

ROYAL COMMISSION
ON
AGRICULTURE IN INDIA

VOLUME XII

EVIDENCE

TAKEN IN
BURMA



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CENTRAL PUBLICATION BRANCH
1928

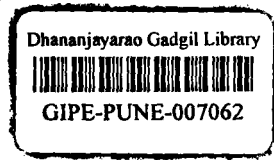
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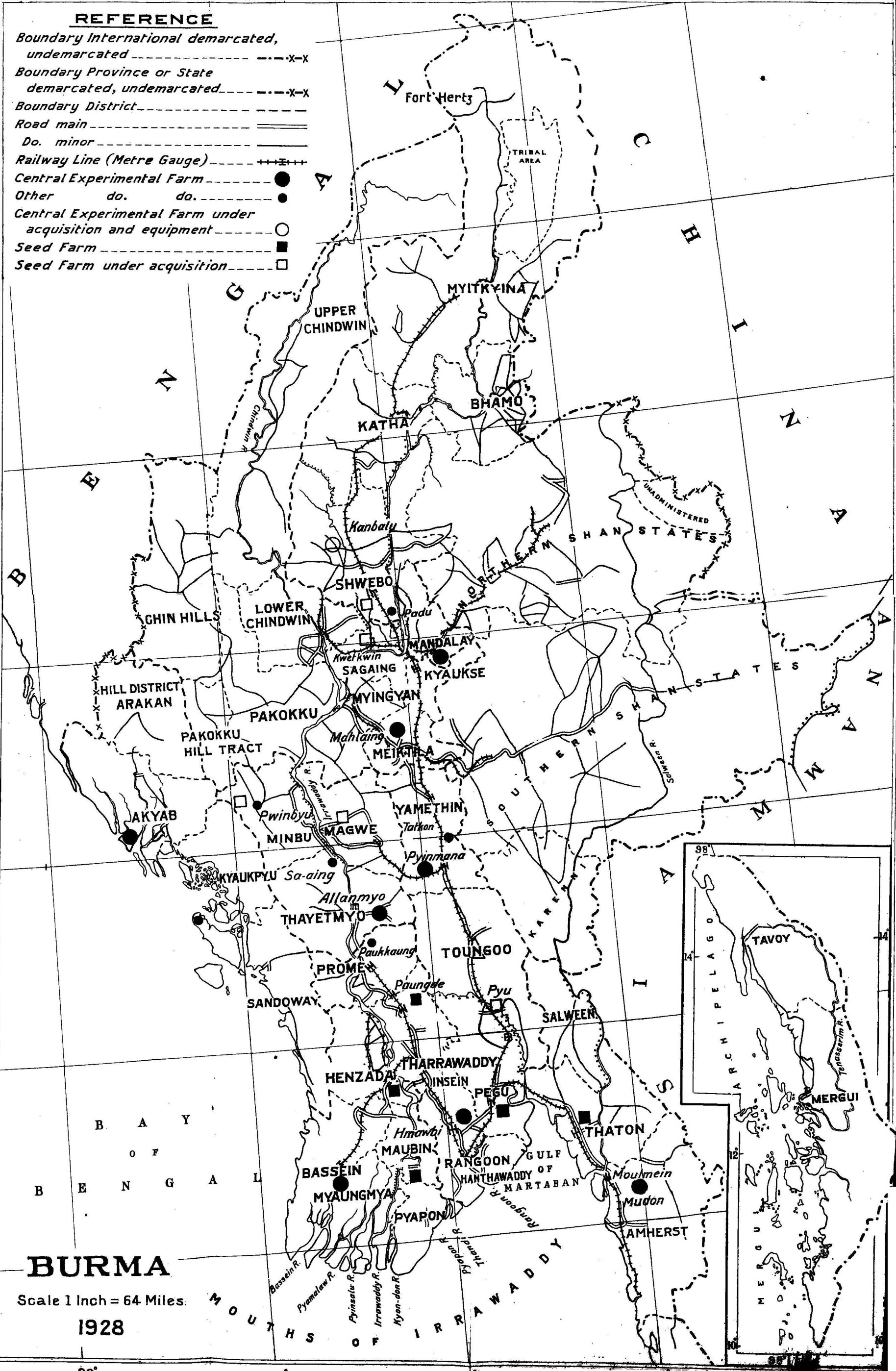
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- Other do. do. ●
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- Seed Farm ■
- Seed Farm under acquisition □

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INTERIM REPORT

To

THE KING'S MOST EXCELLENT MAJESTY.

May It Please Your Majesty,

We, the Commissioners appointed to examine and report on the present conditions of agricultural and rural economy in British India, and to make recommendations for the improvement of agriculture and to promote the welfare and prosperity of the rural population; in particular, to investigate:—(a) the measures now being taken for the promotion of agricultural and veterinary research, experiment, demonstration and education, for the compilation of agricultural statistics, for the introduction of new and better crops and for improvement in agricultural practice, dairy farming and the breeding of stock; (b) the existing methods of transport and marketing of agricultural produce and stock; (c) the methods by which agricultural operations are financed and credit afforded to agriculturists; (d) the main factors affecting rural prosperity and the welfare of the agricultural population; and to make recommendations; availing ourselves of Your Majesty's permission to report our proceedings from time to time, desire to submit to Your Majesty the minutes of the evidence which we have taken in respect of Burma on the subject of our Inquiry.

All of which we most humbly submit for Your Majesty's most gracious consideration.

(Signed) LINLITHGOW,
Chairman.

(„) H. S. LAWRENCE.

(„) T. H. MIDDLETON.

(„) J. MacKENNA.

(„) H. CALVERT.

(„) GAJAPATI NARAYANA DEO.

(„) N. GANGULEE.

(„) L. K. HYDER.

(„) B. S. KAMAT.

(Signed) J. A. MADAN,

(„) F. W. H. SMITH.

Joint Secretaries.

26th January 1928.

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TERMS OF REFERENCE

Generally,

To examine and report on the present conditions of agriculture and rural economy in British India and to make recommendations for the improvement of agriculture and the promotion of the welfare and prosperity of the rural population ;

In particular to investigate—

- (a) the measures now being taken for the promotion of agricultural and veterinary research, experiment, demonstration and education, for the compilation of agricultural statistics, for the introduction of new and better crops and for improvement in agricultural practice, dairy farming and the breeding of stock ;
- (b) the existing methods of transport and marketing of agricultural produce and stock ;
- (c) the methods by which agricultural operations are financed and credit afforded to agriculturists ;
- (d) the main factors affecting rural prosperity and the welfare of the agricultural population ;

and to make recommendations.

It will not be within the scope of the Commission's duties to make recommendations regarding the existing system of landownership and tenancy or of the assessment of land revenue and irrigation charges, or the existing division of functions between the Government of India and the local Governments. But the Commission shall be at liberty to suggest means whereby the activities of the Governments in India may best be co-ordinated and to indicate directions in which the Government of India may usefully supplement the activities of local Governments.

QUESTIONNAIRE

PART I

Question.

1. Research.
2. Agricultural Education.
3. Demonstration and Propaganda.
4. Administration.
5. Finance.
6. Agricultural Indebtedness.
7. Fragmentation of Holdings.

PART II

8. Irrigation.
9. Soils.
10. Fertilisers.
11. Crops.
12. Cultivation.
13. Crop Protection.
14. Implements.

PART III

15. Veterinary.
16. Animal Husbandry.

PART IV

17. Agricultural Industries.
18. Agricultural Labour.
19. Forests.
20. Marketing.
21. Tariffs and Sea Freights.
22. Co-operation.
23. General Education.
24. Attracting Capital.
25. Welfare of Rural Population.
26. Statistics.

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QUESTIONNAIRE

PART I

1. Research.

(a) Have you suggestions to advance for the better organisation, administration and financing of—

(i) All research affecting the welfare of the agriculturist, including research into the scientific value of the indigenous theory and traditional methods of agriculture,

(ii) Veterinary research ?

(b) If in cases known to you progress is not being made because of the want of skilled workers, or field or laboratory facilities for study or by reason of any other handicaps, please give particulars. [Suggestions of a general kind should be made under (a) ; answers under this heading should relate to specific subjects. The purpose is to secure a list of the problems met with by scientific investigators in the course of their work which are being held over because of lack of resources or deficient organisation.]

(c) Can you suggest any particular subject for research not at present being investigated to which attention might usefully be turned ?

2. Agricultural Education.

With reference to any form of agricultural education of which you may have experience, please state your views on the following :—

(i) Is the supply of teachers and institutions sufficient ?

(ii) Is there an urgent need for extension of teaching facilities in any district or districts known to you personally ?

(iii) Should teachers in rural areas be drawn from the agricultural classes ?

(iv) Are the attendances at existing institutions as numerous as you would expect in present circumstances ; if not, state reasons. Can you suggest measures likely to stimulate the demand for instruction ?

(v) What are the main incentives which induce lads to study agriculture ?

(vi) Are pupils mainly drawn from the agricultural classes ?

(vii) Are there any modifications in existing courses of study which appear to be called for ; if so, what are they ?

(viii) What are your views upon (a) nature study ; (b) school plots ; (c) school farms ?

(ix) What are the careers of the majority of students who have studied agriculture ?

(x) How can agriculture be made attractive to middle class youths ?

(xi) Are there recent movements for improving the technical knowledge of students who have studied agriculture ?

- (xii) How can adult education in rural tracts be popularised ?
 (xiii) In suggesting any scheme for better educational facilities in rural areas, please give your views for (a) its administration and (b) its finance.

3. Demonstration and Propaganda.

- (a) What are the measures which in your view have been successful in influencing and improving the practice of cultivators ?
 (b) Can you make suggestions for increasing the effectiveness of field demonstrations ?
 (c) Can you suggest methods whereby cultivators may be induced to adopt expert advice ?
 (d) If you are aware of any striking instances of the success or the failure of demonstration and propaganda work, please give particulars and indicate the reasons for success or for failure.

4. Administration.

- (a) Do you wish to suggest means towards the better co-ordination of the activities of the Governments in India or to indicate directions in which the Government of India may usefully supplement the activities of the local Governments ?
 (b) Is it your opinion that the expert scientific knowledge required in the development of agriculture in the different Provinces could be supplied to a greater extent than is the case at present by increasing the scientific staff of the Government of India ? If so, indicate the types of work which would benefit by pooling the services of experts, and suggest how that work should be controlled.

(c) Are you satisfied from the agricultural standpoint with the services afforded by—

- (i) The Agricultural and Veterinary Services,
- (ii) Railways and steamers,
- (iii) Roads,
- (iv) Meteorological Department,
- (v) Posts, and
- (vi) Telegraphs, including wireless ?

If not, please indicate directions in which you think these Services might be improved or extended.

5. Finance.

(a) What are your views as to the steps that should be taken for the better financing of agricultural operations and for the provision of short and long-term credit to cultivators ?

(b) Do you wish to suggest means whereby cultivators may be induced to make fuller use of the Government system of *taccavi* ?

6. Agricultural Indebtedness.

- (a) What in your opinion are :—
 (i) the main causes of borrowing,
 (ii) the sources of credit, and
 (iii) the reasons preventing repayment.

(b) What measures in your opinion are necessary for lightening agriculture's burden of debt? For example, should special measures be taken to deal with rural insolvency, to enforce the application of the Usurious Loans Act, or to facilitate the redemption of mortgages?

(c) Should measures be taken to restrict or control the credit of cultivators such as limiting the right of mortgage and sale? Should non-terminable mortgages be prohibited?

7. Fragmentation of Holdings.

(a) Do you wish to suggest means for reducing the loss in agricultural efficiency attendant upon the excessive subdivision of holdings?

(b) What are the obstacles in the way of consolidation and how can they be overcome?

(c) Do you consider legislation to be necessary to deal with minors, widows with life interest, persons legally incapable, alienation and dissentients, and to keep disputes out of the courts?

PART II

8. Irrigation.

(a) Name any district or districts in which you advocate the adoption of new irrigation schemes, or suggest extensions or improvements in the existing systems or methods of irrigation by—

- (i) Perennial and non-perennial canals,
- (ii) Tanks and ponds,
- (iii) Wells.

What are the obstacles in your district or Province to the extension of irrigation by each of the above methods?

(b) Are you satisfied with the existing methods of distributing canal water to cultivators? Describe the methods that have been employed to prevent wastage of water by evaporation and by absorption in the soil. What form of outlet for distribution to cultivators at the tail end do you regard as the most equitable and economical? Have these methods and devices been successful, or do you wish to suggest improvements?

(N.B.—Irrigation charges are *not* within the terms of reference of the Commission, and should not be commented upon.)

9. Soils.

(a) Have you suggestions to make—

- (i) for the improvement of soils, whether by drainage or other means, not dealt with under other headings in this questionnaire.
- (ii) for the reclamation of Alkali (Usar) or other uncultivable land,
- (iii) for the prevention of the erosion of the surface soil by flood water?

(b) Can you give instances of soils known to you which, within your recollection, have—

- (i) undergone marked improvement,
- (ii) suffered marked deterioration?

If so, please give full particulars.

(c) What measures should Government take to encourage the reclamation of areas of cultivable land which have gone out of cultivation ?

10. Fertilisers.

(a) In your opinion, could greater use be profitably made of natural manures or artificial fertilisers ? If so, please indicate the directions in which you think improvement possible.

(b) Can you suggest measures to prevent the fraudulent adulteration of fertilisers ?

(c) What methods would you employ to popularise new and improved fertilisers ?

(d) Mention any localities known to you in which a considerable increase in the use of manures has recently taken place.

(e) Has effect of manuring with phosphates, nitrates, sulphate of ammonia, and potash manures been sufficiently investigated ? If so, what is the result of such investigation ?

(f) What methods would you employ to discourage the practice of using cowdung as fuel ?

11. Crops.

(a) Please give your views on—

(i) the improvement of existing crops,

(ii) the introduction of new crops including fodder crops,

(iii) the distribution of seeds,

(iv) the prevention of damage by wild animals.

(b) Can you suggest any heavy yielding food crops in replacement of the present crops ?

(c) Any successful efforts in improving crops or substituting more profitable crops which have come under your own observation should be mentioned.

12. Cultivation.

Can you suggest improvements in—

(i) the existing system of tillage, or

(ii) the customary rotations or mixtures of the more important crops ?

13. Crop Protection, Internal and External.

Please give your views on—

(i) The efficacy and sufficiency of existing measures for protection of crops from external infection, pests and diseases.

(ii) The desirability of adopting internal measures against infection.

14. Implements.

(a) Have you any suggestion for the improvement of existing, or the introduction of new, agricultural implements and machinery ?

(b) What steps do you think may usefully be taken to hasten the adoption by the cultivator of improved implements ?

(c) Are there any difficulties which manufacturers have to contend with in the production of agricultural implements or their distribution for sale throughout the country? If so, can you suggest means by which these difficulties may be removed?

PART III

15. Veterinary.

(a) Should the Civil Veterinary Department be under the Director of Agriculture or should it be independent?

(b) (i) Are dispensaries under the control of Local (District) Boards? Does this system work well?

(ii) Is the need for expansion being adequately met?

(iii) Would you advocate the transfer of control to Provincial authority?

(c) (i) Do agriculturists make full use of the veterinary dispensaries? If not, can you suggest improvements to remedy this?

(ii) Is full use made of touring dispensaries?

(d) What are the obstacles met with in dealing with contagious diseases? Do you advocate legislation dealing with notification, segregation, disposal of diseased carcasses, compulsory inoculation of contacts and prohibition of the movement of animals exposed to infection? Failing legislation, can you suggest other means of improving existing conditions?

(e) Is there any difficulty in securing sufficient serum to meet the demand?

(f) What are the obstacles in the way of popularising preventive inoculation? Is any fee charged, and, if so, does this act as a deterrent?

(g) Do you consider that the provision of further facilities for research into animal disease is desirable?

If so, do you advocate that such further facilities should take the form of—

(i) an extension of the Muktesar Institute, or

(ii) the setting up, or extension of, Provincial Veterinary Research Institutions?

(h) Do you recommend that special investigations should be conducted by—

(i) officers of the Muktesar Institute, or

(ii) research officers in the Provinces?

(i) Do you recommend the appointment of a Superior Veterinary Officer with the Government of India? What advantages do you expect would result from such an appointment?

16. Animal Husbandry.

(a) Do you wish to make suggestions for—

(i) improving the breeds of livestock,

(ii) the betterment of the dairying industry,

(iii) improving existing practice in animal husbandry

(b) Comment on the following as causes of injury to cattle in your district—

- (i) Overstocking of common pastures,
 - (ii) Absence of enclosed pastures, such as grass borders in tilled fields,
 - (iii) Insufficiency of dry fodder such as the straw of cereals or the stems and leaves of pulses,
 - (iv) Absence of green fodders in dry seasons,
 - (v) Absence of mineral constituents in fodder and feeding stuffs.
- (c) Please mention the months of the year in which fodder shortage is most marked in your district. For how many weeks does scarcity of fodder usually exist? After this period of scarcity ends how many weeks elapse before young growing cattle begin to thrive?
- (d) Can you suggest any practicable methods of improving or supplementing the fodder supply that would be applicable to your district?
- (e) How can landowners be induced to take a keener practical interest in these matters?

PART IV

17. Agricultural Industries.

(a) Can you give any estimate of the number of days of work done by an average cultivator on his holding during the year? What does he do in the slack season?

(b) Can you suggest means for encouraging the adoption of subsidiary industries? Can you suggest any new subsidiary industries to occupy the spare time of the family which could be established with Government aid?

(c) What are the obstacles in the way of expansion of such industries as beekeeping, poultry rearing, fruit growing, sericulture, pisciculture, lac culture, rope making, basket making, etc.?

