural instructors other than lecturers in schools and occasional lectures given by officers of the Agricultural Department.

No special measures are taken to provide lecturers and officers of the Agricultural Department with occasional "refresher" courses.

ST. LUCIA.

Q. 6.—Four: two are connected with agricultural duties as a whole—advising and demonstrating improved cultural methods, also measures for combating and preventing disease and introducing new industries.

The other two are chiefly concerned with the control of Panama disease, in banana cultivation.

JAMAICA.

Q. 6.—The staff consists of 16 agricultural instructors, 18 inspectors of plant diseases, and 3 inspectors of agricultural produce. Special courses for the agricultural instructors and inspectors are arranged for from time to time at the headquarters of the Department at Hope. The technical scientists of the Department give lectures at these courses and demonstrations are given at the experiment stations and the Government Stock Farm, Hope.

LEEWARD ISLANDS.

Q. 6.—All the agricultural officers and specifically the heads of each agricultural department may be regarded as agricultural instructors. The Federal superintendent of agriculture is the chief adviser and any difficult point is referred to him. Should his decision require supplementary confirmation the services of the Imperial College of Tropical Agriculture and the Imperial Commissioner of Agriculture are requisitioned. Arrangements have been made for heads of sub-departments to attend a short course at the Imperial College of Tropical Agriculture.

DOMINICA.

Q. 6.—All officers of the Department are really engaged in instructional work, but two travelling agricultural instructors are appointed to be continually on the move among the peasantry to instruct them in improved methods of agriculture.

Officers of the Department are kept abreast of scientific progress by periodical visits of the Commissioner of Agriculture for the West Indies and other professors of the Imperial College of Tropical Agriculture, Trinidad; also by the purchase of scientific books or journals, and by exchange of reports with Agricultural Departments in the Empire. Refresher courses are now being arranged by the Imperial College of Tropical Agriculture, Trinidad.

ST. KITTS-NEVIS.

Q. 6.—*St. Kitts.*—Agricultural superintendent and cotton inspector.

Nevis.—Agricultural instructor and cotton inspector.

Anguilla.—Cotton inspector.

Most of the agricultural instructor's time is occupied in instructing and advising the present cultivators at Nevis.

Arrangements have recently been made for the agricultural officers to visit the Imperial College of Tropical Agriculture at Trinidad for such a course.

BERMUDA.

Q. 6.—The officers of the Department who act as instructors are:—

- (a) Director of Agriculture. General supervision. Addresses meetings, visits farms and schools, writes for "Agricultural Bulletin" and local newspapers.
- (b) Plant Pathologist. In charge of all disease and pest control work, addresses meetings, visits farms and schools, and writes frequently for the local press and for the "Agricultural Bulletin."
- (c) Agricultural Assistant. Is in charge of live stock, and is the chief adviser on this subject, particularly on poultry husbandry; visits farms and schools.

- (d) Government Veterinary Officer (a part time officer). Gives advice on matters relating to live stock, particularly disease control.
- (e) Inspector of Produce. In charge of inspection service. Advises farmers regarding grading and packing, and visits farms for this purpose.
- (f) Assistant Inspector of Produce (a part time officer). Assists the inspector of produce. Is generally stationed in New York, our principal market, during the shipping season, and keeps the Department advised of market conditions, and the farmers through the Department.

In 1926 the above-named officers paid visits to farms and other properties to the number of 1,701.

No special measures are taken to enable the above-named officers to keep abreast of scientific progress by providing them with occasional "refresher" courses at agricultural colleges.

The director and the plant pathologist frequently visit the United States and Canada, and there attend botanical conferences and the like. The assistant represented the Colony at the World's Poultry Congress in Ottawa. Arrangements have recently been made which will enable the plant pathologist to visit more frequently the United States of America and Canada at the Government's expense. (In the past he has personally borne a part of the cost.)

QUESTION 7: CO-OPERATIVE SOCIETIES.

ENGLAND AND WALES.

Q. 7.—As well as the Agricultural Education Association referred to in the answer to Question 6, three further organizations deserving mention are the National Farmers' Union, the Royal Agricultural Society of England and the Bath and West Society. All three bodies issue a Year-Book or a Journal in which increasing attention is given to results of scientific research. Some of the National Farmers' Union branches, e.g. the Essex branch, also publish a Year-Book and a monthly journal devoting considerable space to the results of scientific research. The Royal Agricultural Society of England also issue annually "Notes" on the results of agricultural research at home and abroad. The Bath and West Society in its annual journal deals *in extenso inter alia* with the work of the Long Ashton Research Station. Private firms, if carrying on business on a sufficiently large scale, sometimes have advisers on their staffs, although naturally the advice is mainly concerned with the development of the firm's business. Imperial Chemical Industries, Ltd. (Nitram) has recently appointed a substantial staff of advisers to farmers.

SCOTLAND.

Q. 7.—Agricultural co-operative societies in Scotland have up to the present confined their attention mainly to trading. Agricultural societies and other bodies frequently arrange for lectures dealing with different aspects of agricultural research and the Highland and Agricultural Society of Scotland publishes papers of scientific interest in its annual "Transactions."

NORTHERN IRELAND.

Q. 7.—The spirit of active co-operation which characterized the efforts of the Ulster Farmers' Union in promoting the establishment of the Agricultural Research Institute prevails throughout the entire relations of the Farmers' Union with the Ministry. There are 123 branches of the Farmers' Union in Northern Ireland, all of which maintain close touch with the Ministry's educational activities.

County instructors and members of the Ministry's staff attend meetings of branches of the Union from time to time when invited to address the members on problems of local difficulty.

In some cases members of the Farmers' Union are also members of the County Committees and of the Ministry's Advisory Committees and the double representation is all to the good as far as the Ministry's educational propaganda is concerned.

Supplies of all leaflets issued by the Ministry are sent to the branches of the Farmers' Union for distribution to their members and the official journal of the Union gives extensive publicity to the Ministry's work.

The Ulster Agricultural Organization Society, which has 105 branches in Northern Ireland, also co-operates actively in the educational work of the Ministry.

The propaganda work of the Society, as far as it goes, follows very closely the lines adopted by the Ministry in its efforts to raise the standard of agriculture.

The Ministry's Educational Exhibit at the Shows of the Royal Ulster Agricultural Society and at the principal provincial agricultural shows in Northern Ireland constitutes one of the outstanding features on such occasions. The whole educational system of the Ministry is epitomized in the exhibit. Each of the research divisions organizes its own section, and illustrates by demonstrations, diagrams and suitably labelled specimens the nature of the work of the division, the progress achieved and its practical application.

The results of field experiments carried out by the County instructors are also summarized and suitably demonstrated in separate sections of the exhibit. Stands arranged in an attractive manner by the staffs of the Ulster Dairy School and the North-West School display specimens of the work done by the pupils at those institutions. Members of the staffs attend at the stands during the period of the show.

Throughout the whole of the exhibit there is nothing of a hypothetical character, every item included is selected with one object in view—to indicate how the results of agricultural research may be directed towards increasing the producer's returns and reducing his costs.

The success of this side of the Ministry's education effort is indicated by the fact that it has been found necessary to erect a special building to house the exhibit, the original space allotted by the Royal Ulster Agricultural Society being totally inadequate for the accommodation of the visitors seeking information at the various sections.

IRISH FREE STATE.

Q. 7.—Co-operative societies in the Irish Free State do not at present (January, 1928) to any appreciable extent, act as agencies for the dissemination of scientific knowledge, but the Irish Agricultural Organization Society, Limited, hope in the near future to institute a co-operative journal for that and kindred purposes for circulation amongst farmers through co-operative societies.

CANADA.

Q. 7.—Co-operative societies and other voluntary agencies act as educational influences in that they arrange for many meetings at which agricultural lectures are given.

WESTERN AUSTRALIA.

Q. 7.—No answer given.

SOUTH AUSTRALIA.

Q. 7.—Nil.

TASMANIA.

Q. 7.—Nil.

VICTORIA.

Q. 7.—Banks, fertilizer companies, machinery companies, actively propagate the teachings of the scientific staff of the Department. The Department gives special lectures to bank managers. Local butter factories in many cases are active agents for the dissemination of up-to-date information.

NEW SOUTH WALES.