(d) Do you think that Government should do more to establish industries connected with the preparation of agricultural produce for consumption, such as oil pressing, sugar making, cotton ginning, rice hulling, utilisation of wheat straw for card-board, utilisation of cotton seed for felt, fodder, oil and fuel, utilisation of rice straw for paper, etc.?

(e) Could subsidiary employment be found by encouraging industrial concerns to move to rural areas? Can you suggest methods?

(f) Do you recommend a more intensive study of each rural industry in its technical, commercial and financial aspects, with a view to, among other things, introduction of improved tools and appliances?

(g) Can you suggest any other measures which might lead to greater rural employment?

(h) Can you suggest means whereby the people could be induced to devote their spare time to improving the health conditions of their own environment?

18. Agricultural Labour.

(a) What measures, if any, should be taken to attract agricultural labour from areas in which there is a surplus to—

(i) areas under cultivation in which there is a shortage of such labour ?
and

(ii) areas in which large tracts of cultivable land remain uncultivated ?

Please distinguish between suggestions designed to relieve seasonal unemployment and proposals for the permanent migration of agricultural population.

(b) If there is any shortage of agricultural labour in your Province, what are the causes thereof and how could they be removed ?

(c) Can you suggest measures designed to facilitate the occupation and development, by surplus agricultural labour, of areas not at present under cultivation ?

19. Forests.

(a) Do you consider that forest lands as such are at present being put to their fullest use for agricultural purposes ? For instance, are grazing facilities granted to the extent compatible with the proper preservation of forest areas ? If not, state the changes or developments in current practice which you consider advisable.

(b) Can you suggest means whereby the supply of firewood and fodder in rural areas may be increased ?

(c) Has deterioration of forests led to soil erosion ? What remedies would you suggest for erosion and damage from floods ?

(d) Can you indicate any methods by which supply of moisture in the soil, the rainfall and supply of canal water can be increased and regulated by afforestation or by the increased protection of forests so as to benefit agriculture ? Would the same methods be useful in preventing the destruction by erosion of agricultural land ?

(e) Is there an opening for schemes of afforestation in the neighbourhood of villages ?

(f) Are forests suffering deterioration from excessive grazing ? Is soil erosion being thereby facilitated ? Suggest remedies.

20. Marketing.

(a) Do you consider existing market facilities to be satisfactory ? Please specify and criticise the markets to which you refer, and make suggestions for their improvement.

(b) Are you satisfied with the existing system of marketing and distribution ? If not, please indicate the produce to which you refer and describe and criticise in detail the channels of marketing and distribution from the producer to the consumer in India (or exporter in the case of produce exported overseas). State the services rendered by each intermediary and whether such intermediary acts in the capacity of merchant or commission agent, and comment upon the efficiency of these services and the margins upon which such intermediaries operate. Please describe

the method by which each transaction is financed, or in the case of barter, by which an exchange is effected.

(c) Do you wish to suggest steps whereby the quality, purity, grading or packing of agricultural produce may be improved, distinguishing where possible between produce destined for—

- (i) Indian markets ?
- (ii) Export markets ?

(d) Do you think that more effective steps might be taken to place at the disposal of cultivators, merchants and traders information as to market conditions, whether Indian or overseas ; crop returns ; complaints as to Indian produce from wheresoever originating ; and agricultural and marketing news in general ?

21. Tariffs and Sea Freights.

Do existing (a) customs duties, both import and export, and (b) sea freights adversely affect the prosperity of the Indian cultivator ? If so, have you any recommendations to make ?

22. Co-operation.

(a) What steps do you think should be taken to encourage the growth of the co-operative movement—

- (i) by Government,
- (ii) by non-official agencies ?

(b) Have you any observations to make upon—

- (i) Credit societies ;
- (ii) Purchase societies ;
- (iii) Societies formed for the sale of produce or stock ;
- (iv) Societies for effecting improvements—*e.g.*, the digging of wells and the construction of bunds, walls and fences, or the planting of hedges ;
- (v) Societies formed for the aggregation of fragmented holdings and their redistribution in plots of reasonable size ;
- (vi) Societies for the co-operative use of agricultural machinery ;
- (vii) Societies for joint farming ;
- (viii) Cattle breeding societies ;
- (ix) Societies formed for any purpose connected with agriculture or with the betterment of village life, but not specified above ?

(c) Where co-operative schemes for joint improvement, such as co-operative irrigation or co-operative fencing or a co-operative consolidation of holdings scheme, cannot be given effect to owing to the unwillingness of a small minority to join, do you think legislation should be introduced in order to compel such persons to join for the common benefit of all ?

(d) Do you consider that those societies of which you have personal knowledge have, in the main, achieved their object ?

23. General Education.

(a) Do you wish to make observations upon existing systems of education in their bearing upon the agricultural efficiency of the people? If you make suggestions, please distinguish, as far as possible, between—

- (i) Higher or collegiate,
- (ii) Middle school, and
- (iii) Elementary school education.

(b) (i) Can you suggest any methods whereby rural education may improve the ability and culture of agriculturists of all grades while retaining their interest in the land?

(ii) What is your experience of compulsory education in rural areas?

(iii) What is the explanation of the small proportion of boys in rural primary schools who pass through the fourth class?

24. Attracting Capital.

(a) What steps are necessary in order to induce a larger number of men of capital and enterprise to take to agriculture?

(b) What are the factors tending to discourage owners of agricultural land from carrying out improvements?

25. Welfare of Rural Population.

(a) Outside the subjects enumerated above, have you any suggestions to offer for improving hygiene in rural areas and for the promotion of the general well-being and prosperity of the rural population?

(b) Are you, for instance, in favour of Government conducting economic surveys in typical villages with a view to ascertaining the economic position of the cultivators? If so, what, in your opinion, should be the scope and methods of such enquiries?

(c) If you have carried out anything in the nature of such intensive enquiry, please state the broad conclusions which you reached.

26. Statistics.

(a) Do you wish to make suggestions for the extension or improvement of the existing methods of—

- (i) ascertaining areas under cultivation and crops;
- (ii) estimating the yield of agricultural produce;
- (iii) enumerating livestock and implements;
- (iv) collecting information on land tenure, the incidence of land revenue and the size of the agricultural population;
- (v) arranging and publishing agricultural statistics?

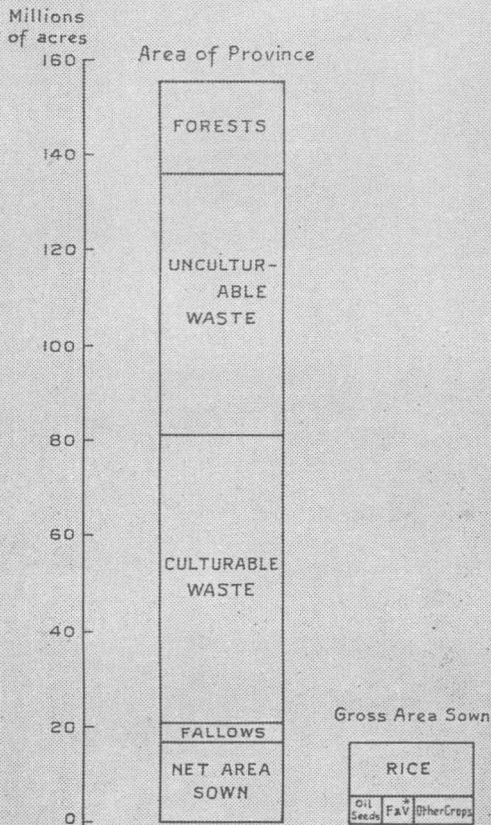
(b) Have you any other suggestions to make under this heading?

BURMA

CLASSIFICATION OF AREA AND AREA UNDER VARIOUS CROPS

(Averages for the 5 years 1921-22 to 1925-26)

Note:— The difference between the Gross Area Sown and the Net Area Sown represents the area Sown more than once.



* Fruit and Vegetable

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BURMA

1. GENERAL FEATURES

Burma is the northern part of the Indo-Chinese Peninsula and the most easterly province of the Indian Empire. It comprises all the country enclosed by the eastern off-shoots of the Himalayas and the sea. In the northern part it consists of high mountains; towards the south these mountains open out into separate ranges enclosing river valleys, while along the sea border is a flat coastal strip. It is shut off from India on the north-west by a mass of densely forest-clad mountains ranged in steep and high ridges running nearly north and south and intersected by deep and narrow valleys inhabited by wild tribes. These mountains form a barrier which has kept the peoples of the two countries separate in race, language, religion and customs. Its total area is given in the census of India as 233,707 square miles and in area it is the largest province of the Indian Empire being more than twice the size of the United Provinces of Agra and Oudh; more than one-third larger than Madras; and nearly twice the size of Bombay. It lies between Assam on the north-west and China on the north-east and between the Bay of Bengal on the west and south-west and Siam on the south-east. Waterways form its main means of internal communication, while sea communications furnish the principal commercial link between Burma and the outside world, including the other provinces of the Indian Empire.

The main physical features of the province are its mountains and its rivers. The chief mountain ranges and their spurs run nearly north and south and make communication east and west difficult. The ranges gradually become lower as they run south and as they receive a bountiful rainfall they are plenteously covered with forest and other vegetation. The rivers of Burma are the key to its physical geography. They are three in number, the Irrawaddy, the Salween and the Sittang and flow from north to south parallel to the line of the mountain ranges. Their effect on the natural divisions of the country will be explained in the next chapter.

The rainfall varies greatly from tract to tract of the country and on the Arakan and Tenasserim coasts on which the monsoon coming across from Ceylon makes its first impact the annual rainfall averages over 200 inches. In the Irrawaddy delta the average is about 100 inches. Here the monsoon breaks, as a rule, early in May and continues till the end of September. In Central Burma, between the Arakan Yomas on the west and the Shan Hills on the east, conditions approximate somewhat to those of the Indian Deccan. The Arakan Yomas protect this tract from the south-west monsoon and there are often long breaks of rainless

weather in the monsoon season. The average rainfall is a little over 30 inches. This is the only part of Burma where scarcity is at all likely to occur. The water channels are dry except in the wet season and there is a great deal of island and river bank cultivation as the Irrawaddy subsides after the rains. North of the central dry tract lies the Upper Burma wet zone comprising the districts of Katha, Bhamo, Myitkyina and part of the Shan States. The rainfall here varies considerably and ranges from 50 to 100 inches.

As most of Burma lies in the tropics, the climate generally, except in the dry zone of Central Burma, is hot and damp. On the hills to the north and east it is more temperate but Burma usually escapes the extremes of heat and cold to which northern India is subject. The maximum temperature in Lower Burma seldom rises to 100°. In Central Burma, it may reach 110° to 115°, but this excessive heat is compensated for by cooler nights in the winter months. In the Shan States and the Chin and Kachin Hills the elevation gives a temperate climate, the thermometer seldom rising above 80° and in the colder months there is frost at night.

The agricultural practice of the country is almost entirely dictated by the rainfall and so much of the province has an assured and ample supply of rain that it is not surprising to find that rice dominates the agricultural energies of the country. Thus of the total occupied area in 1925-26 of 19,969,425 acres, 11,558,371 were under rice. The acreage under all other crops was 4,473,894 acres only, of which sesamum contributed 1,132,862 acres, beans 795,005 acres, millet 700,789 acres, ground-nut 498,587 acres, cotton 449,168 acres and fruit gardens 370,840 acres. Minor crops are maize 199,388 acres, gram 118,166 acres and wheat 48,202 acres. The valuable crops, tobacco and rubber, occupied 83,665 and 79,222 acres respectively.

It is estimated that the culturable waste available is over 21 million acres, but this figure is purely conjectural.

As regards livestock, the supply of working bullocks would appear to have kept pace with the demand although prices have risen greatly in the last few years in sympathy with the rise of prices of other agricultural products. The last Season and Crop Report gives the number of working bullocks at 1,890,950, bulls 637,127, cows 1,391,797 and young stock 995,097. In Lower Burma and in the wet zone of Upper Burma, the buffalo is an animal of great agricultural importance and the figures for them are buffalo bulls and bullocks 364,530, buffalo cows 401,094, buffalo calves 672,024. Sheep are relatively unimportant and thrive only in the central dry zone. They number 73,871. Goats are numerous though they receive little attention and number 620,696. Pigs are kept by Karens and the hill tribes and amount to 371,170. Horses and ponies number only 84,353.

2. NATURAL DIVISIONS

The agriculture of Burma is determined almost entirely by considerations of rainfall and the province divides naturally into four main regions

or tracts. The first and most important of these is the Lower Burma wet tract which comprises the Arakan, Tenasserim and Pegu divisions with a rainfall varying from 80 to well over 200 inches. In this tract falls the rich delta of the Irrawaddy and a narrow strip of level land in Arakan and Tennasserim between the mountains and the sea. This is the great rice tract of the province — entirely rain-fed. The area under rice has increased as follows :—

				Acres
1896	..	..	..	5,451,541
1906	..	..	..	9,283,801
1916	..	..	..	10,070,250
1926	..	..	..	11,558,371

The export figures for the last ten years to India and elsewhere have been :—

Year	India	Elsewhere	Total
	Tons	Tons	Tons
1917	659,824	891,986	1,551,810
1918	487,148	1,314,744	1,801,892
1919	2,175,176	418,590	2,593,766
1920	1,342,856	724,212	2,067,068
1921	1,432,850	804,096	2,236,946
1922	1,050,313	1,493,308	2,543,621
1923	796,967	1,453,937	2,250,904
1924	692,737	1,811,356	2,504,093
1925	1,427,867	1,967,838	3,395,705
1926	1,041,713	1,861,982	2,903,695

Apart from rice, a certain amount of sugarcane is cultivated on the alluvial land along the banks of streams while most villages of importance have groves of mangoes or cocoanuts. Tenasserim has valuable gardens of the much-prized durian and mango-steen fruits peculiar to Burma and the Malay States. In Tenasserim also are found the principal rubber plantations.

The soil of the delta consists of old alluvium of great depth. On the ridges and foot-hills the soil is sandy or lateritic. Along the banks of the Irrawaddy and other rivers there are considerable stretches of

new alluvium on which such crops as beans and tobacco can be grown in the cold weather.

North of this wet alluvial tract lies the Upper Burma dry tract which occupies practically all the central belt of the country. In general appearance the country is undulating, consisting of low hills of tertiary formation. In Mandalay, and Kyankse, however, there are large tracts of level land under cultivation. The soils vary from stiff black clay on the lower grounds to light sands and gravels on the slopes and uplands. Where irrigation is available, rice is exclusively cultivated as also in the valleys where it is rain-fed. Where irrigation is not available, dry cultivation is engaged in, the principal crops being the millets, maize, cotton, sesamum, gram, beans and groundnut. The introduction of this last crop, largely through the agency of a government garden, has completely revolutionized the agriculture of the dry zone and in twenty years its cultivation has advanced from practically *nil* to 460,000 acres.

The Upper Burma wet zone comprises the northern districts of the province, Katha, Bhamo, Myitkyina, the Upper Chindwin and parts of the northern Shan States. Vast tracts of country are available for cultivation here. The sparsity of population, difficulties of labour and the unhealthiness of the tract are limiting factors. Paddy is cultivated in the lowlands and shifting cultivation on the hills. In Myitkyina, a serious attempt is being made to grow sugarcane on a factory basis.

The last tract is the Shan States, a federation of States under the Governor of Burma. This tract has great agricultural possibilities consisting as it does of a vast plateau extending from the eastern boundary of Burma to the Chinese frontier with an elevation of from 3,000 to 6,000 feet. Development is retarded however by lack of population and communications. Excellent potatoes are grown in the States while the wheat produced is of good quality.

The division between these climatic zones is not precise or definite and in them we come across areas of intermediate rainfall. For instance, between the Lower Burma wet tract and the central dry tract lies Pyinmana with a rainfall of from 50 to 80 inches where the best sugarcane in the province is cultivated. Cattle breeding is almost entirely confined to the dry zone and the Shan States, it being practically impossible to produce young stock in the wet tracts of Lower Burma or in the northern wet range. The cattle produced in the dry zone and in the Shan States are yearly driven down in huge droves for sale to the cultivators in the riverain tracts of Lower Burma.

3. PROVINCIAL INCOME AND EXPENDITURE

The receipts and disbursements of the Government of Burma from 1921-22 till 1925-26 are shown in the following statement. The figures call for little comment, but it may be noted that the provincial contribution, originally 64 lakhs, has been temporarily remitted and if this remission becomes permanent, an additional sum will be available for

the ordinary purposes of administration. From the point of view of agriculture and general rural uplift, the most interesting feature is the progressive expansion of expenditure on education, medical relief, public health, agriculture and industries.