Q. 7.—Various organizations of primary producers assist in extending agricultural education throughout the State. For instance, in the case of the Agricultural Bureau, the members of the various branches are encouraged to contribute papers to be read and discussed at their monthly meetings, and they also submit papers for discussion at their district conferences and annual conference.

QUEENSLAND.

Q. 7.—Local producers' associations and commodity boards in accordance with their activities, refer to this Department for information on agricultural matters of a technical nature, and co-operate to a certain extent with experimental plot work.

NEW ZEALAND.

Q. 7.—The limited extent to which such societies may be said to educate their members along lines of scientific agricultural progress is confined, principally to efforts made in this direction in connection with dairying and dairy products.

SOUTH AFRICA.

Q. 7.—Co-operative societies exercise an important influence on their members mostly, however, in improved grading, packing and marketing of farm produce. A great deal of work in improving agriculture generally is done in the Union by the Farmers' Organizations usually termed "Farmers' Association" or "Agricultural Society." Of these there are a very large number spread over the whole of the sub-continent. These local units are in turn linked up with provincial units which hold a regular annual meeting and pass resolutions for the consideration of the head organization called "The South African Agricultural Union."

INDIA.

Q. 7.—In considering this question it should be stated as a preliminary that co-operative societies and other non-official organizations engaged in ameliorating the lot of the cultivator in India have been

established mainly through the efforts of Government officials, and would most probably become inactive on the withdrawal of Government help ; in the provinces in which a serious effort has been made to de-officialize the movement, it has suffered severely. The rural problem to which co-operation has been mainly applied has been that of indebtedness. With the numerical increase of credit societies a knowledge of the principles underlying co-operative work has gradually spread among the people, and in areas where these have been best understood, societies are to some extent supplementing the work of agricultural departments in distributing improved seed, fertilizers and implements. The number of societies specially devoted to productive and distributive business is about 1,800. The Cotton Sale Societies in Bombay, the Irrigation and Milk Societies in Bengal, the Co-operative Seed Societies and Dairy Society in the Central Provinces and the Societies for the consolidation of Holdings, Clearance of Silt in Canals, and Sale of Farm Produce in the Punjab have done good work.

The other voluntary organizations are the agricultural associations referred to under Question 8.

CEYLON.

Q. 7.—Co-operative societies to the number of 342 exist at the present time. These are almost entirely amongst the smaller primary producers. They have been of inestimable value in the dissemination of improved methods of cultivation, etc., and in the spread of agricultural knowledge. The lands of prominent members of these societies have been utilized for demonstrations either of improved cultural operations, of manuring, or of the use of improved types of seed. Subsequently this work has been followed by competitions amongst the members, and later by provision for manures or seed through the organisation of the society. This has been possible by reason of the work in connection with co-operative societies and agricultural work being of the same organization, but whether this arrangement is to continue is under consideration.

MAURITIUS.

Q. 7.—The Co-operative Credit Societies are used to a considerable extent in disseminating information.

SEYCHELLES.

Q. 7.—The Planters' Association is the proper medium for the dissemination of scientific knowledge.

MALAYA.

Q. 7.—No answer given.

FIJI.

Q. 7.—Two Agricultural Associations are responsible for doing a limited amount of educational work among their members.

SOUTHERN RHODESIA.

Q. 7.—See reference to the Maize Association in reply to Question 1. The Tobacco Warehouse and Export Company, Salisbury—a co-operative association—gives its members and the public instruction in the grading, handling and packing of leaf tobacco. The Rhodesian Agricultural Union, a body representative of all the farming interests in Southern Rhodesia also exercises a valuable educational function and disseminates knowledge by means of annual, or more frequent congresses at which representatives of all farmers' associations in the Colony attend. The Co-operative Fruit Growers' Association disseminates advice to its members on matters affecting their interests as does also the Cattle Owners' Association to its members on matters of primary importance to cattle breeders.

KENYA.

Q. 7.—None.

NYASALAND.

Q. 7.—There is one co-operative society in the country and this has only recently been established. The society promises to have an important educational influence by the guidance it gives to members who place orders for fertilizers, seeds, and agricultural implements.

UGANDA.

Q. 7.—Nil.

TANGANYIKA.

Q. 7.—No co-operative societies exist. Missions act as educational influences in the dissemination of elementary agricultural knowledge.

NIGERIA.

Q. 7.—There are no strictly co-operative societies in this country.

GOLD COAST.

Q. 7.—There have been a few co-operative societies established among farmers, generally under the supervision of agricultural officers. These have usually been established for the purpose of marketing produce, but advantage has been taken by agricultural officers of the meetings of members to give agricultural information of general interest. A system for the encouragement of co-operative societies generally throughout the country is now under consideration. This would be under the supervision of the Department of Agriculture and the importance of such societies as educational influences is recognized and would be taken advantage of.

SIERRA LEONE.

Q. 7.—Nil.

MALTA.

Q. 7.—We have no co-operative societies.

CYPRUS.

Q. 7.—There are several credit societies and other co-operative societies, but they have no educational influence so far as agriculture is concerned.

PALESTINE.

Q. 7.—The Palestine Zionist Executive Experimental Station co-operates with the Department in the dissemination of scientific knowledge.

BRITISH GUIANA.

Q. 7.—A number of co-operative credit societies exist, but exert little influence in this respect.

TRINIDAD.

Q. 7.—There are 25 co-operative agricultural credit societies, and use is made of these to disseminate knowledge. The best of these are exerting a good educational influence by practical example.

GRENADA.

Q. 7.—There is an agricultural society in Grenada which is a live body taking a keen interest in all that pertains to agriculture in that island.

ST. VINCENT.

Q. 7.—There are no such societies.

BARBADOS.

Q. 7.—There is an agricultural society with regular monthly meetings at which occasional papers are read on subjects of agricultural importance, and at which discussions arise concerning agricultural and economic crop interests.

ST. LUCIA.

Q. 7.—Co-operative societies act as educational influences by convening meetings, and thus making it easy for the agricultural officers to meet and address the members, and to deal with problems which members wish discussed and explained.

JAMAICA.

Q. 7.—Co-operative societies are in their infancy. Co-operative loan banks have expanded and are, on the whole, successful.

Land settlement schemes in connection with these banks are also in operation and appear to be successful.

LEEWARD ISLANDS.

Q. 7.—Co-operative associations exist in Antigua. They were extended to the other presidencies but are at present (1927) not functioning. In Dominica a peasant bureau is in active existence and an assured market guaranteed for peasant produce. In Antigua the Cotton Growers' Association and the Onion Growers' Association undertake the marketing of these crops. These associations are all worked on a co-operative basis and after payment of a flat rate all profits are divided among actual suppliers—a small reserve fund being deducted. The committees responsible for this work receive no salary or dividend—the work entailed being entirely voluntary. In this respect Antigua may claim to hold the record in co-operative associations in the West Indies. In this connection sub-committees have been formed to further the interests of minor industries.

DOMINICA.

Q. 7.—The Dominica Agricultural and Commercial Society is always willing to arrange for meetings of its members, to hear addresses on agricultural subjects. General meetings are often called to discuss local agricultural matters.

ST. KITTS-NEVIS.

Q. 7.—There are agricultural societies in St. Kitts, Nevis and Anguilla. Matters of agricultural interest are discussed at the meetings of these societies.

BERMUDA.

Q. 7.—One agricultural co-operative society exists in the Colony. The Secretary is a member of the Board of Agriculture. The society seeks the advice of the Department with respect to the purchase of insecticides, seed potatoes and on other matters.

QUESTION 8 : BUREAU SYSTEM.

ENGLAND AND WALES.

Q. 8.—The discussion among farmers of agricultural problems is a regular feature of rural life. In some counties the formation of farmers' discussion societies has been prosecuted as a part of the scheme of agricultural education.

SCOTLAND.

Q. 8.—Agricultural discussion clubs exist in different parts of the country—the best known being the West of Scotland Agricultural Discussion Society which has been in existence for over thirty years. Agricultural subjects are regularly discussed by the Highland and Agricultural Society, the Chamber of Agriculture and the National Farmers' Union. Lectures and discussions on agricultural science are also organized by the associations of former students which exist in connection with the three agricultural colleges and by young farmers' clubs.