GOVERNMENT OF
(Figures are in
Revenue and Expenditure)

Receipt Heads	1921-22	1922-23	1923-24	1924-25	1925-26
<i>Revenue Receipts</i>					
Principal Heads of Revenue—					
Land Revenue	531	496	472	571	534
Excise	98	112	119	116	124
Stamps	49	50	58	62	67
Forest	221	183	178	182	210
Other heads	38	5	5	12	16
Bailways .. .. .	..	..	1	..	..
Irrigation	4	42	36	39	43
Debt Services—					
Interest	5	6	8	13	13
Civil Administration—					
Administration of Justice	7½	9	9	11	11
Jails and Convict Settlements	4½	4	4	4	5
Police	4½	6	6	9	5
Education	3	4	4	5	5
Medical	1½	2	2	2	2
Public Health .. .. .	..	..	..	1	1
Agriculture .. .. .	..	..	1	1	1
Industries .. .. .	..	..	..	..	..
Other Departments	1	1	1	2	4
Civil Works	6	8	10	13	9
Miscellaneous	31	6	8	7	5
Miscellaneous Adjustments between Central and Provincial Governments	7	..	..	2	..
Extraordinary Receipts .. .. .	..	..	..	..	9
Total, Revenue Receipts ..	1,012	934	922	1,052	1,064

BURMA
 lakhs of rupees)
charged to Revenue

Expenditure Heads	1921-22	1922-23	1923-24	1924-25	1925-26
<i>Expenditure charged to Revenue</i>					
Direct Demands on the Revenue—					
Land Revenue	54	51	51	57	69
Forest	93	102	102	97	81
Other heads	18	22	21	22	34
Capital outlay of Forests (charged to Revenue) .. .. .	..	..	..	..	8
Railways	37	65	-109	..	..
Irrigation Revenue expenditure	33	66	49	46	45
Irrigation (capital expenditure charged to Revenue)	9	9	7	8	24
Debt Interest	-14	-17	-13	-14	-14
Civil Administration—					
General Administration	84	92	95	106	101
Administration of Justice	43	49	55	59	62
Jails and Convict Settlements	24	26	30	27	29
Police	148	141	142	132	135
Ports and Pilotage	23	32	30	30	19
Education	59	67	73	79	97
Medical	31	33	34	36	38
Public Health	8	7	9	8	11
Agriculture	13	16	19	20	20
Industries	2	1	1	3	4
Other Departments	3	8	7	4	4
Civil Works	190	203	213	192	243
Miscellaneous	46	51	69	75	70
Provincial Contribution	64	64	64	64	44
Miscellaneous Adjustments between Central and Provincial Governments	80	2	..	2	1
Extraordinary charges .. .. .	..	..	..	..	..
Total, Expenditure charged to Revenue ..	998	1,090	9,459	1,053	1,125

GOVERNMENT OF
(Figures are in
Capital Receipts)

Receipt Heads	1921-22	1922-23	1923-24	1924-25	1925-26
<i>Capital Receipts</i>					
Revenue Surplus	14	..	..	..	..
Famine Insurance Fund	1	..	..	0½	0½
Loans and Advances by Provincial Governments	23	27	26	37	44
Total Capital Receipts ..	38	27	26	37½	44½
Opening Balance	572	585	368	304	279½
Total ..	610	612	394	341½	324

BURMA
 lakhs of rupees)
and Expenditure

Expenditure Heads	1921-22	1922-23	1923-24	1924-25	1925-26
<i>Capital Expenditure</i>					
Revenue Deficit .. .. .	..	156	27	1	61
Famine Insurance Fund .. .. .	..	..	..	..	..
Loans and Advances by Provincial Govern- ments	25	88	63	61	20
Total Capital Expenditure ..	25	244	90	62	81
Closing Balance	585	368	304	279½	243
Total ..	610	612	394	341½	324

4. REVENUE ADMINISTRATION AND LAND RECORDS

The tenure of agricultural land in Lower Burma is simple when compared with the variety of tenures found in other provinces. Briefly put, the ownership of land is regarded as vested in the State but by continuous possession for 12 years and the regular payment of revenue over that period, an occupant is given the status of a landholder. This gives him a permanent, heritable and transferable right of use and occupancy of his land, subject only to the payment of all such revenue tax, cesses and rates as may from time to time be imposed in respect of such land under any law for the time being in force and to the reservation to Government of all mines and mineral products and of all buried treasure. In order to establish his position as a landholder and to acquire a title deed as against the State, he is entitled to receive on application a landholder's certificate. Land may also be granted to cultivators for all time or by lease or given on licence for a specified period. Subject to the strict observance of the conditions attached to these grants and leases, the cultivator obtains a firm possession of his land as against Government or third parties. Where a cultivator has not obtained the status of a landholder or has not taken out a grant, licence or lease, he is a tenant-at-will of Government until he has attained twelve years of uninterrupted occupation and theoretically is liable to ejection without compensation during these twelve years. This power of Government is only however used in cases where non-agriculturists have obtained possession of land. In Upper Burma land is divided into two categories, non-State and State. Non-State land was land in which the Burmese kings were understood to have recognised the existence of proprietary rights against the State. No rights against the State can be acquired on State land by occupation throughout a period of time or, as the regulation puts it, "an occupier of State land can have no heritable or transferable right of use or occupancy therein nor can any rights adverse to the Government exist in such land unless they have been created or continued by a grant made by or on behalf of the British Government." In the case of non-State land, a landholder has complete proprietary rights and is practically in the position of the person who has attained landholder's rights in Lower Burma. But rights to non-State land cannot be acquired in respect of land which was not declared non-State land when the tenure was decided after enquiry by Government. A consolidated land law applicable to Upper and Lower Burma is under consideration and will probably be introduced shortly in the form of a Bill in the Legislative Council.

Practically all occupied land in Burma has been cadastrally surveyed and mapped on a scale of 16 inches to the mile. Every field is surveyed in detail and the map is kept up to date by the local surveyors who are supposed to measure up new cultivation and mark other changes every year and bring the map up to date. This work is in the hands of the Land Records staff who maintain annually an accurate survey, a record of persons liable to assessment and an annual crop marking of all crops. The Land Records Department is a very strong one and

consists of revenue surveyors dealing with from 10,000 to 15,000 acres with inspectors, usually one to each township,* all working under the Superintendent of Land Records. The Superintendent of Land Records and his establishment is under the immediate control of the deputy commissioner who is responsible for the proper carrying out of all land records work. The whole department is under the control of the Commissioner of Settlements and Land Records.

Before land records, however, we have the settlement, which is not such an elaborate affair as it is in India. There is no settlement in the sense of an engagement made by a farmer to pay so much revenue in respect of so much land for such and such a period. The only things which are settled in Burma are rates of assessment and the period for which these rates are to be in force. The settlement officer in fact originally laid the foundation of all the revenue assessment and collection. He started off with a clean map provided by the Survey of India and entered the boundaries of every holding on the map. He then prepared a list of the persons in occupation of the land and proceeded to arrive at his assessment rates by crop cuttings to ascertain the fertility of the soil. On these results the land is divided into fertility classes. Enquiries into cost of production, the value of produce over a period of years and rents and mortgages are all recorded and he arrived at a theoretical rate on a proportion of the surplus left when the cost of production is subtracted from the average value of the produce. This theoretical rate, which Government claims as its right to take as revenue, is one-half of the net produce, but in point of fact this maximum is seldom, if ever, attained. Rents are only beginning to be a factor in the fixation of assessment rates though competition rents have always been taken into consideration. As a rule settlements are for twenty years at the end of which period the settlement is revised. Enhanced rates notified after revision settlement must not exceed the expired rates by more than thirty-three per cent during the first five years of the new settlement nor during the next five years exceed sixty-six per cent while allowance is made to cultivators who have incurred expenditure to improve their lands by the granting of exceptional and favourable terms. Assessment in Burma is a fluctuating assessment and separate rates are notified for separate assessment tracts within a district. Whenever waste land is brought under cultivation, the new area is measured up and assessed generally at the same rates as land in its immediate neighbourhood. In Lower Burma, a nominal acreage rate of two annas is assessed on land which is left fallow for special reasons. But in Upper Burma in the dry zone all land not cultivated is exempted from assessment. In Lower Burma where a crop is destroyed by floods or other natural cause, the land is not assessed and in the dry zone of Upper Burma, if the crop is less than three-quarters of normal, it is considered a total failure and completely exempted from assessment.

After the original settlement, the settlement party handed over to the Land Records Department their maps with the boundaries of holdings

* An administrative unit corresponding to a local revenue division of a district in India (*tehsil*.)

marked and the holding register and these it is the duty of the Land Records Department to keep up to date. This holding register is only a record and has no presumption of validity. The Land Records staff merely enters against each holding the name of the person who appears primarily liable to revenue as in possession of the holding directly under the State and any dispute must be settled by the civil court. Where mutations are ordered by a court, they are communicated to the surveyor by the court. Mutations by registered holders must be brought to the surveyor's notice, and it is incumbent on all parties to alienation to report these to the revenue surveyor.

On his holding register and on his map, as corrected, the revenue surveyor draws up his annual assessment register. He has also in the course of his field inspection recorded statistics of the areas under different crops and of tenancies, mortgages and sales. When the rolls of the assessment season are complete, he prepares a tax ticket for each holding and these tax tickets are issued from the deputy commissioner's office.

The total expenditure on the Land Records Department for 1925-26 amounted to Rs. 25,46,158, including figures for Rangoon and the special survey party. The percentage cost to total assessment (excluding figures for Rangoon and the special survey party) was 5.99.

5. THE CULTIVATOR

The total population of Burma at the Census of 1921 was 13,212,192, of whom no less than 9,158,932 were engaged directly or indirectly in agriculture. Although Burma is the largest of the Indian provinces, it is by far the most sparsely populated and the bulk of the population lives in villages which number 35,048 as against only 79 towns. The balance between males and females is very level, there being 6,756,969 males and 6,455,223 females.

The density of population per square mile in Burma stands at 57 as against 226 for all provinces of India, but beyond the statement of this fact no useful inferences as to under-population or over-population can be drawn. In some districts where cultivation is widespread, the population is naturally denser than in those where there is a large amount of forest or unculturable waste and it is enough to state the figures without trying to draw any particular conclusions. There are three principal races of Burma, the Burmese, the Karens and the Shans while in the north and north-west part of the province we find the Chins and Kachins. Of these by far the most important are the Burmans, and the predominant religion of the country is Buddhism in which at the last census no less than 11,172,984 persons affirmed their belief. Buddhists are more than 5½ times as numerous as all the non-Buddhists put together and are nearly 19 times as numerous as the Animists who are the next largest class.

The ordinary village habitation is a hut raised on piles some little distance off the ground, built of jungle timber and bamboo matting and roofed with thatch or split bamboo. Better class houses have plank walling and floors and corrugated iron roofs are more and more being adopted. The house as a rule consists of a front verandah and an upper room which is reached by a flight of steps. The front verandah is used

as the living room of the house, the cooking generally being done outside on the ground or in a small kitchen at the side of the building: the upper room forms the sleeping accommodation of the family.

The Burmese dress is very attractive. The male dress consists of a jacket which is generally white, a cotton or silk coloured skirt (*paso* or *longyi*) and a silk head covering (*gaungbaung*). The women wear a jacket resembling the men's and a petticoat or skirt of silk or cotton. A gaily dressed Burmese holiday crowd is a very pretty sight as the brilliant colours of their silks get their full value from the bright sunshine.

The life of the average cultivator is made up of periods of arduous and exhausting labour in the fields followed by considerable spells of comparative idleness. But these slack periods are fully taken up by pagoda festivals or *pwès* (theatrical performances) and the observance of other social and religious customs which tradition has imposed upon him. During the seasons he is not employed in the fields, he resides in his permanent dwelling in the village. In the rainy season, when the cultivation of paddy or other crops absorbs all his energies and attention, he spends the greater part of his time in the fields, and, for convenience in working his land, he builds there a temporary bamboo hut where he can live with his family or hired labourers and with his working bullocks beside him.

In the drier tracts there is a greater variety in the choice of a dwelling place and it is more common to find the cultivator living throughout the year on his holding. Even in the paddy plains of Lower Burma permanent homesteads are becoming common in some districts, but the homestead as such is not a feature of the countryside. This herding together in villages is partly due to the natural inclination of the cultivator himself and partly to the operation of the Burma Village Act, which, for purposes of crime control, discourages the erection of permanent dwellings outside the boundaries of the village site.

The agricultural year may be said to commence with the break of the rains in May. In the paddy tract, field huts are built and firewood stored during the slack months of April and May and the nurseries are got down by the first fortnight in June. Ploughing and harrowing the remainder of the holding and the transplanting of the main crop are carried on into August, and in some of the later districts, may extend even into early September. But from then onwards till the latter half of November, when the early paddies begin to ripen, there is little field work to be done.

Harvesting becomes general during the first half of December and by the middle of January most of the crop in even the latest districts is off the ground. Threshing and winnowing the paddy occupy the greater part of February and by March the bulk of the crop has found its way into the hands of millers and brokers, or into the godowns of traders in the towns and villages who hold it for a rise in the market.

In the dry zone, the operations and seasonal work are of course different and probably cover a greater part of the year. But in all tracts, except in some of the irrigated areas, there is the same alternation of busy and slack periods with a more or less general cessation of agricultural activity in the hot weather.

The size of the average holding varies a great deal with the district but is generally a simple multiple of the area which can be ploughed by a pair of bullocks. Especially is this the case in the Lower Burma paddy plains where agriculture has become industrialised into the production of a single crop mainly for export, and where mixed farming is unknown. In these tracts the general allowance is one yoke of bullocks to every twelve acres although this proportion may vary from eight to fourteen acres in heavy and lighter lands. In Upper Burma, where farming is more mixed and carried out on a less extensive scale, the area worked by one pair is fifteen acres, but the yoke of bullocks in Upper Burma plays a smaller part in fixing the size of a cultivator's holding. In the dry tract, we find very small holdings associated usually with garden cultivation or worked as a part-time occupation by a cultivator who has another non-agricultural source of income; but as a sole means of livelihood the diminutive holding, frequent in parts of India, is by no means common.

The Land Record Department has produced a table which shows the size of the average holding in Upper and Lower Burma :—

	Under 5 acres	Over 5 Under 10	Over 10 Under 20	Over 20 Under 50	Over 50
	Per cent	Per cent	Per cent	Per cent	Per cent
Lower Burma	55	15	15	11	4
Upper Burma	62	20	12	5	1

The figures in this table, however, have little agricultural significance, for they refer only to complete holdings owned by individual landowners in arbitrarily fixed areas of about 600 acres called *kwins*; the actual area worked by a cultivator as a farm unit with the assistance of his family and hired labour is more. This unit is given in several settlement reports for particular districts, and the Agricultural Department has recently collected figures throughout the greater part of Burma which indicate more nearly what this unit is. In Lower Burma, it is comparatively large but declines in size northwards through the drier zones. The following figures, although not based upon a sufficient amount of data to give reliable averages for whole districts, convey a better impression of the size of holding met with most frequently :—

Crops	Districts	Average size of holding in acres	Crops	Districts	Average size of holding in acres
Paddy ..	Hanthawaddy ..	67	Cotton .. Sesamum .. Sugarne, beans, Paddy .. Paddy (Upper Burma).	Myingyan ..	8·8
	Insein ..	40		Thayetmyo ..	4·4
	Pegu ..	35		Yamethin ..	14
	Tarrawaddy ..	17			
	Thaton ..	81			
	Bassein ..	34		Mandalay ..	7·9
	Myaungmya ..	26			
	Maubin ..	23			
	Akyab ..	17			

Quite large farms of 200 to 250 acres are found in Hanthawaddy, Pegu and Thaton districts worked by tenants on a yearly lease and, although these are not numerous, they demonstrate the system of agriculture which has been induced by the industrialisation of the paddy crop grown mainly for export.

The mention of tenants and hired labour indicates that peasant proprietorship is by no means universal in Burma. In an inquiry carried out into the condition of agricultural tenants and labourers by Mr. Couper in 1923, it was found that, in the places where figures were collected, an average of thirty-eight per cent of the land was worked on yearly tenancies and that in some townships it rose to as high as seventy-two per cent. This refers to Lower Burma where land is freely bought and sold by both agricultural and non-agricultural classes and where, by foreclosure, the small owner cultivator has frequently to part with his land in settlement of debts during a succession of bad seasons.

A small owner cultivator frequently rents additional land to work with his own, or he may hire out his own land and rent a larger holding to cultivate himself. The rents are almost always paid in kind and are fixed at so many baskets per acre usually representing from one-fourth to as much as one-half of the total produce. It is customary for the owners to pay the land revenue which varies from Rs. 1-8, to Rs. 4-8, Rs. 5 or Rs. 6 per acre according to the productiveness of the soil.

Tenancies are for a period of one year and the cultivator frequently changes his holding; Mr. Couper, for instance, found that out of ninety-nine cultivators only twelve had been in the same holding for more than four years. There is no great sentimental attachment for family reasons amongst owners and cultivators to particular land; and, as already indicated, paddy land is regarded among owners almost solely in the nature of an investment to be bought and sold as occasion demands. Affection for a paddy field does not exist, but where dry land is concerned, as in Upper Burma, sentiment plays a more prominent part and frequent changes of ownership are not so common.

Peasant proprietorship is the rule in Upper Burma, but in Lower Burma absentee landlordism with its attendant evils is a conspicuous feature of the paddy tracts. The larger landowners live in the towns and hire out their land yearly to the highest bidder. This unstability of tenure acts as a severe handicap to progressive agricultural improvement, for the cultivator can never be sure at the beginning of a season whether he will get his own land back again, or, indeed, whether he will get any land at all. If he loses his holding he may become a labourer for the year and hire both himself and his bullocks to some one else; but this represents a drop in status to be remedied, if possible, in the succeeding year by again becoming a tenant should land be available.

In spite of the large holdings and the comparatively extensive form of agriculture pursued there is as yet enough land to go round if fairly distributed. The density of the population varies, of course, from district to district, being greater in the rice lands of the delta and diminishing

in the dry zone and towards the hills. The delta, although comprising only fifteen per cent of the total area contains thirty-seven per cent of the population and the more densely populated districts are naturally found in this sector. There are four dense patches in the areas influenced by the large towns of Rangoon, Mandalay, Moulmein and Akyab, but even here the population is sparser than is common in India. The most dense population is in Maubin district with 201 persons per square mile, and the least dense Myitkyina with a figure of only 11 per square mile. Dry zone districts vary from 54 in Thayetmyo to 179 in Sagaing, the latter coming to a certain extent under the influence of Mandalay.

With a comparative plenitude of land and the lack of any custom insisting upon the sub-division of holdings among the members of his family on the decease of an owner, fragmentation of holdings in the Indian sense constitutes at present no problem whatever in Burma. When an occasion for the division of a property arises, the land is generally sold and the proceeds divided.