NORTHERN IRELAND.

Q. 8.—The milk recording associations—of which there are now 71 in Northern Ireland—and the Ulster Farmers' Union serve in effect as a bureau system. The meetings of the milk recording associations are attended by the Ministry's live stock inspectors and agricultural matters are discussed from many points of view.

In cases where unusual difficulties are met with, such as sterility, abortion and other problems arising in connection with the management of stock, special arrangements are made for the attendance of other members of the Ministry's staff and of the staff of the research division concerned, to give, by means of lectures and demonstrations, advice to the members of the associations.

The Ministry's inspectors are frequently invited to lecture to meetings of the Farmers' Union and on such occasions the discussions are of very considerable benefit in the solution of local agricultural difficulties.

IRISH FREE STATE.

Q. 8.—While there is no definite scheme of agricultural bureaux in the Irish Free State, opportunities for discussion of agricultural problems amongst farmers are to some extent provided at the winter agricultural classes referred to under (4); at the numerous lectures delivered by the various instructors employed by County Committees of Agriculture; at meetings of the 230 cow testing associations at present established under the Department's scheme No. 20, at many of which meetings lectures are delivered by instructors in cow testing employed by the Department; and at meetings of breeding societies, co-operative agricultural and dairy societies, and branches of the Irish Farmers' Union throughout the Irish Free State.

CANADA.

Q. 8.—There are in each Province of Canada agricultural organizations and associations where agricultural problems are regularly discussed. The farmers' clubs exist in some of the Provinces and in many districts junior farmers' clubs are very active. The many agricultural problems are brought up at the annual meetings of the various breeders' associations. In addition there are the seed growers' meetings, agricultural societies' meetings, horticulture association conventions, etc., where many agricultural problems receive consideration.

WESTERN AUSTRALIA.

Q. 8.—Meetings to discuss problems are arranged by producers to deal with specific problems. Department sends technical officers. No farmers' club or bureaux.

SOUTH AUSTRALIA.

Q. 8.—The Agricultural Bureau System has been in existence in this State since 1888. It consists to-day (July, 1929) of a Central Board, and 271 branches comprising 7,600 individual members. All these branches meet regularly once a month for discussion of agricultural problems and matters of local interest. In addition to this there are 12 district conferences held each year, at which various groups of bureau branches are represented. Technical officers of the

Department of Agriculture always attend these conferences and give advice where possible. Finally, an annual congress of all the branches is held regularly in Adelaide at the time of the Spring Show of the Royal Agricultural and Horticultural Society.

TASMANIA.

Q. 8.—A bureau organization exists with some thirty-five branches of the average membership of twenty-five. Monthly meetings are held at which there is discussion.

VICTORIA.

Q. 8.—The agricultural societies largely take the place of the bureau system in this State. The Chamber of Agriculture is the body with which all agricultural societies are affiliated. The Chamber is a permanent organization which stands for advanced agriculture. Each year it holds a convention attended by delegates. The convention deliberates on resolutions brought forward by local agricultural societies. The decisions are conveyed to the Department of Agriculture and the Government.

Better Farming Association.

Following in the wake of the better farming train a number of better farming associations have been organized. The object of these organizations is to arrange for the regular local discussion of farmers' problems.

NEW SOUTH WALES.

Q. 8.—See reply to Question 7.

QUEENSLAND.

Q. 8.—The agricultural bureau system, as it operates in South Australia, is not in vogue in Queensland. There exists, however, a farmers' organisation known as the Council of Agriculture, which has its branches (over 700) throughout the length and breadth of the farming districts. These are known as local producers' associations.

This organization also issues its own weekly newspaper, "The Queensland Producer." There are also eleven marketing organizations constituted under the Wheat Pool Act, the Fruit Marketing Organization Act, or the Primary Producers' Marketing and Organization Act. These organizations are the Wheat Pool, the Committee of Direction of Fruit Marketing, the Butter Pool, the Cheese Pool, the Atherton Maize Pool, the Atherton Pig Pool, the Bona Fide Pool, the Broom Millet Pool, the Arrowroot Pool, the Cotton Pool, and the Egg Pool.

NEW ZEALAND.