The Burma cultivator stands high among his Eastern fellows in respect of literacy. Owing to the existence of Buddhist monastic schools in almost every village the vast majority of the village boys are taught the rudiments of reading and writing. A heavy percentage lapses into illiteracy after such imperfect instruction, but those who remain literate into the adult stage constitute a proportion of the population which is more than three times as large as that in any other province of India. The 1921 Census gives the following comparative figures:—

Average number of literates, age 10 or more per 1,000

Males		Females	
Burma	India	Burma	India
576	161	123	23

The standard of literacy is not, of course, high, but the Burma figures include only those who are able to indite a simple letter to a friend; and most cultivators are capable of signing their names to a document even though they may not be able to read it completely or entirely understand its contents. Within recent years there has been a great expansion of vernacular newspapers. These find their way into most of the villages, especially those near the main roads and railways, and the happenings in the outer world, the prices of cotton and paddy in the main towns and all the miscellaneous items of news that go to make up a vernacular newspaper are available to most cultivators. The newspapers are very widely circulated and extensively read, the more enlightened villager reading them aloud for the information of his less advanced brethren.

With the means at his disposal the Burman cultivator cultivates paddy and other crops in an intelligent and fairly efficient manner. As a ploughman and paddy cultivator he is better than the average Indian immigrant; his fields are cleaner and better planted, and he shows more discrimination in the selection of varieties best suited to his land. As, however, it takes eight men to reap the crop which five men have sown, the Indian labourer is in considerable demand at harvest time and a good deal of the crop is reaped by such casual labour on contract rates. As has been previously noted the total number of immigrants to Burma by all routes during 1926 was 4,08,464, and although a very large number of these are permanently employed at the large ports and at the rice mills in the seaport towns, a considerable number seek only seasonal employment in the reaping of the paddy crop. In 1906, 3,42,597 emigrated back from Burma so that the balance of immigrants over emigrants was only 25,877. These become absorbed permanently in the industrial labour round the large cities, very few of them settling down in the country areas.

As he is able, as a rule, to obtain a comfortable living by his seasonal work, the Burman shows little inclination to exert himself to accumulate wealth, and thrift is not one of his marked characteristics. The Burman is notoriously generous and when funds are available money is spent freely either on religious objects or on giving entertainments for the amusement of his fellow villagers. When the money is gone resort is had to the moneylender or landlord for the means of financing the next year's crop. On account of his light-hearted attitude to the accumulation of wealth, chronic indebtedness is almost universal amongst the cultivating classes and the greater the credit the greater usually is the debt which is incurred. When the cultivator borrows from the *chettyar* (a member of a Madras banking caste) on a strict business basis of security the rates of interest vary according to the security tendered and are by no means as high as when he borrows from his landlord or village Burmese moneylender on the basis of repaying his debts in kind after harvest. The latter method of borrowing is most popular in the villages as the *chettyars* are somewhat strict in demanding security and are now unwilling to advance money on land. Loans of this nature—that is, repayment of debt in kind after harvest—are taken during the cultivating season, the basis being a sum of money for which a hundred baskets of paddy are paid back in February. The following table indicates the scale of repayment required:—

Loan taken in		Amount of loan	
May	.. ..	Rs. 60 to 70	Repaid in February
July	.. ..	.. 80 to 90	by 100 baskets of
August	.. ..	.. 100	paddy worth Rs. 160
September	.. ..	.. 110	to Rs. 170.

6. THE AGRICULTURAL DEPARTMENT

The history of the Agricultural Department may be divided into three periods. The first is the period anterior to 1906 when agriculture was under the Director of Land Records and Agriculture. Under this administration, action on the agricultural side was spasmodic; there was no trained agricultural staff and a few government gardens under amateur enthusiasts represented the limit of effort. To these gardens, however, was due the introduction of the groundnut which has brought such great agricultural wealth to the province.

The second period dates from 1906 when a civilian Director of Agriculture was appointed. An agricultural chemist joined the staff that year and two deputy directors of agriculture were appointed in 1907. A period of acute financial stringency, in which the very existence of the department was threatened, followed by the outbreak of the Great War, brought operations practically to a standstill and it was not till 1918 that a forward step could be taken. But even in this period two large experimental farms were opened at Mandalay and Hmawbi and various smaller district farms of about twenty acres in extent for the trial under local conditions of new strains of seed produced on the central farms at Mandalay and Hmawbi. During this period the posts of economic botanist and of third deputy director of agriculture which had been sanctioned were not filled and the idea of an agricultural college was abandoned largely on account of financial stringency.

With the cessation of hostilities Government was in a position to devote more attention to the Agricultural Department and a comprehensive reorganisation scheme was sanctioned by the Secretary of State in 1919. This scheme was in general endorsed by a committee appointed by the local Government which reported in 1925, and as a result of the local Government's orders on that report the department is now constituted as follows.

The department is divided into two sections, the one dealing with field experiments, district demonstration and propaganda and the other with agricultural teaching and research. For the purposes of field experiments and district demonstration, the province is divided into eight circles, each under a deputy director of agriculture. This excludes the Shan States for which it is hoped that two deputy directors will ultimately be appointed when financial circumstances permit. At present an arrangement has been made by which work in the Shan States is superintended by deputy directors of agriculture stationed in Burma.

It is the intention that each of these circles should ultimately have a central farm. Uptodate five such central experimental farms have been opened at Hmawbi, Pyinmana, Mahlaing, Allanmyo and Akyab while the large farm at Mandalay, which is now the college farm, has uptodate served the purposes of the Northern circle. Two more farms are now being equipped at Mudon in the Tenassarim circle and Myaungmya in the Irrawaddy circle and, with the selection of a central farm for the Northern circle, the chain of central farms will be complete. There

are also subsidiary farms for special crops at Pwinbyu, Padu, Tatkon, Thayetmyo and Kyaukpyu.

The main duties of the deputy director are research on the agricultural problems of his circle. His first duty is to discover what these agricultural problems are and, having found them, to experiment on the central farms with a view to finding a solution. When a solution has been found he must endeavour to have it introduced into the general agricultural practice of his circle by demonstration and propaganda. He is assisted in the work of his circle by an assistant director, who is a member of the Burma Agricultural Service, two senior agricultural assistants for demonstration and propaganda work and the supervision of subsidiary farms and two senior agricultural assistants on the staff of each of his central farms. Great emphasis is laid on the importance of seed distribution and propaganda work. A considerable amount of this is done through the assistance of the Co-operative Department while in some tracts agricultural unions for the distribution of pure seed have been found very effective. The village or group of villages under a village headman is taken as the unit and in each union there is one or more privately owned seed farms which multiply pure strains for distribution to the individual members of the union. The necessity for the rapid multiplication of pure seed strains has been fully realised and it is the policy of the department to provide a connecting link between the central experimental farms and the agricultural unions or co-operative societies by the provision of seed farms in the areas where pure seed can be rapidly multiplied. In pursuance of this policy a number of areas, varying from 50 to 100 acres, have been taken up by purchase or by exclusion from grazing grounds so as to provide as large a number of such farms as possible. These will be let out to approved tenants of the Agricultural Department who will be responsible for the maintenance of the purity of the seed and, to a large extent, for its distribution. Some of these farms in the more important centres will be equipped with seed godowns and quarters for an agricultural assistant and field man so that the growing of the pure seed crop can be kept under the closest observation.

As has been pointed out above, the department was only organised in 1919 and the full recruitment of a superior staff sanctioned under that scheme was not completed till 1923. The result is that the work of the department is still largely in the experimental stage, and it is only in the Southern and Northern circles, which existed prior to 1919, that it has been possible to develop work on any organised scale. At the same time a few outstanding results have been achieved. For instance, in the Myingyan circle, which is one of the main cotton tracts of the province, a high yielding strain of cotton with a ginning percentage of 36 as against the ordinary 31 to 32 per cent is under distribution and seed has been given out for 5,000 acres. Both the *kapas* and lint of this strain can be disposed of at a premium of Rs. 5 per 100 *viss*,* but at present the crop is bought back by the department, ginned by them and the seed

* The *viss* = 3.6 lbs.

distributed by sale to cultivators. Further promising varieties have been obtained by selection and hybridisation. These have been submitted to the Cotton Technological Research Laboratory, Bombay, for spinning tests and as these have proved satisfactory the varieties will be thoroughly tried out under field conditions.

In the Lower Chindwin area the gram crop was practically wiped out by a wilt disease and the devastation was so general that Burmans called this area the "gram cemetery." By the introduction of an immune variety the Agricultural Department has totally replaced the local crops.

The work of the Central circle with headquarters at Pynmana is largely concerned with sugarcane. A central farm of 54 acres was acquired in 1924 and the buildings and equipment have just been completed. The duties of its deputy director will be an intensive study of sugarcane in all its aspects and although too little time has elapsed for any particular results to be achieved, the existence of the farm has resulted in the introduction of sugarcane into several new areas in the neighbourhood. There is a ready demand for all available supplies of exotic canes for planting.

The central farm of the West Central circle is located at Allansmy and extends to 143 acres. Its concern will largely be cotton and the improvement of the Lower Burma strain of that crop. In this circle two subsidiary farms have been opened, one for the study of tobacco and the other for irrigated rice in the Mon canal area. From this farm, which has been in existence for a number of years, improved strains of paddy have been introduced in the Mon canal area. The total seed distributed to date is 213 tons and there are now 52 private seed farms multiplying the strains for distribution.

The Southern circle dates back to the earliest days of the Agricultural Department and at that time was responsible for practically the whole of the experimental work for Lower Burma. Its field of operations has now been considerably restricted. The area of the farm is 450 acres—400 acres of rain-fed paddy land and 50 acres of garden land. The main object of the farm is to investigate problems connected with the cultivation of paddy under Lower Burma conditions, and, in particular, to improve the quality and yield of varieties suited for the export trade. Pure line selection from indigenous races has been the method adopted to improve the paddy varieties grown in the country and no less than 1,043 strains in all have been dealt with. As a result, seven improved strains of paddy are at present being distributed to suit most of the conditions met with in Lower Burma. The amount of pure improved seed issued from this farm last year and from its attached seed farms was 550 tons, sufficient for 24,652 acres. In addition to this work of selection, experiments on the manurial requirements of the soil and the utilisation of indigenous manures have been carried out, as also experiments in seed rates and methods of planting. The central farm has a ring of seed farms around it to demonstrate the results obtained on the farm to the cultivator in the district. Twenty seed farms, totalling 1,216 acres, have been opened and ten more farms, totalling 532 acres, will be opened

shortly. In addition, it is proposed to open two larger seed farms equipped with godowns at two of the main centres. These larger farms will have an area of 155 acres and 125 acres respectively and will act as the main centres of seed distribution of the two outlying halves of the circle. In the three other circles, the Irrawaddy circle, the Arakan circle and the Tenasserim circle, little progress has been made as these circles have only recently been constituted and the farms have not yet been fully equipped. In the first two the improvement of paddy will be the principal problem, and in the Tenasserim circle, although this will also be the principal crop, fruit and coconuts will occupy a good deal of the attention of the deputy director.

The scientific research work of the department is concentrated at the Agricultural College and Research Institute at Mandalay, the research officers being also professors in their subject at the Agricultural College. In the field of agricultural chemistry the agricultural chemist has for many years been engaged in an investigation into the prussic acid content of Burma beans (*phaseolus lunatus*). This enquiry was forced upon the department by the trade as one or two unfortunate accidents in feeding cattle, which had been attributed to Burma beans forming a part of their diet, had very seriously affected the market for this product. After many years' study the conclusion arrived at is that the prussic acid cannot be eliminated from the beans by selection and the efforts of the department are now being devoted to research for a substitute. The work has now been handed over to the economic botanist who has under trial 80 varieties of indigenous and exotic beans with a view to finding prussic acid free substitutes for the Burma beans of commerce.

From time to time a large amount of work has been done on soil surveys and systematic surveys of two districts are now in hand. The object is to discover, if possible, a co-relation of soil types with paddies particularly suited to such types, a work which when successfully completed will be of permanent value. Apart from these systematic surveys detailed surveys have been made of all the government farms and a large number of surveys for private applicants. Another line of work is a series of analyses with a view to investigating the possibilities of the manufacture of citric acid and the extraction of essential oils. An investigation of some interest and of a rather peculiar nature was undertaken by the agricultural chemist at the instigation of the Department of Public Health. Frequent complaints were received that the process of par-boiling of paddy amounted almost to a nuisance to the neighbourhood in which the operation was carried out on account of the supposed noxious gases which were given off in the process. The problem has been completely solved and the improved process has been adopted by European millers and others in Burma. It is understood that it has also been taken up in the Federated Malay States, in Siam and in Ceylon. In addition to these particular lines of investigation a great amount of work has been done in the analyses of soils, manures, fertilisers, oil-seeds, etc., for the Agricultural Department and for other departments of Government and the public. It may be noted that great difficulty has been experienced in recruiting suitable trained assistants for the

subordinate staff. But this state of affairs will doubtless be remedied when the Agricultural College begins to function.

Until the arrival of an economic botanist a large amount of botanical work was done by the deputy directors in Upper and Lower Burma. Now that an economic botanist has been appointed to the staff he has been given a separate area and establishment on the college farm at Mandalay on which all the plant breeding and selection work in connection with rice and various dry zone crops is carried out. The area devoted to plant breeding and selection is 20 acres and in connection with the college a teaching garden containing representative species of the various natural orders is being laid out while a fruit garden will also be opened for purposes of instruction. In addition to this, the economic botanist has free access for work to certain of the central farms. Work at present is being mainly devoted to paddy, wheat, gram, beans and sesamum, but here again, as in the chemical section, much difficulty is experienced in getting a trained staff of assistants.

A mycologist was appointed to the staff in 1923 but the college laboratories for his accommodation were not completed until 1924. A beginning has been made with the study of various fungus diseases of sugarcane, sesamum, *jowar*, wheat, gram, cotton, betel vine and groundnuts, while a considerable amount of advice has been given to rubber companies and to sugarcane, tea and coffee estates.

An entomologist (who is a member of the Burma Agricultural Service) deals, so far as he can, with the vast number of insect pests to which the crops of Burma are subjected. Considerable success has attended efforts to deal with palm beetle and with land crabs both of which are serious pests of the province. Attention has also been devoted to lac culture, the object being to work out a practical method of growing lac on cultivated plants for cultivators in the plains while some experiments have also been carried out in bee-keeping. The most important part, however, of the work of the entomologist has been in connection with sericulture. Here the lines of work have been first to find out a multivoltine race of worms suitable to local conditions. Considerable success has been achieved in this direction, two strains having been obtained which are wholly multivoltine and give a much higher yield of silk. The other main objects are to work out the best method of growing mulberry under the varying conditions in the hills and plains of the province and to study the economics of the industry from the point of view of the rearer. Efforts are being made to foster the industry by the supply of mulberry cuttings and seedlings and of eggs or seed cocoons of improved races which have been examined and guaranteed free from disease, while the question of reeling has also been taken up and efforts made to introduce the industry into new districts.

The agricultural engineer is fully occupied with the routine work of the department and with the manufacture of improved implements, water-lifts and other agricultural appliances. A new type of plough has been designed and put on the market. At present these are manufactured in England, but a local blacksmith at Pyinmana is also turning out these ploughs in quantity for local sale and to supply orders

from the Agricultural Department. There seems no reason why the manufacture should not ultimately become local. The manufacture of improved water-lifts, introduced by the agricultural engineer, has been taken up by certain village carpenters and they are being sold freely. A new type of jaggery-boiling furnace has also been designed which is capable of burning the dried stems or megass. This effects a very marked economy in fuel. In addition to his actual work on agricultural machinery the agricultural engineer has also the supervision, in some cases, of the construction of the smaller departmental buildings on the farms.

It is to be regretted that practically no progress has been made in the matter of stock breeding or dairying, but it is now proposed that the Tatkon farm should be devoted to cattle breeding, the object being to build up a herd of pure Burmese cattle and also to conduct certain experiments in cross-breeding.

An interesting feature has been the establishment of agricultural improvement committees which have been formed in five districts. These are largely non-official though for the time being the deputy commissioner of the district or the deputy director of agriculture acts as chairman. The functions of these committees are mainly advisory and may be defined as follows:—

- (1) The committees act in an advisory capacity to Government in general and to the Agricultural Department in particular in matters relating to the agricultural improvement and development in a district.
- (2) The committees arrange for the holding of shows and exhibitions in the district.
- (3) The committees make recommendations with regard to the grant of loans or grants-in-aid under the Land Improvement Loans Act and carry out such other duties as may be referred to them from time to time by the local Government.

The main results achieved by the department up to date may be briefly summarised as follows. It is estimated that 200,000 acres of rice in the province are under selected varieties distributed from the Hmawbi and Mandalay farms. The superior value of this rice is now recognised by the market both in London and on the Continent. It is free from the objectionable red grain, is of a uniform shape and consistency and when milled gives an increased outturn which averages about 3 baskets of white rice per hundred baskets of paddy milled. Premia are paid by millers of all classes for paddy grown from the Agricultural Department's seed, these premia varying from Rs. 5 to Rs. 15 per hundred baskets * of paddy.

In certain parts of Upper Burma, the gram crop was almost entirely eliminated by the fungus *fusarium udum*. The soils had become so impregnated with this disease that it was impossible to grow the crop more than one year on the same ground. The Agricultural Department tackled the problem and after experiment with varieties received from every province in India a variety from Karachi which was found to be

* Baskets vary but average weight is 46 lb.

fairly immune was placed under selection with the result that a completely immune strain was evolved and seed multiplied. In 1923 enough seed of this immune variety was distributed to sow 28,000 acres. The distribution has continued with the result that the old variety has been completely ousted. The Director estimates that the annual money value of this piece of work is nearly as much as the present expenditure on the whole department.

In cotton work has hardly advanced beyond the experimental stage but the selected varieties with a higher ginning percentage have been distributed and 5,000 acres sown with this seed. Cambodia cotton has also been introduced and distributed in suitable areas, the total area now being about 6,000 acres. Similarly new types of groundnut, showing an increase of 15 per cent in the oil content and much easier to harvest than the local varieties, have been successfully introduced. Considerable improvements have also been effected in agricultural machinery.

With regard to agricultural education, as has been noted above, the idea of an agricultural college was for financial reasons kept in abeyance until it was revived in the reorganisation scheme of 1918. During this period and until the completion of the college, the province had to rely upon the friendly offices of the Government of Bombay for the training of its subordinate staff and by an arrangement with that Government large numbers of students were trained at the Poona Agricultural College. The Agricultural College at Mandalay was formally opened by His Excellency the Governor, Sir Harcourt Butler, in December 1924. It is well equipped with laboratories which provide ample accommodation for teaching and research in agricultural chemistry, botany, mycology and entomology, while instruction is also given in English, mathematics and physics. There is also an excellent library. The early experiences of the college have not been too happy. Apart from research its primary object was laid down as the instruction of a staff for the Agricultural Department. It was at first proposed to hold a four-years' course leading to a diploma and when the course commenced in 1924 stipends were given to 24 students, for the most part possessing the high school qualifications, with a promise of employment in the upper subordinate establishment in the event of their obtaining a diploma. It was also intended to introduce a shorter two-years' course for candidates for the lower subordinate establishment. The high school final qualification, however, was not found to be satisfactory, the standard being too low and an attempt was then made to substitute a three-years' course with I.A. or I.Sc., as a standard of entrance. The intention was to affiliate the college to the Rangoon University but the scheme had to be abandoned almost immediately owing to the paucity of candidates that applied. A three-years' diploma course is now being started. At the present moment there are 11 third year students, 15 second year students and 20 first year students taking this course.

Apart from the courses of instruction at the college, special short courses are held at central farms to provide practical instruction for cultivators and their sons. These courses are designed to give practical

instruction in the use of improved implements and to demonstrate improved methods. Stipends are also offered to the sons of cultivators and landowners to enable them to undergo training for longer periods on the central farms.

Outside of Government effort, the only other attempt at agricultural education in the province is the Pyinmana Agricultural School—a vernacular school conducted by the American Baptist Mission. Government gives grants for building construction up to half the total cost or Rs. 75,000, whichever is less, and a yearly grant for recurring expenditure increasing from Rs. 2,200 to Rs. 18,000. The aim of the school is to give an agricultural education to village boys who have completed the fourth standard of the vernacular primary school. Instruction is entirely in Burmese although English and literary subjects of the middle school course are also taught. The total area of the school farm is nearly 180 acres and the buildings are nearing completion. There are at present 62 students in the school, but there will be accommodation for 120 when the buildings are completed.

The following statement shows the receipts and expenditure under "Agriculture" for the ten years 1915-16 to 1924-25:—

Year	Receipts	Expenditure
	Rs.	Rs.
1915-16	16,026	2,67,153
1916-17	24,733	2,49,783
1917-18	17,328	2,66,882
1918-19	20,562	3,84,717
1919-20	31,178	3,10,585
1920-21	20,810	3,84,066
1921-22	34,489	5,05,373
1922-23	40,563	6,50,249
1923-24	54,930	7,83,847
1924-25	61,967	8,17,394
Total ..	3,22,586	46,20,049

7. THE VETERINARY DEPARTMENT

The Government of Burma devoted some attention to veterinary matters long before the question of an agricultural department was considered. Thus as long ago as 1876 we find that there was a veterinary instructor in the province and from 1884 onwards a certain number of veterinary assistants. The staff of veterinary assistants rapidly increased until, in 1906, there were 120 with 10 inspectors, 5 deputy superintendents and 3 superintendents. At the end of 1925 there were actually employed 3 superintendents, 8 deputy superintendents, 24 veterinary inspectors and 214 veterinary assistants.

The special committee which recently investigated the Agricultural Department reported also on the Veterinary Department and on their

recommendations the Government has passed the following orders. The province will be divided into four circles and nine sub-circles, the former being under superintendents and the latter under deputy superintendents. The cadre of the Burma Veterinary Service (Provincial) will be increased from nine to fifteen, nine to be employed in charge of the sub-circles in the district and six at the Veterinary College at Insein. Veterinary inspectors will be increased to twenty-eight and veterinary assistants to two hundred and eighty on pay ranging from Rs. 50 per month to Rs. 150. Simultaneously the standard of education required for admission to the Insein Veterinary College will be raised to the high school final. At present veterinary assistants are appointed after passing a three-years' course at the Veterinary School at Insein. Inspectors are recruited partly by promotion from the rank of veterinary assistants up to two-thirds of the cadre of inspectors and the remainder from amongst students who have taken a diploma at the Calcutta Veterinary College. These students were sent to the Calcutta College with stipends by the local Government. Deputy superintendents are selected from among Calcutta-trained graduates and in rare instances by the promotion of vernacular veterinary inspectors. The province is divided into circles controlled by superintendents of the Indian Veterinary Service and these circles are divided into sub-circles controlled by deputy superintendents. The scheme aims at two veterinary inspectors for each sub-circle and one veterinary assistant for each township. A certain number of assistants are kept in reserve for emergencies or to control frontier stations. District councils are in theory responsible for the health of cattle in their districts but veterinary assistants are paid from provincial funds which also pay for their travelling allowance. They are lent to the district council for the districts to which they are posted. District councils pay their contingent expenses and copies of all diaries go to the chairman of the district council. The head of the Veterinary Department has the power to transfer veterinary assistants from one district to another. In Burma the duties of the staff are largely determined by the Cattle Diseases Rules, 1914, which apply practically to all areas in which the Burma Village Act of 1907 is in force. Under the Burma Village Act the registration of the death of cattle is compulsory and must be done by the owner within 48 hours of the death. The Cattle Diseases Rules of 1914 lay down clearly the responsibilities of villagers in cases of outbreaks of cattle disease and as to treatment of the carcasses and skins of cattle that die. The system followed in Burma is that of the peripatetic veterinary assistant. There are only four veterinary dispensaries in the province and the public seem to evince little enthusiasm for them. The vast areas of the agricultural districts and the difficulties of moving cattle militate against any wide development of the principle of the stationary dispensary and it is thought that more good is done by the veterinary assistants moving freely from village to village with supplies of medicine and attending to cases in the course of their tours.

In 1923 Government appointed a committee to investigate the question of the Insein Veterinary School and its future. As a result, the school is now being completely reorganised as a teaching and research college.

When this reorganisation is completed, Burma will be independent of other provinces for training its superior staff. A building scheme involving an expenditure of slightly over three lakhs has been put in hand and the buildings are nearing completion. It is intended that the college should be fully equipped with laboratories both for teaching and research. The entrance standard proposed is the high school final followed by a three-years' course at the college and accommodation has been provided for eighty students. If the standard is kept sufficiently high it will be possible to train students at Insein for admission to the Burma Veterinary Service.

8. IRRIGATION

Burma is so bountifully blessed by Nature in the matter of rainfall that it is only in the dry central zone that irrigation is of any importance. It may be said that where irrigation is available it is entirely directed to rice cultivation. In fact this crop represents ninety per cent of the whole area under irrigation. On the four major canals of the province no less than ninety-nine per cent of the land irrigated is under rice. It is only in the Kyaukse district that irrigation is devoted to any extent to crops other than rice and this district accounts for about half of the total irrigated area under crops other than the rice crop. Here also a certain amount of double cropping is done, sesamum being sown over a large area before a late rice crop is taken off.

Irrigation was practised by the Burmans long before the British occupation of the country and in fact has been known in the dry zone of Upper Burma from time immemorial. The physical formation of the province militates against irrigation schemes of any magnitude but smaller schemes can be multiplied and the area irrigated in Upper Burma has been trebled since 1901. In many cases, the work has consisted of the realignment and remodelling of schemes originally started by Burman agency.

Irrigation works in Burma were reclassified in 1926 and for purposes of comparison this reclassification may be applied as having existed from 1891 the year from which reliable records are available. The classification is into two groups (1) productive works for which capital accounts are kept, (2) unproductive works for some of which capital accounts are kept and others for which capital accounts are not kept. The first group includes the Shwebo and Mon canals, constructed between 1901 and 1911, and the more important of the indigenous works—the Kyaukse Canal, the Shwetachaung Canal, the Man Canal and the Meiktila Lake. The second group embraces the Mandalay and Yeu Canals, the Salin Canal, the Nyaungyan-Minhla Tank and the Kyaukse Tank, for which capital accounts are kept, and all the numerous petty canals for which no accounts are kept.

The average annual irrigation area for 5-year periods has increased from 238,331 acres in the quinquennium 1891-95 to 737,883 acres in the quinquennium 1921-25.

The irrigation done by the four major canals has increased from 358,997

acres in 1921 to 406,472 acres in 1925. The area irrigated by productive capital works (group 1) has increased between 1900 and 1925 by 325,168 acres or 206 per cent; that by capital unproductive and non-capital (group 2) by 196,389 acres or 214 per cent. In 1901, the mileage of Government channels open for irrigation was 593; in 1925 it was 1,717 miles representing an average increase of 45 miles per annum over 25 years.

The total capital outlay—direct and indirect—on productive works in operation till the end of 1925-26 has been Rs. 1,86,25,709. The percentage of profit on capital outlay (including interest on capital outlay) has been 4.34 per cent and the total income including water rate and miscellaneous receipts and share of land revenue due to irrigation works has been 7.72 per cent on the capital outlay. The corresponding figures for unproductive works for which capital and revenue accounts are kept have been Rs. 1,47,96,785 capital: 1.05 per cent profit on capital outlay and 2.48 per cent profit when the total income—direct and indirect—is included.

The four major canals were originally constructed from funds supplied by the Government of India. In 1921-22 the Government of Burma purchased them for Rs. 2,20,98,665 and the revenue from irrigation is now entirely provincial. No water rate is charged. A consolidated rate is levied on all irrigated areas, the Irrigation Department receiving in some cases a credit of a percentage of the consolidated rate and in others the whole rate less a fixed rate credited to land revenue. The object aimed at is to simplify collection of the revenue and it has worked well. In the Shwabo Canal area, the canal revenue staff, whose duties consist of seeing to the distribution of water and checking areas irrigated, has been amalgamated with the land revenue staff and it is proposed to extend this system to other districts. The policy is to amalgamate the irrigation revenue staff and the land records staff so far as this is possible and so effect economies in revenue collection. Up till now the revenue has always been assessed and collected by the revenue officers.

In a country like Burma where there are so many natural waterways and where the control of these natural waterways and protection against flood are of almost equal importance with that of the provision of water through irrigation channels, it is but natural that a great deal of the work of the Irrigation Department is devoted to questions of navigation and embankments for the prevention of floods.

On the side of navigation there are two important canals in Lower Burma maintained by the department which are of great importance in the commercial development of the province and on which tolls are levied by Government. The first is the Pegu-Sittang Canal completed in 1877-78 and the other the Twante Canal completed in 1916-17. The former canal connects the Sittang with the Pegu river and enables timber from the Sittang Valley to be floated to Rangoon *via* the Pegu river. It also carries a considerable traffic of rice, vegetables, bamboos and firewood. The Twante Canal carries a very heavy traffic in rice from the delta districts to the Rangoon mills and also provides a short cut for river steamers coming from the delta to Rangoon. The Pegu-Sittang Canal

has never paid for its upkeep directly, though it is a very useful waterway and probably makes indirect contribution to the revenues of the Province by the commercial advantages which it gives. In 1924-25 the gross revenue was Rs. 2,22,972, the working expenses being Rs. 4,46,680. The Twante Canal, on the other hand, brought in Rs. 4,61,110 in the same year, the working expenses being Rs. 1,17,273 and the net revenue Rs. 3,43,837 representing a profit percentage of 6.69 on the capital outlay. This canal was constructed from funds supplied by the Government of India, but it was purchased by the local Government in 1921-22 for Rs. 45,64,692.

In Upper Burma, the only navigation canal of any importance is the Shwetachaung Canal in the Mandalay district which combines the functions of an irrigation and a navigation canal. This has never been a considerable source of income to Government and as a metre gauge line is being constructed parallel to the canal and it is proposed to construct a metal road along the canal bank, it is likely to cease to be used as a navigation canal for the carriage of goods by water.

Within recent years nearly twenty-five lakhs of rupees have been spent in cutting new waterways and improving existing ones in the Irrawaddy delta to facilitate communications between stations in the delta and Rangoon and expenditure approximating to 16 lakhs is in contemplation. All these improvements, while they give no direct return, facilitate the movement of agricultural produce to market and materially improve the trading conditions of the country.

The third branch of the activities of the Department of Irrigation is concerned with embankments, the majority of which are regarded as productive as the department receives a credit of fifty per cent of the gross land revenue demand on the areas protected by them. These embankments have been in existence for many years, the Maubin Island and the main Irrawaddy embankments dating back to the early 'eighties. The capital cost of the seven embankments which are regarded as productive was Rs. 48,86,617, protecting in 1924 an area of 848,891 acres and yielding a net revenue of Rs. 5,84,116. These figures show a return of nearly twelve per cent on the capital cost of the works taken collectively. In addition there are numerous small protective works up and down the delta which are regarded as unproductive and in many cases small embankments have been made and are maintained by the cultivators themselves.

Finally, it only remains to remark that great attention is now being devoted to projects for improving the drainage of areas liable to floods. An interesting system of river training without embankments has been evolved by Messrs. F. A. Leete, C.I.E., and G. C. Cheyne, M.B.E., and gives every prospect of permanent success.* The result of this comparatively inexpensive method of river training is to reclaim annually large areas of land suitable for cultivation by a regulated deposit of silt

* "Regulation of Rivers without Embankments." Published by Messrs. Crosby Lockwood and Son, Stationers' Hall Court, Ludgate Hill, London. 1924. Price 30 shillings.

from the streams. Extensive surveys are being made all over Lower Burma with a view to estimating what further steps can be taken to improve the drainage of these flooded tracts.

Reference may also be made to the hydro-electric survey of the province. A rough general survey has been carried out, but a more detailed investigation of certain areas is being undertaken, especially with reference to the provision of a hydro-electrically directed water supply for the city of Rangoon. In this enquiry attention will also be devoted to the possible industrial utilisation of the power generated.

9. FORESTRY IN RELATION TO AGRICULTURE.

The latest report of the forest administration in Burma gives the total area of forest land as 148,396 square miles or two-thirds of the whole province, of which 95,374 square miles are unclassified forests and 31,460 square miles are reserved.

In unclassified forests the control of the Forest Department is generally limited to the protection of certain species, principally teak. For the reserved forests, the Forest Department is directly responsible for the entire management. Little attention can be devoted to the unclassified forests and in consequence promiscuous grazing and unregulated extraction of forest produce are rapidly depleting them of useful growth with the result that they are steadily deteriorating. In the more remote and less accessible forests, the objectionable custom of *taungya* or shifting cultivation, carried out by wandering tribes of cultivators, is having a most deleterious effect on the forests.

In the case of reserved forests, the interests of the cultivators are safeguarded by the forest settlements at which the settlement officer lays down the amount of bamboos, thatch or other forest produce which can be removed under the settlement by the villagers in the vicinity. In 1925-26 the value of produce, including grazing, removed from the reserved forests under the rights and privileges conferred by the settlements was Rs. 2,65,000 and timber for use for house building and other produce granted free under the similar arrangements was valued at Rs. 1,98,000. This however by no means represents the total benefits derived by the cultivators from the forests as naturally they take the bulk of their supplies from the unclassified forests which are not under control and no records of such extractions are kept.

It may be noted that apart from direct benefits derived by cultivators from the free utilisation of forest produce, the principal benefit which forests confer on agriculture in Burma is the amount of work provided for the agricultural population in these forests. It may be said that labour required for the trade extraction of timber is almost entirely supplied by the agricultural population. About a million tons per annum are extracted at an average cost of at least Rs. 25 per ton and a very large amount of this total sum of 2½ crores of rupees passes into the hands either of agriculturists who work in the forests in their spare time or of members of agricultural families who can be spared for more continuous

work in the forests. In addition, the constant demand for bamboos for building and for fuel and other minor forest products gives constant part-time employment to the agriculturists while the labour required for the various works necessary for the improvement and maintenance of the forests is supplied almost entirely by agriculturists in their spare time. In fact, in a country where all the houses outside of the larger towns are built of wood and bamboos and roofed with thatch the relations between the agriculturists and the forests are of the closest and not unnaturally the bulk of the work in connection with the extraction of these products is conducted by the agriculturists themselves. The Chief Conservator of Forests estimates the average annual requirements of the rural household in forest produce at timber 50 cubic feet, firewood 250 cubic feet, bamboos 300 cubic feet, thatch 400 bundles and in practically every case the requirements of the small agriculturist are extracted and handled by himself. The records for grazing show that during the year 1925-26 only 5,402 buffaloes and 26,474 cows and bullocks availed themselves of grazing on payment. On the other hand, over 150,000 buffaloes and over 340,000 cows and bullocks enjoyed grazing in forests by rights conferred upon the cultivators under the settlement, while a certain amount of free grazing was also granted during the pleasure of Government or otherwise than under the settlement.