Q. 8.—While the bureau system does not, in the strict sense of the term, operate in New Zealand, the primary producers of this Dominion are very highly organised for the purpose of protecting their interests and furthering the knowledge of members. The largest and most influential of such organized bodies is the New Zealand Farmers' Union, with branches in all rural districts. The members of the various branches meet frequently, and at such meetings matters of interest, both local and general, relative to primary production are freely discussed. Sometimes these meetings are followed by lectures delivered by instructional officers of the Department of Agriculture. Similar bodies have been organized for those engaged in specific phases of agriculture, as for example, sheepowners, dairy-farmers, beekeepers, horticulturists, poultry-keepers, and the like.

SOUTH AFRICA.

Q. 8.—This has been answered in the answer to Question 7, and it only remains to add that the Minister of Agriculture consults with a body called the "Agriculture Advisory Board" selected from the Executive of the South African Agricultural Union.

INDIA.

Q. 8.—Agricultural associations have been organized, the members of which occasionally assemble to discuss their problems with officers of the Agricultural Department. Their number is naturally limited in a country where agriculture is carried on mainly by cultivators who are extremely backward in education. Good progress has, however, been made in the Central Provinces and Bombay Presidency

in forming Taluq agricultural associations—Taluq being the name applied to a division of a district. The active members of these associations are the leading land-holders of the Taluq. They cooperate with the departments of agriculture concerned in different activities such as the propagation and distribution of improved seed, the sale of implements, manures, fungicides, the organization of agricultural shows, etc.

For each meeting an agenda is drawn up with the assistance of the agricultural officer or assistant who is to attend it. Each subject is discussed in the vernacular as a rule; the proceedings are recorded and action taken when necessary on recommendations involving action.

CEYLON.

Q. 8.—There are 24 district planters' associations affiliated into one central association known as the Planters' Association of Ceylon and there is a Low-Country Products Association dealing with low-country products. These associations submit subjects for consideration at the Annual Agricultural Conference. This conference is open to all members of these associations and deals mainly with the scientific aspect of agriculture. At the regular monthly, bi-monthly or quarterly meetings of these associations agricultural matters are from time to time discussed and scientific workers are invited to give lectures at such meetings or to assist in the discussions. The Board of Agriculture and its Committees hold regular meetings. To the Board of Agriculture, the Planters' Associations, and the Low-Country Products Association make prescribed numbers of nominations.

MAURITIUS.

Q. 8.—There are no farmers' clubs but the Société des Chimistes and, to a less extent, the Chamber of Agriculture have been regularly used as channels for the dissemination of information. In relation to stock questions, the Stock Breeders' Association and the Société du Petit Élevage serve the same purpose. In 1927 a conference of estate owners and planters was convened for the purpose of discussing various points in relation to the sugar industry, and a similar conference is being organized for next year. A special consultative committee also meets regularly for dealing with questions in relation to Phytalus destruction.

SEYCHELLES.

Q. 8.—See answer to Question 7.

MALAYA.

Q. 8.—There are several bodies working towards the improvement of the rubber industry and encouraging planters to keep abreast of scientific progress in that particular industry. Foremost amongst these is the Planters' Association of Malaya, which body has branches throughout the Peninsula, and the Incorporated Society of Planters, which body has an annual conference at which papers are read by scientific officers, and issues publications which contain articles of interest to the industry. Both the District Planters' Associations and the branches of the Incorporated Society of Planters hold periodical meetings at which lectures are occasionally given by scientific officers.

FIJI.

Q. 8.—Owing to the isolation of individual planters it is impractical for them to club together in order to have frequent meetings for the discussion of agricultural matters. An agricultural convention has been held annually during the last three years, and has been of some assistance to the administration in framing legislation on country matters.

SOUTHERN RHODESIA.

Q. 8.—There are sixty District Farmers' Associations, embracing all districts of the Colony: other bodies are mentioned in the answer to Question 7.

KENYA.

Q. 8.—Farmers' associations in every district. They are mainly interested in roads, railways and cattle; and agriculture is not prominent in their discussions; say, one-twentieth part.

NYASALAND.