At present it cannot be said that the conflict between agriculture and forests is acute though in the more densely populated parts of Lower Burma there is constant conflict between cultivation and forest rights when applications for the throwing open of a fuel reserve to cultivation come up. Any proposal to throw open a fuel reserve to cultivation is almost invariably opposed by a public opinion equal in strength to that which demands transfer to cultivation and the maintenance of the balance between the conflicting interests of agriculture and forestry will become increasingly difficult as the population increases and as the forests near villages become depleted of the produce which the agriculturist requires for his local needs. The present position may be summed up in the statement that at present the supply of forest produce is generally adequate but the accessible areas of supply outside reserved forests are being rapidly depleted before the demands of cultivation, grazing and wasteful exploitation. The people now have to go further afield for their supplies and in many cases this has involved such a burden that a recognised trader in forest produce replaces the old system by which the individual extracted his own requirements. In these circumstances, the policy of the future contemplates the gradual absorption of the vast areas of unclassed forests so far as this can be effected either by reservation or by allotment as village waste for the use of definite village communities. The definite allotment of land as village waste has the advantage that the villagers concerned will have the right to protect such land, a right which at present they do not enjoy. In order to meet the increased demand on the reserved forests which has arisen within recent years, considerable attention is being devoted to regeneration and planting up operations. On the general relation between

forests and agriculture in Burma, the Chief Conservator writes as follows :—

“Where the interests of forestry conflict with those of agriculture the problem of correlating them is not always easy. It is accepted as axiomatic that land suitable for permanent cultivation should be released for the purpose unless there are exceptionally strong reasons for retaining it under forest. On this policy the bulk of the reserved forests have been relegated to the hills and those in the plains have been restricted in area to what is essential to supply the wants of the surrounding population. Pressure of population upon the soil is responsible for periodical demands to eliminate the limited blocks of forest that have been retained in the plains. It is, however, generally recognised that a cheap and accessible supply of forest produce is a necessity to the peasant proprietor and this supply cannot be made available unless there is a proper provision for the maintenance of land under forest. A recent careful enquiry into the status of the reserves in the plains on either side of the Pegu Yomas has shown that when the matter is properly examined, both the district authorities and the people themselves are fully alive to the value of these reserves in the rural economy. In the case of the reserved forests on the hills the demand to push back their boundaries has not arisen and is unlikely to arise in the near future in view of the low agricultural value of the land and in the face of our present policy of working the accessible portions primarily for the benefit of the local people. There will, however, arise at intervals a clamour against the restrictions imposed by forest regulations. In resisting this much will depend on the extent to which people can be educated to realise the necessity for conserving supplies and to understand that restrictions in the methods of extracting and utilising forest products are necessary for conservative management. The ideal position would be to have portions of the communal lands set aside for the production of forest crops and managed by co-operation under State supervision. Under existing conditions, bamboos are frequently planted as a garden crop, and occasionally an enterprising individual has planted cutch trees for use as house-posts and fuel. There has, however, been little system and no co-operation in the matter, and until these materialise any reduction in the accessible areas of our reserved forests would be a very short-sighted policy, both from the point of view of the State and that of the agriculturist.”

10. GENERAL EDUCATION.

The latest report of the Director of Public Instruction shows that the percentage of scholars to the total population in 1926 was 6·8 males and 2·41 females or a percentage total for the province of 4·66. The province has one university consisting of two constituent colleges, the University College, Rangoon, and the Judson College, Rangoon, and an Intermediate Arts College at Mandalay. For males, there are 149 high schools with 38,589 pupils, 1,326 middle schools with 125,384

pupils, 3,584 primary schools with 172,224 pupils and 725 special schools with 14,020 pupils. For females there are 259 high schools with 6,539 pupils, 174 middle schools with 17,656 students, 677 primary schools with 35,023 pupils and 31 special schools with 666 pupils. In addition to this there are 18,489 unrecognised institutions with 203,710 pupils. It may be remarked that the monastic system of education takes a very large place in the education of the rural population. 1,184 of these schools with 69,684 pupils are on the aided list and in addition there is a very large number of private monastic schools roughly calculated at 17,398 with 179,210 pupils. From the point of view of the Education Department these schools are of no great value in the strict educational sense but it cannot be denied that they contribute very largely to the literacy of the province. Thus the census figures for 1921 show an average proportion of literacy over the age of ten as 576 for males in Burma in every thousand as compared with 161 in India, and 123 females in Burma as against 23 in India. It is to be feared however that, as in India, the bulk of the pupils go very little further than standard II. In these circumstances the possibility of introducing agricultural teaching into the ordinary schools of Burma seems very remote despite the higher general standard of literacy in the province. There has, in fact, been no attempt at teaching agriculture in ordinary schools beyond an experiment with school gardening which failed in its object because it was regarded as a vocational subject and not merely as an effort to introduce some pleasant variety into the school curriculum. As a college of agriculture has only recently been opened in the province, no serious attempt has yet been made to tackle the question of agricultural education in other institutions.

The total expenditure on education in 1925-26 was Rs. 1,72,41,598, nearly 27 lakhs of rupees more than in 1924-25. Of this Rs. 78,06,450 was met from provincial funds, Rs. 17,46,800 from local funds and Rs. 7,34,906 from municipal funds. The balance is met from fees, funds of the Federated Shan States, and payments by missions or managers on account of their share in the maintenance of schools which receive grants-in-aid. It may be remarked that over fifty per cent of the expenditure shown under local funds was contributed by provincial revenues. As in other provinces of India, education is a matter in which the local legislature takes the keenest interest and progress both in expenditure and in the raising of the standard will be rapid.

11. CO-OPERATION.

The co-operative movement is one of great importance and the statistics of the movement may be of interest. At the end of June 1926, there were 5,383 societies of all kinds with a total membership of 147,264. The total amount of working capital, excluding sale and insurance societies, was Rs. 4,74,83,833 and the total expenditure on management Rs. 16,48,435. During the last few years, there has been a considerable weeding out of unsatisfactory societies and the number of societies and of members shows some reduction over the last four years.

The apex institution of the movement is the Burma Provincial Co-operative Bank Limited, with headquarters at Mandalay and branches at Rangoon, Thaton and Bassein. The capital of the bank is made up of shares of Rs. 100 each held by individual shareholders and shares of Rs. 100 held by constituent societies and the capital of the bank at the close of the financial year 1926 was Rs. 6,61,540. Fixed deposits are received from the public at rates of interest which are varied according to the requirements of the bank, but run about $5\frac{1}{2}$, 6, 7 and $7\frac{1}{2}$ per cent for one, two, three or four year deposits. The bank at the close of the financial year 1926 held fixed deposits of Rs. 85,62,002. An important source of finance also are the deposits in its saving bank section which undoubtedly have induced a spirit of thrift among the people. In addition, certain co-operative societies also deposit their reserve or surplus funds in the provincial bank and over $7\frac{1}{2}$ lakhs were made available from these sources during the year. The bank has investments in Government paper of over $33\frac{1}{2}$ lakhs. The provincial bank as the apex bank of the system provides fluid reserves for all district banks, town banks and urban societies which seek its assistance and its branch banks at Rangoon, Thaton and Bassein undertake the duty of financing credit societies in their local area and also of attracting local capital.

In addition to the provincial bank, there are 23 central banks which perform for small areas the functions of the provincial bank from which, if local supplies of capital are not ample, they can obtain funds. Omitting money lent by societies of one class to societies of another class, the net amount of working capital in these central banks was at the end of June 1926 Rs. 49,80,225 and they showed a profit on working of Rs. 1,29,191.

As in other provinces, the most important and most numerous class of society are the primary agricultural societies of which there were at the end of June 1926, 3,919 pure credit societies, 111 tenancy co-partnership and credit and 2 land mortgage societies. These credit societies are of course the base of the whole movement and engage most of the time of the administrative staff. Primary credit societies have a total membership of 87,781 and a share capital of Rs. 37,57,386. The profit for the year amounted to Rs. 3,59,420. The average loan at the end of the year under report was Rs. 197. Above these primary societies are unions for supervision and guarantee numbering 569. These exercise supervision, inspection and primary audit.

In comparison with credit societies, progress in other directions has not been great. For instance there are only 21 purchase and sales societies (agricultural) and 6 non-agricultural. There are 6 agricultural production societies and 3 non-agricultural production societies. There are 395 cattle insurance societies, confined entirely to five districts in Upper Burma, but it cannot be said that they are very active. It is in district agricultural and co-operative associations and union group boards that the link between co-operation and agriculture is strongest and it is the policy of the Agricultural Department to run private seed farms by the agency of co-operative societies and their members. Some success has

been achieved in Upper Burma where a considerable amount of seed and implements have been distributed through co-operative societies, and private seed farms have been established which are run by co-operative societies and their members. In Lower Burma progress is slower but the principle is gaining in popularity and the Agricultural Department look to the Co-operative Department for great assistance in the matter of running seed farms and in the distribution of the approved products of the Agricultural Department. The link between the officers of the two departments is close and, as the Agricultural Department supplies the material, the Co-operative Department will be in a position to assist in its wider distribution. From the statistics given, it cannot be said that co-operation has made any very marked impression in Burma as a whole. It is doubtful if more than five per cent of the total population who might become co-operators have as yet joined the movement.

12. COMMUNICATIONS AND MARKETING.

The physical features of the province have been the principal factors in shaping the systems of internal communication as these have been progressively developed. The general conformation of the country is that of river valleys separated from each other by great mountain ranges and these naturally present considerable obstacles to the construction of a general network of roads or of railways such as is possible in the great plains of India. The rivers have been the dominating factor and the tendency therefore has been for trade to establish itself most firmly in those areas possessing natural means of communication by water. In fact, it has been pointed out that only ten of the thirty-eight district headquarters cannot be reached at all times of the year by ocean steamers or river launch. When the British occupied Burma there were practically no roads in the accepted sense of the term, but only jungle tracks and such roads as were constructed in the early days of the British occupation were designed mainly to link up posts on the frontier with district headquarters. The first road of any importance was constructed in 1861 from Myede in the Thayetmyo district through Prome to Paungde, and ten years later it was continued to Rangoon. When in 1874-77 a metre gauge railway was constructed along this road to connect Prome with Rangoon, a new road was necessitated parallel to the railway. Simultaneously a road between Pegu and Rangoon was constructed and its continuation to Toungoo was contemplated. But with the construction of the railway to Toungoo in 1885 the scheme was abandoned and attention was devoted to the construction of feeder roads. A road was also started from Moulmein, the ultimate terminus of which was contemplated as Ye, but this road has never been completed. Moulmein is now connected with Ye by a railway.

The annexation of Upper Burma diverted expenditure from communications in Lower Burma to the provision of roads for military requirements in the upper province, and frontier troubles led to the construction of numerous roads on the frontier. Fortunately, however, railway construction has kept pace with the general development of

the province, and the line from Rangoon to Mandalay was opened in 1889. An extension from Sagaing on the west bank of the Irrawaddy to Myitkyina was begun in 1890 and opened in 1899. The requirements of the delta were met by the construction between 1873 and 1900 of three canals to connect the creeks at the mouths of the Irrawaddy, Rangoon, Pegu and Sittang rivers to provide inland waterways for country boats. Of these the Twante Canal is the most important. It has been widened and improved and is freely used by rice traffic while the Pegu-Sittang Canal now mainly is utilised by timber rafts. The third canal, the Sittang-Kyaikto, has become inoperative since the construction of the railway to Martaban. To sum up, at the beginning of the present century the communications of Burma consisted of about 1,100 miles of metre gauge railway line and 8,000 miles of roads of all classes in addition to the inland waterways. Within recent years, there has been a great advance in railway construction and the mileage is now approaching 2,000. Rangoon is connected by railway with Moulmein, Bassein, Mandalay, Myingyan, Heho in the Southern Shan States, Hsipaw and Lashio in the Northern Shan States, with Myitkyina in the extreme North and with the Lower Chindwin district. There are now about 10,000 miles of roads. The great difficulty in the maintenance of roads in Burma is the scarcity of metal in Lower Burma and the rapid deterioration of timber bridges which were used in the earlier days. A special sub-committee appointed in 1920 to examine road proposals for the province recommended an expenditure of no less than eight crores of rupees and these recommendations have been accepted by the local Government. The general financial situation also has considerably curtailed development and a great deal more expenditure has been incurred on maintenance and repairs than on original works. This may be seen from the fact that for the decade ending 1910 the average yearly expenditure on roads was only 18 lakhs for original works and 21·2 lakhs for repairs and for the decade ending 1920, 18·8 lakhs for original works and 33 lakhs for repairs. In 1919, 75 lakhs were specially allowed for expenditure during the next three years on road improvements and in 1922 Rs. 244 lakhs were earmarked from the profits derived from the rice control scheme to be spent in conferring permanent benefits on the agriculturists of the province.

Since 1923 a Communications Board, which has been given powers of administration, was formed for the province and since then there has been a distinct forward movement in the matter of communications. It has considered 241 projects and approved of work estimated to cost 467 lakhs. The most important work sanctioned is the programme of trunk road construction which is to be completed in 1931. An important link in this chain of trunk roads is a bridge across the Irrawaddy at Sagaing, and it is understood that the sanction of the Government of India has now been accorded to its construction. This will link up the east and west banks of the Irrawaddy. Since the appointment of the Communications Board the expenditure for the seven years ending 1926-27 has increased to an average of 43 lakhs on original works and 43·5 lakhs on repairs. The expenditure for 1926-27 on provincial main

roads alone has been 57·2 lakhs on original works and 38·9 lakhs on repairs. Of the 10,000 miles of road in the province, 6,000 are main roads which are maintained by the local Government and 4,000 miles are maintained by local authorities as district roads. Up till 1923 the Public Works Department was responsible for the maintenance of district roads, but since the passing of the Burma Rural Self-Government Act, this responsibility rests with district councils or with deputy commissioners in areas excluded from this Act. Where local authorities have not an adequate staff and plant, the Public Works Department undertakes maintenance of the roads. It is estimated that to maintain these district roads at their present standard Rs. 27 $\frac{3}{4}$ lakhs is required annually and to this the local Government makes a contribution of 17 lakhs. In order to prevent works being carried out by any district council which are beyond the financial capacity of such district council to maintain, the local Government has limited the capital expenditure on district roads to Rs. 6 $\frac{1}{4}$ lakhs per annum and contributes the funds for other approved works which are carried out by the Public Works Department.

In common with other provinces of India, the advent of the motor-car is making itself felt in Burma and the number of motor vehicles imported into Burma during 1926 was no less than 2,664. Wherever a road permits of it, motor bus services financed privately are immediately started to connect the surrounding villages with the nearest town, steamer or railway station.

It may be of interest to note the principle that is being followed in the construction of new main roads. Where possible these follow the general alignment of established cart tracks, but when they run in the same direction as a railway they are generally constructed within two miles of the line and parallel with it, now on one side, now on the other, and crossing the railway at the principal towns or at suitable points about every tenth mile. They thus form lateral feeders to which subsidiary feeder roads of reasonable length may be constructed on either side of the railway to connect with the principal stations, and without such subsidiary feeders having to pass over or under the line. Main roads are from 22 to 24 feet broad, the central 12 feet being metalled with stone, and permanent bridges are now being put in with a 16 feet broad roadway capable of taking a weight of 12 tons. The cost of construction varies from Rs. 30,000 to Rs. 50,000 per mile according to whether stone and laterite are obtainable locally and the cost of maintenance varies from Rs. 1,500 to Rs. 5,000 per mile. Under the direction of the Communications Board and subject to the possibility of providing finance, an extensive programme of road construction in all districts on a definite plan has been initiated and is being rapidly pushed forward.

Marketing

Marketing in Burma presents no particular features. The chain is from the small village broker to the local dealer residing in the surrounding markets and milling centres and thence to the small local mill or the

large rice mills in Rangoon. Formerly, it was the custom for these large Rangoon mills to give advances to their brokers to enable them to purchase paddy in bulk but it is understood that this custom has now been discontinued.

When a cultivator has threshed and winnowed his paddy, he sets aside enough to pay his land revenue if he is a landowner or his rent if he is a tenant. He then pays his hired labour and any advances he may have taken towards the expense of raising the crop under disposal. He then sets aside his *wunsa* or the amount which he calculates will be necessary for his domestic purposes for the year and the remainder he holds ready for sale. If a small man, he deals with the local village broker who arranges for its transport to the large broker at the local railway station or river siding. The ruling prices in Rangoon are generally well known in paddy producing tracts and the cultivator seeks, by bargaining with the broker, to obtain a price as closely approximating to the Rangoon level as the broker may be willing to concede. Another matter of dispute is the basket with which the paddy is measured, for the basket varies from village to village in the most extraordinary degree even within a radius of five miles. As a rule, however, an amicable settlement is arrived at and there are few cases of serious dispute. Occasionally, the cultivator gets the advantage of carting his own paddy for which he is paid cart hire.

When the paddy has reached the large broker various things may happen. If the broker is not working in direct arrangement with a Rangoon mill he may store it in his own godowns for a rise in the market. Large ranges of these buildings will be seen at all the principal railway stations and at many of the river sidings in Burma. If he adopts this policy he can hold the crop for a rise in price, or, in other words, speculate on the market. If he does not incline to speculation he can dispose of the paddy at once to the numerous local small rice mills which within recent years have sprung up in formidable numbers all over the delta or he may forward it at once to the large rice mill in Rangoon. The produce of the small mills either finds its way to Upper Burma or is sold in the neighbourhood of the mill or it may be sent after milling to Rangoon where it is handled both by the brokers and by the large shippers, in the latter case being frequently re-milled. Another industry which has sprung up within recent years and which is mainly in the hands of the small millers is the parboiling of rice for the Madras and Ceylon markets.

The bulk of the crop, however, is dealt with by large mills in the ports of Akyab, Bassein, Moulmein and Rangoon. These mills classify paddy by the somewhat artificial distinction of rail and river paddy which so far as they are concerned merely means the route by which the paddy arrives, although in actual fact there is a slight difference in the quality and class of paddy carried by the different routes. Rail paddy, as a rule, is a short-lived variety and slightly inferior to the boat paddy, which is a long-lived variety. This latter has the advantage that it has generally been put straight from the threshing floor or river siding into

the paddy boats and is therefore cleaner and has suffered less from adulteration.

All the large rice mills have their sidings or jetties and at these the paddy is delivered to the mill from the railway or from the country boat. In Rangoon the method of purchase is on the basis of a 9 gallon basket weighing 46 lb., a bonus being given for weight in excess of 46 lb. and a proportionate cut if the paddy weighs less than 46 lb. There are numerous complaints of collusion between the weighmen, the broker and the tally clerk but these are not serious. It may be remarked that a considerable amount of skill can be exercised in measuring paddy as paddy lightly dropped from a height into the weighing basket may weigh considerably less, bulk for bulk, than does a basketful closely filled and pressed down, but the paddy seller as a rule is no fool and is quite capable of looking after his own interests. There are of course numerous cases of theft from wagons or boats while in transit or while stored on the threshing floor and at railway sidings, but this is a feature by no means peculiar to Burma. There are also constant complaints of the lack of supply of railway trucks but, as a rule, the railway administration does all it can to deal with the crop at the rush period.

The marketing of cotton is not quite so satisfactory. As a rule, this crop is grown by a small cultivator who is generally in financial difficulties. In some cases, if his debts are considerable he finances his agricultural operations on credit and on the arrangement that he repays in *kapas* when the crop is plucked. Naturally not much is left to him by the time his crop matures. If his indebtedness is not so acute and if he can finance himself until the picking season he may still have to have recourse to the village trader for money to tide him over and here again the arrangement is to repay the cash loan in *kapas* at a fixed market price. This fixed price, it is to be feared, is generally in favour of the trader and the price must cover the interest on the loan and the risk taken. It is only in rare cases where a cultivator can refuse financial help altogether that he gets the full benefit of his crop.

These arrangements have far-reaching effects, not the least of which is the agricultural disability created. Instead of being able to keep their best seed, these cultivators have to hand over their whole crop to the trader and to buy back from him any seed which he likes to supply. As a result, it is seed of bad germination and mixed seed that comes back to the cultivator and the efforts of the Agricultural Department to improve the crop are, for that reason, handicapped. It is unfortunate that in cotton there is no free market. The cultivator is, in the first place, in the hands of the trader who does not deal with large ginneries direct but works through a broker and thus there is a long chain between the field and the mill, which militates both against the cultivator and against the efforts of the Agricultural Department to improve his crop. The Agricultural Department has attempted to open cotton markets as recommended by the Indian Cotton Committee, but it is understood that no great success has so far been achieved.

The other commercial crop of importance is groundnut and the eccentricities of this market are graphically described by Mr. Chalmers,

Development Commissioner, in a memorandum submitted to the Commission from which the following is an extract :—

“ The cultivator in marketing this crop is less well organised than in the two crops already discussed. The main markets are on the river bank from Pakokku to Allannmyo. The Magwe market, which is probably the worst from the cultivator's point of view, may be taken as a sample of the seller's experience in disposing of his crop. The cultivator arrives in Magwe—generally overnight in order to save his cattle travelling in the heat of the day—he puts up at the compound of his broker and early in the morning the local buyer appears on his bicycle and bargaining begins. The buyer examines the consignment and depreciates it as much as possible ; the broker, if he is honest, holds a brief for the cultivator,—by repute he seldom is—his bias is towards the buyer with whom he has many transactions, whereas he sees the seller but once a year. If a bargain is struck, the cart of nuts is chalked, and proceeds to the buyer's godown or dump. Here the usual chicanery takes place. The nuts are delivered on a weight *cum* volume basis. The baskets vary considerably at the various stations. The Rangoon basket is supposed to weigh 25 lb. and the prices advices are on a F. A. Q. standard. The buyer's measurer takes over on a Magwe basket heaped, which normally weighs 37 lb. If the Rangoon quotation is, say, Rs. 180 per 100 baskets the Magwe buyer adds to this fifty per cent to cover the basket difference, and deducts Rs. 50 the freight charge to Rangoon to get a starting price ; whatever he is below this is gain—gain of a perfectly legitimate kind : but it is at this point that the cultivator is skinned. From time to time a basket is weighed and should it fall below 37 lb. a cut is made on the price of the consignment. No bonus is given for an excess in weight as in the case of paddy. The basket is heaped up with nuts and may be pressed down or shaken. In the latter the weight may go up as high as 40 lb. per basket, and the loss be as much as eight per cent of his crop. The nuts spilled are the perquisite of the measurer ; in a morning's weighing this may amount to something considerable as any ‘ broken basket ’ is also his.

The cultivator is but a child in the hands of the broker and the measurer. If he attempts to adulterate his nuts with husk or shell, he is caught out when the basket is weighed, and the cut is sufficient to cover the buyer's probable loss. Shingle added is easily detected. Watering when the nuts have to travel a long way so that there is time to absorb it, and steaming for quick absorption of weight are resorted to ; but the buyer and measurer meets this every day and can soon detect ‘ doctored ’ nuts. These are the difficulties of the cultivator when the deal is on the straight. What are his chances when the broker takes secret commission, the measurer is a rogue, and the weight false ? For the present indifferent methods the cultivator has himself in part to blame. He has but to organise and he can dictate his own terms provided they are reasonable. He could, if he had sufficient intelligence, less suspicion, and any power to combine, market his produce in an open market, where prices would be known daily on advice from Rangoon, sell by weight which is the best test of good nuts, unless we are going to test for oil content and have proper

stamped scales and a neutral weighman. Until this is done there can be little improvement in the market conditions. To summarise: the ideal we ought to struggle for is:—

- (1) an open market with daily market prices published (elimination of the broker) ;
- (2) sale by weight with a bonus for consignments over F. A. Q ;
- (3) genuine weightment by neutral tallymen.

The first two can be accomplished if the cultivator through his societies will combine ; but strange to say Magwe district is one of the areas where co-operation has not taken hold.

The third is a difficulty, as honesty is a rare quality, and where it does exist it is apt to be destroyed by the seller or buyer bribing the man appointed to give them a square deal.

The cultivator has been done so often, that he is a bundle of suspicions : the better the plan devised for his good, the more suspicious he becomes : the fact that he cannot detect a catch in a good scheme only confirms him in his belief of the cunning used to invent it. He will in most cases have none of it ; if he does come in, he comes in with the intention of perverting it at the earliest opportunity. Arcadia only exists in the imagination of the poets. The agriculturist enjoys ' slim ' practice so long as he is not the victim. Buying by weight is steadily gaining in favour and the other riverine markets have adopted it. Magwe will in time follow. The question of freight has not been examined : but Rs. 50 for the freight of about 1½ tons of nut from Magwe to Rangoon appears to be excessive ; the crop is a bulky one and takes up much space. The Myingyan method of dealing with the nut is more economical. The oil is pressed, the shell burned, and the cake resulting is in the best form for transport. The oil can be disposed of in the province, and the cake exported for cattle-feed. Perhaps the line of advance here is the small mill ; but the difficulty is to deal with the by-product, the cake in a small unit : it means expensive hydraulic presses and good marketing facilities for the oil and cake if the venture is to be a success."

With regard to the marketing of cattle, this also is somewhat haphazard and there are no real stock markets in the province. As has been pointed out, the dry zone is the great breeding centre of Burma and the animals from this area are drifted down the river on rafts, marched down by road or conveyed by train to Lower Burma. There is a kind of cattle market at Allannyo in the Thayetmyo district on the east bank of the Irrawaddy and this has attained some reputation and is fairly successful. Should sales not be effected there, the cattle continue their march south to Paungde in the Prome district where a considerable business is also done. Pyawbwe in the Yamethin district is also a large cattle dealing centre where many cultivators go to buy their supplies, but the markets are not organised or controlled. The ordinary vendor of cattle is the cattle-breeder who has his own stock to dispose of, buys a few from his neighbours or is entrusted with the sale of others and starts off on his march southward selling as he goes. The other dealers are large buyers from Lower Burma who go to cattle breeding centres buying from village to village and on their return disposing of the animals in their own local

areas in Lower Burma. It may be remarked that a considerable number of cattle also come in to the more eastern districts of the province from Siam and the French States.

13. LOCAL SELF-GOVERNMENT.

Local self-government in the sense in which it is known in other parts of India only came into effect with the passing by the local legislature in 1921 of the Burma Rural Self-Government Act. This enactment provides the basis for the education of the rural population in the responsibilities of representative institutions by transferring the administration of local matters outside municipalities, including vernacular education, from purely official control to elected councils and boards, such local bodies being, as far as possible, neither assisted nor controlled by government officers. Prior to this the only suggestions of local self-government in the accepted sense were municipalities of which, as a rule, the deputy commissioner was president with an official or non-official vice-president and in the smaller towns, town committees. Outside these areas rural administration was regulated by the Burma Village Act administered by village headmen and village committees. Prior to its amendment in 1924 the village headman was practically all-powerful within his village tract, but since that date some of his powers have been transferred to a village committee, especially in connection with the trial of civil and criminal cases. Under the Act, it is the duty of the headman to report certain matters to the officer in charge of the nearest police station, for instance, the arrival in his village of any suspected criminal, the committing of or the intention to commit various major offences, the occurrence under suspicious circumstances of any death in his village tract and any matter likely to affect the maintenance of order. His main duty however is the collection of the revenue of his tract and the general supervision of his village. Rules have been made under this Act prescribing the duties of the headmen of village tracts in respect of contagious or infectious diseases among human beings and it is also under this Act that are defined the duties of the headman and residents of a village tract in respect of the prevention and suppression of cattle disease. These undoubtedly have formed a very powerful assistance to the Veterinary Department.

With regard to the Burma Rural Self-Government Act, 1921, this Act provides first for the creation of circle boards and secondly for district councils. So far, however, the only functions definitely assigned to circle boards are the election of members to the district councils and the submission of an annual statement of their requirements and estimates of expenditure for the coming financial year. Other functions can be exercised only on the transfer of any matter by the district councils under Section 53 of the Act and, in general, district councils have made no complete delegation of the control and administration of any matters to the circle boards. A further delegation would be from circle boards to village committees which are contemplated in the Burma Village Act as amended in 1924, but since the circle boards have had no functions

delegated to them which they can delegate in turn to village committees under Section 25 of the Burma Rural Self-Government Act, 1921, these committees cannot yet take any place in the scheme of rural self-government as dealt with in the Act. And indeed so little has been delegated to circle boards that they are practically moribund.

It is too early as yet to say what success will attend these councils as they only really came into effect at the end of 1923, but there is no doubt that at present they are suffering from lack of trained secretaries, engineers and other staff, while the inexperience of the members is also an obstacle to rapid advance. It thus follows that in the meantime a large number of duties are performed as they were before the introduction of the Act, for instance, village headmen continue to have duties in respect of public health and the health of cattle in subordination to the district officers of Government and independent of the new local bodies and the Public Works Department does a considerable amount of their road construction and maintenance. These difficulties, however, are merely temporary and will disappear as experience is gained.

The total provincial contributions to district councils during 1925-26 was Rs. 31,04,279. Of this total Rs. 15,93,209 was for education and Rs. 16,11,070 for general purposes*. The total receipts of district councils (excluding revenue, balance and debt) were Rs. 81,58,687 and their payments (excluding debt) Rs. 71,97,306.

14. PUBLIC HEALTH AND SANITATION.

As a rule, the Burman is vigorous, healthy and active; and although rice is the staple food the population does not suffer from the deficiency of diet which seems to depress other rice-eating groups of India. This is probably due to the fact that his diet is varied and that, even in the poorest household, salt fish forms an integral part of the food ration. In addition, a very large amount of country vegetables and roots are consumed, while the fact that the preparation of the raw paddy in the village hullers does not lead to high polishing or the removal of nutritive portions of the rice probably contributes to the soundness of the diet. In the more congested parts of Lower Burma, however, the very large influx of Indian immigrants, who in 1925-26 numbered no less than 408,464, tends by the somewhat lower standard of living of these immigrants to depress the average level of nutrition, while there is no doubt that by this same agency a considerable amount of disease is introduced and spread. That the Burman is on the whole better fed than the other races of India may be inferred from the expectation of life figures which were worked out for the 1911 census: these enquiries gave an expectation of life for a Burman male as $31\frac{1}{2}$ years and for a female $32\frac{1}{2}$ years, figures which are only approached by Madras where the expectancy of life for males is 26 and females over $27\frac{1}{2}$. In other provinces the figure is about 21. Added to this is the fact that, except in the largest cities, there is very little congestion of population

* Of this sum Rs. 10,93,632 was for public works, Rs. 2,35,696 for public health and Rs. 2,39,146 for medical purposes.

as Burma is much underpopulated, the average density of populations per square mile being only 68, the next province being the Central Provinces with 139 to the square mile, rising to no less than 608 persons to the square mile in Bengal.

Burma is subject to diseases similar to those which work havoc in India and amongst the most important of these and by far the dominating disease is fever in one form or another. When we consider that for six months of the year, the delta of Lower Burma is practically entirely under water and that for months afterwards shallow pools are left scattered about the country—most suitable breeding grounds for mosquitoes—it is not to be wondered at that a large number of the population are constant victims to malaria. This liability to malaria undoubtedly reduces the working efficiency of a large part of the rural population. Plague is now more or less established in the province, principally in Rangoon from which it is liable to be disseminated up-country. Cholera outbreaks are frequent and there is a considerable amount of small-pox. Hookworm disease is also unfortunately present, though so far it has not proved serious.

As regards hygiene, the Burman is by habit scrupulously clean and the houses are as a rule also kept in a tidy and orderly manner. There is, however, a tendency to carelessness in the village surroundings and the general custom of keeping the cattle in villages at night as a protection against cattle theft does not tend to improve matters. Wells and drinking tanks are apt to be neglected and the ideas of rural hygiene may be said to be of the most primitive. It may be remarked, however, that as in the delta the population lives in houses surrounded by water for a considerable part of the year, it is not easy to attend to matters of village hygiene though it may also be hoped that the thorough cleansing with water which the villages receive during this period may do something to remove accumulations of filth and refuse.

Within recent years, the Public Health Department in Burma has been very substantially strengthened and during the year 1925-26 the total amount spent in the province on civil sanitary works was Rs. 54·37 lakhs, of which Rs. 18·64 lakhs were devoted to water supply and Rs. 19·8 lakhs to conservancy. In the towns and municipalities the percentage of income spent on conservancy was 6·01 and on water supply 5·87 and the total expenditure on sanitary works was Rs. 49,72,000. But the department is by no means strong enough to deal with the great problems of the country. At present it consists only of the Director with two assistant directors, and in most districts the civil surgeon combines with his duties as medical officer those of district health officer. Recently sixteen Burman sub-assistant surgeons have been placed at the disposal of the Public Health Department but this number must be very much increased if any impression is to be made on the province. A Public Health Institute has been opened in Rangoon and doubtless, with this provision for training, the staff of district health officers will in due course be largely increased.

In conclusion, it may be remarked that very considerable improvement has been effected in the sanitary condition of some of the larger

riverine towns of the delta by raising their level. This has been effected by pumping up sand by dredgers from the adjacent rivers. In some cases this has been accompanied by a new lay out of the towns and in these areas the general health has been materially improved.

While the expansion of medical relief has gone on rapidly and there is now practically one medical institution for every 794 square miles of country and for every 45,000 of the population, these schemes hardly touch the needs of the rural population as the hospitals are in the main located in the towns. A scheme has, therefore, been drawn up by which private practitioners and retired sub-assistant surgeons are given a subsidy of from Rs. 50 to Rs. 125 per month provided they will settle and practise in smaller towns where no hospitals or dispensaries exist. At present 13 such practitioners have settled down to practice, apparently with considerable success, and arrangements are being made to extend this scheme and obtain more medical men on these terms. In time it is hoped that by this arrangement modern medicine will be brought within the reach of a greater part of the population, at present dependent on the indigenous Burmese medical practitioners who, as in almost every country, have a large following. Government has devoted its attention to this type of practitioner and schemes for training have been originated which will enable him to bring to his indigenous theory of medicine at least the principles of cleanliness, asepsis and the application of antiseptics.

APPENDIX.

The witness submitted the following note in order to give a fuller explanation of the points raised in questions.

[Reference—The Chairman's question with regard to my answer to Question 1 (a). I submit this note for fuller explanation of the point.]

There is an important Entomological section in the Indian Museum containing a valuable identified reference collection and on many occasions Pusa, Dehra Dun and all other institutions dealing with entomology have to send specimens for identification to this place. I suggest developing it on the lines of the British Museum.

Identification is capable of being done only by specialists. It is generally possible for one to become a specialist only in a small group to which he devotes his whole time. Reference to a large collection and literature is also necessary for this work. All institutions maintaining a collection in India, the Indian Museum, Pusa, Dehra Dun and others, have to send the specimens for identification to such specialists all over the world. In the beginning the Provinces used to send specimens to Pusa and Pusa used to send them out to specialists. Now the Provinces are sending specimens direct to specialists. I do it, and I know Madras does the same. Pusa maintains an identified reference collection and the Provinces too have now got an identified collection as is required for their work, thus generally doing away with the necessity of any reference to Pusa.

Maintaining a large collection is really museum work requiring a lot of time and the time devoted to it by agricultural entomologists should, properly speaking, be devoted to economic work. To be a systematist one must be at it so thoroughly that one has no time to think of other problems.

If the collection is centralised as I suggest, the systematic work will be efficient. Any one trying to specialise in any group will have at one place the collection from the whole of India.