Q. 8.—Most of the districts have planters' associations, and agricultural problems are from time to time discussed at the meetings of these associations, but in the main the subjects on the agenda relate to such matters as legislation, roads, postal facilities, etc.

UGANDA.

Q. 8.—The Planters' Association has an annual meeting for the discussion of planting problems.

TANGANYIKA.

Q. 8.—No system of bureaux exists; but seven non-native planters' associations and one native planters' association are in existence, formed for the purpose of discussion and settlement of economic problems. Upon invitation, officers of the Department of Agriculture attend the meetings of these associations to discuss agricultural problems.

NIGERIA.

Q. 8.—There is only a small part of the country where anything of the sort is possible yet, and even there the associations are as yet young and experimental. It is still questionable whether such farmers' clubs or the like are a method that will be suited to local conditions within such future period as one plans for.

GOLD COAST.

Q. 8.—Full discussions are always invited after meetings between agricultural officers and the people, such as on occasion of the visits to the experimental stations referred to in the answer to Question 2, meetings with farmers as in answer to Question 4 and with co-operative societies as in answer to Question 7.

SIERRA LEONE.

Q. 8.—Nil. The various agricultural officers—see answer to Question 6—give the necessary information.

MALTA.

Q. 8.—The answer is in the negative.

CYPRUS.

Q. 8.—Nil.

PALESTINE.

Q. 8.—Nil.

BRITISH GUIANA.

Q. 8.—There is an organization known as the Farmers' Conference, which exercises to some extent the function of an agricultural society, and which keeps in touch with agricultural matters in the various districts, but unfortunately its influence is more often political than agricultural.

TRINIDAD.

Q. 8.—The agricultural societies already mentioned, a Planters' Association in Tobago and other bodies of somewhat spasmodic activity, e.g. poultry club, goat club, etc., serve for the discussion of agricultural problems.

GRENADA.

Q. 8.—There is an agricultural society in Grenada which is a live body taking a keen interest in all that pertains to agriculture in that island.

ST. VINCENT.

Q. 8.—There are no farmers' clubs or agricultural bureaux. There is a Chamber of Agriculture and Commerce in existence.

BARBADOS.

Q. 8.—There is nothing additional to that already mentioned in the answer to Question 7.

ST. LUCIA.

Q. 8.—There are no farmers' clubs or agricultural bureaux, but small planters' associations are established in the towns and principal villages of the island. These associations consist of farmers and small planters who hold regular meetings to discuss agricultural problems.

There is also an agricultural and commercial society to which the majority of the big planters belong, and this society also holds meetings to discuss agricultural and other problems.

JAMAICA.

Q. 8.—The Jamaica Imperial Association and various associations of planters and penkeepers are active in discussing agricultural problems. The departmental officers attend on occasions to afford technical information when invited to do so.

LEEWARD ISLANDS.

Q. 8.—There are agricultural and commercial societies in each presidency which hold monthly meetings at which matters both agricultural and commercial are discussed. The agricultural officers of every presidency as well as Federal officers are *ex officio* members of the societies. It is customary for agricultural officers to review from time to time agricultural matters of interest locally or under experimental trial and to advise the society on any subject requiring investigation or worthy of cultivation.

On the occasion of visits of the Commissioner of Agriculture for the West Indies and also of officers of the Imperial College of Tropical Agriculture special meetings are summoned. These visits are especially appreciated and the meetings are usually well attended. Planters recognize and acknowledge the utility of these visits and in conjunction with the frequent addresses delivered by officers of the Department help to maintain a healthy liaison with the Imperial College of Tropical Agriculture and the Imperial Department of Agriculture.

DOMINICA.

Q. 8.—The Dominica Agricultural and Commercial Society is always willing to arrange for meetings of its members, to hear addresses on agricultural subjects. General meetings are often called to discuss local agricultural matters.

ST. KITTS-NEVIS.

Q. 8.—There are agricultural societies in St. Kitts, Nevis and Aguilla. Matters of agricultural interest are discussed at the meetings of these societies.

BERMUDA.

Q. 8.—The above-mentioned co-operative society is infrequently addressed by members of the Department and others. In addition there exist three active horticultural societies which meet monthly for discussions. A poultry association meets at irregular intervals, and discusses poultry problems.



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