I think I have now been able to express myself sufficiently to be able to say that identification of specimens is by no means of the nature of fundamental work which the Provinces expect from Pusa and also, as I have explained above, Pusa cannot be expected to be able to do this work. Even if the Pusa Entomological Section be expanded according to the Imperial Entomologist's proposal it will be many years before systematic specialists develop and it is doubtful if specialists in all groups will ever develop. This has happened nowhere. Personally I do not think that a large expenditure on the development of systematic entomology and on bringing out systematic specialists at high rates of pay is at all justifiable. With facilities at the Museum systematists will develop. The provincial entomologists are directly dealing with the pests occurring in the Provinces and they know, or at least are expected to know, the behaviour of these pests in their own Provinces more intimately than Pusa. Pusa therefore will be of absolutely no help to the Provinces, as far as pests are concerned, unless it carries out intensive study and research on economic lines, as I suggest.

As regards the link in my proposed scheme between the Indian Museum and the different centres of entomological work, all the centres will send their whole collections as they are made to the Indian Museum which will identify what it can and get others identified and report the result and where required will send back duplicate named specimens. In this manner the survey of the insect fauna will be more efficiently and quickly done than is the case at present. Properly speaking, this survey is more the work of the Zoological Survey Department than of agricultural entomologists, though as regards pests it is of value to the latter for knowing distribution and occurrence. The agricultural entomologists working in the Provinces have the opportunity of making collections. I want to relieve them of the work of getting identified, and maintaining, any collection beyond what is required for their work. In some cases however what actually happens is that some economic entomologist comes to specialise in a group to which some pests belong and the collection of such a group is built up principally by his own work. It should be compulsory for such collections to be deposited in the Indian Museum; otherwise, with his departure and the consequent lack of interest, the collection may be spoilt. Also such collections (excepting duplicates) must not be allowed to be taken out of India.

**Mr. H. F. ROBERTSON, B.Sc., I.A.S., Deputy Director
of Agriculture, Myingyan Circle, Meiktila.**

Replies to the Questionnaire.

(The replies apply only to the Myingyan Circle and the Dry Zone.)

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(a) In my view the only successful measure in influencing and improving the practice of cultivators is to carry out "demonstrations on their own and neighbour's land and under the ordinary conditions." All other lines of propaganda in the absence of this one have a very minor effect, if any. Government experimental farms such as central farms have little effect as the cultivators rightly discern that conditions are not the same. Propaganda by leaflet, lecture, lantern slide, etc., may draw attention and encourage a cultivator to volunteer a trial or demonstration on his land but they will not make him take up the practice and it might have been just as well to begin with the demonstration. When this has been successfully made these measures of propaganda may be used to advantage to call the attention of others to it and to explain and describe.

(b) I can suggest little further than I am doing at present. The main point is to provide enough money and staff to enable the Agricultural Department to carry out the field demonstration properly. With regard to staff I would recommend the permanent appointment of men of the ordinary working cultivator type after training as labourers on a central farm carrying out practical demonstrations under a senior Agricultural Assistant. Temporary appointment is in my opinion not suitable and one, or two at most, to each senior Agricultural Assistant would be necessary. At times of special stress of work, e.g., sowing season, extra temporary demonstrators may be recruited for short periods from the labourers of the central farm and their places made up by casual labourers. This means having a surplus of trained men on the farm (i.e., not surplus to labour requirements but more than is required for any expert operation, e.g., drill-sowing) and scope is limited.

(c) Beyond what has been said above and the necessity for the officers of the Agricultural Department first winning the trust and confidence of the cultivators, I would suggest "best holding" competitions, i.e., prizes for the best-conducted holdings within a prescribed area, points being allotted on a definite scale for each item in a cultivator's running of his holding with special encouragement for adopting expert advice. The prizes would be distributed at the local agricultural show or durbar. Again, when an improvement entails capital expenditure beyond the means of an ordinary cultivator it might be a good thing to assist in financing it. This is done for instance in the case of "improved lay-out," (i.e., erection of *kazins*, construction of drains, etc., to prevent erosion, loss of fertility by washing and damage to crops) by means of land improvement loans. But this would require careful handling.

(d) In this circle, during the agricultural year 1926-27 there has been a tremendous increase in the demand for *Theikpan* ploughshares. This has been due entirely to practical demonstration and the inherent advantages of the ploughshares. The former took the shape of sending round a man to villages who actually set up a share with its wooden frame on the spot (often using wood of no value just cut down in the jungle) and another who actually did ploughing when possible.

Again, in the same year and for exactly the same reasons, the demand for packets of copper sulphate for anti-smut treatment of *jowar* rose from a free demonstration issue of 2,000 packets for the 1926 crop to about 20,000 for sale for the 1927 crop.

Both these matters are however still in the initial stages.

QUESTION 5.—FINANCE.—(a) Apart from *taccavi* loans, which are discussed in answer to 5 (b), I am in favour of a type of registered co-operative seed purchase and sale societies which will provide seed and cultivators' expenses on a limited and defined scale according to the size of the holding of each member, and nothing beyond. If a loan is not repaid when due after harvest no further credit should be allowed until the debt is cleared. The initial members should be very carefully selected and limited and they will exercise discretion in the admission of later

members. A society of this type (but dealing with seed and implements only) in the very early stages is doing well at Payitkon in Lower Chindwin district and some three or four more are being formed. Such a society can be very helpful to us in the spread of improved seed.

For long-term credit, an extended use of land improvement loans should do if the proposals are carefully gone into by the Agricultural and Irrigation departments as in Meiktila district, where applications and reports of the department on the proposals are placed before a district agricultural improvement committee for consideration. I am afraid anything more ambitious would not be successful here.

(b) One of the troubles is that agricultural advances do not reach the very poorest who are most in need of them. It is difficult to suggest a remedy without running a risk of losses but it might be got over by accepting a first claim on a crop yet to be grown as security, as is done by moneylenders, brokers, etc. Joint personal security has its own limits.

Then there is too much difficulty and trouble in applying for, obtaining and paying back the loans. I have known cultivators refuse seeds if given as an agricultural advance while they were keen to take if given on credit out of my seed and implement advance. Again, perhaps the system is too rigid, though probably necessarily so.

Especially after a bad season it would be a great help if part of the advance could be given in kind instead of money, e.g., as seeds. Just recently cultivators after a very bad season with regard to cotton and early sesamum had to pay up to fifteen rupees and over for 100 viss of cotton seed of very doubtful germination power or up to 65 viss of *kapas* at harvest. Speculators early in the season had purchased at four rupees and when proposals were made by the Deputy Commissioner, Meiktila district, in conjunction with me to spend Rs. 30,000 of agricultural advance money on purchase of cotton seed it could have been obtained for not more than seven rupees. The proposal was not approved by higher authority and the money lapsed.

But it is no good inducing cultivators to make fuller use of *taccavi* loans if it simply encourages them to incur a larger capital debt owing to the lower rate of interest and ease of obtaining the loan, with little hope of being able to repay it out of income, and no intention of using it all for productive expenditure. This will only produce the state of affairs at which so many co-operative credit societies seem to have arrived. It seems necessary to safeguard the cultivator against himself, as selling him up is the last thing wanted. I would therefore rather support means for enabling more cultivators to use *taccavi* loans moderately than for inducing taking of larger individual loans and my remarks in first three paragraphs above are in this direction.

QUESTION 8.—IRRIGATION.—(a) (ii) In the dry zone generally, but especially in Meiktila district, there are many small tanks used for irrigating small patches of paddy and their number is being increased by the ready granting of land improvement loans (applications considered and resolved on by an agricultural improvement committee in Meiktila district). It seems to me that they could be made much more efficient if they could be supervised as to construction, repairs and making of channels for distributing the water by a subordinate irrigation officer.

The obstacles to extension are mainly the smallness of the areas and the lack of suitable places for making tanks.

(iii) I am of opinion that the possibilities of well or tube-well irrigation in the dry zone should be investigated by an agricultural engineer.

QUESTION 9.—SOILS.—(a) (iii) A system of improved lay-out for holdings (i.e., construction of *kazins* and drains where necessary to hold up water and let it soak into the soil, and to prevent erosion, and loss of fertility by washing, and damage to crops) is being advocated at present and land improvement loans can be obtained for the purpose. This is of course working on a small scale and I have no large projects to propose.

QUESTION 10.—FERTILISERS.—(a) In my opinion, the only thing to be done at present is to make greater use of natural manure available in the shape of farmyard manure. When this has been done to the fullest extent, other forms of manuring may be considered.

To this end it is necessary to introduce methods for the improved making, storing and applying of more farmyard manure of a better quality. This is being attempted here by demonstration, special attention being given to the provision of bedding of some sort to take up the urine and prevent the loss of nitrogen.

QUESTION 11.—CROPS.—These are all a part of the departmental work at present [except (a) (iv) which does not apply here to any great extent], and I have nothing fresh to add.

QUESTION 12.—CULTIVATION.—(i) & (ii) There are matters under enquiry by the department which have not yet reached the stage of definite recommendation, except in the case of *Theikpan* ploughs, line sowing, drill-sowing with use of seed-drill, inter-cultivating, and much can be done with these.

QUESTION 14.—IMPLEMENTS.—(a) The use of the *Theikpan* plough instead of the indigenous one is an improvement ready to hand, as also the Indian seed-drill. But I would further suggest that the provision of more efficient implements within the means of the cultivators for dry-crop cultivation generally is a matter which would repay investigation by an agricultural engineer. Suggested implements required are, (1) an improved seed-drill, (2) harrow or harrows, (3) an implement for inter-cultivation, (4) an implement for collecting cotton and *jowar* roots, (5) an implement for harvesting spreading groundnuts.

With regard to introduction of new agricultural implements from abroad, the main difficulty is expense, for doubtless many of them would be useful. For instance, one of the least expensive, a bullock hoe or cultivator, costs at least about Rs. 30. Adaptations are also necessary.

(b) Where expense is the hindrance, an instalment system of sale under the seed and implement advance of the Agricultural Department or agricultural advances of district authorities would help. Otherwise, demonstration on the cultivator's holding is the only thing.

(c) It is essential that the implement be first distributed and popularised through the channels of the Agricultural Department. After that it will be possible to get local traders to take up the sale and I do not see why this should not be done.

Production in same way will be assured of a demand.

QUESTION 16.—ANIMAL HUSBANDRY.—(a) (i) I suggest selection within the Burmese breed itself and the establishment of at least one pure herd by the Agricultural Department. This may then be copied by private individuals. It would be necessary also for the provision of good bulls.

Further, I would suggest investigating the effect of a very slight admixture of Indian blood separately. In something like one-eighth or less crosses it seems of possible advantage; above that it is clearly undesirable.

(ii) Dairying is not usually taken up by Burmans as there are religious scruples against it.

At any rate it is first necessary to select a milking strain of pure Burmese cattle, or to ensure the non-crossing of outside breeds, introduced on large scale, with local cattle.

(iii) It is necessary that the breeding should become controlled and only good bulls used. Under the present system of letting all animals wander over the countryside there is no control, and it requires either education or laws, or both, to make control possible.

(b) (i) Except in Sagaing district there are few or no grazing grounds. The cattle graze all over when there are no crops on the ground, and on uncultivated areas, roadsides, hedgesides, etc., during the cropping season. My view is that, in the hot weather when things are at their worst, there are as many cattle already as can be carried through just alive on the natural grazing and water-supply available, and in a specially trying year a certain proportion have to go by the board.

It is only the work bullocks and bulls which receive stall-feeding ordinarily. Breeding herds are seriously affected and the cows particularly have a very stunted growth.

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(ii) There are no enclosed pastures, except grass borders in tilled fields which in most parts are numerous. But grazing can only be done under picket when crops are on the ground and it is the work-bullocks or bulls, not the breeding cattle, which receive this grazing or grass.

(iii) Dry fodder consisting mainly of *jowar* (*sorghum*) stalks and some stems and leaves of pulses, is usually sufficient for work-bullocks and bulls only. It is eked out by grazing in off seasons. Many cultivators also make some hay from wild grasses. To the extent that breeding cattle are not fed on fodder and that in a bad season there is even sometimes a shortage for work-bullocks, it is insufficient. A carry-over from a good season would help in the case of work-bullocks but it is easier said than done by the cultivators.

A strong limiting factor in the supply of dry *jowar* fodder, especially in the more upland tracts, is the damage done by the pest "*Pwinbyu*" (*striga lutea*). No practicable method has yet been found for preventing this. Lines of work are (1) a short-lived quick-growing variety, e.g., saccoline *jowar*, (2) a resistant variety, (3) drill-sowing with inter-cultivation and hand-hoeing close to and between the plants. If the weed can be prevented from seeding over a number of years it can be defeated, unless seed is brought in by water from other land.

(iv) There is almost a total absence of green fodder during the dry season and this has serious effects. In the case of work-bullocks these are mitigated by feeding of some oilcake (sesamum and groundnut).

(v) Not much about this is known here yet but I do not think under the conditions it is the, or a, vital point.

(c) This does not seem quite to arise here. The shortage, so far as the breeding and young growing cattle are concerned, is a grazing one and is most acute in March, April, and May. Rain in the latter part of May sets the grass-growing rapidly again and young growing cattle begin to thrive in a fortnight or so.

(d) As already mentioned in (iii) above the prevention of *striga lutea* would be a great help. An increased area might be suggested but this involves altering the whole cropping economy of a holding. Heavier manuring with farmyard manure would mean a heavier crop which, in turn, would help to maintain more cattle and provide more manure.

At present, with the low prices of some crops, e.g., cotton, and the high prices bullocks are fetching, chiefly due to demand from Lower Burma, it would seem to me to pay the cultivator to use more of his land for maintaining more cattle. With this in view I have been advocating the rearing of several young bull calves by cultivators who have no breeding cattle.

Small plots of well-irrigated grass such as "*merker*" grass might be maintained and pit silage can be easily done.

(e) This part of the country is not blessed with many large landowners in the sense intended and little can be expected from this line. Cattle-shows are being encouraged but much education and demonstration of what can be done on the part of the Government are first required. There are a few of the more wealthy land-owning cultivators who already take a little practical interest and at least one case of a special bull on hire is known, but the present system of rearing cattle is all against improvement.

Oral Evidence.

64371. *The Chairman*: Mr. Robertson, you are Deputy Director of Agriculture, Myingyan Circle?—I was.

64390. Would you regard it as essential, if minor irrigation schemes

64373. Would you give the Commission quite shortly an account of your own training and past appointments, apart from those you have mentioned?—I am a B.Sc. of Edinburgh University. I came out to Burma in 1921. I was Deputy Director of the Irrawaddy Circle, that is, the delta area of Burma, until 1925 when I went on leave. After I returned from leave I was Deputy Director of the Myingyan Circle which I left in July of this year to come here.

64374. You are familiar, I think, with the dry tract?—I have had over a year of it,

64375. I understand that the introduction of groundnut in that area has had a very happy effect on the prosperity of the cultivators?—That is so.

64376. It has been suggested by one witness before the Commission that there are reasons to suppose that considerable difficulties may be met with in any attempt to improve the quality of the cotton grown in the dry tracts. Do you see any particular reason why research and propaganda should not effect an improvement in the quality of the cotton in the dry tract?—We have already effected improvement in the cotton of the dry tract, but we have not been able to spread it over a large area yet; that is to say, we have a superior strain of selected cotton for distribution. I do not know what the difficulty was which this gentleman particularly referred to, but the difficulty we found in getting the improved selected cotton spread rapidly over a large area was the climatic difficulty. We have extremely bad years when we scarcely get back as much seed as we gave out.

64377. Do you know of any tube wells in the dry tract?—No.

64378. Would it be a great advantage to the cultivator if it was found possible to sink tube wells?—Yes, I think so.

64379. You make an interesting contribution on the matter of demonstration in answer to Question 3 (c). You suggest the giving of a prize for the best holding. Have you ever tried that?—We have carried this out for two years now in the Myingyan Circle.

64380. Would you describe the effect?—I think it is too soon to describe any effect yet. I am, however, convinced that it has promise.

64381. It is essential to keep this thing up for a long series of seasons, is it not?—Yes. I also think that this is important in enhancing the status of the cultivators.

64382. At the end you suggest that when an improvement entails capital expenditure beyond the means of the cultivator it might be a good thing to assist in financing it. You mean Government assistance there?—Yes.

64383. Does that mean going outside the existing Acts?—I have said that we can manage it by means of land improvement loans.

64384. I wondered if you had in mind any further machinery?—I do not think that, in the dry zone, any other means would work very well.

64385. Here again the extreme uncertainty of the season is always a difficulty?—Yes.

64386. You suggest, in your answer to Question 8 (a) (ii), what you call the supervision of the construction of minor irrigation works. What do you mean by supervision?—Technical advice on the construction and repairs of small irrigation works, not strict supervision as regards construction: in other words: not attempting to do more than provide sound advice and to stimulate interest.

64387. There should be no absolute control?—I should not like to suggest that.

64388. Is it your view that there is a considerable opening for that class of work in certain tracts?—At present Government has been giving out quite a large amount, in land improvement loans, through the Agricultural Improvements Committee in the Meiktila district and I think that a lot of that money could be made better use of if they had the benefit of this technical advice.

64389. Is there a sound body of traditional practice amongst cultivators in the matter of construction?—It is very haphazard in my opinion. It is very difficult to get cultivators to combine together properly.

64390. Would you regard it as essential, if minor irrigation schemes of this sort are really to be pushed, that some officer should be made responsible for a time for touring about the districts?—Yes, that is my idea.

64391. And for helping the cultivators with advice?—Yes; at present the engineering officers have got all the work they can do.

64392. In your answer to Question 8 (a) (iii) are you suggesting another whole-time engineer to deal with tube-well irrigation?—No, it should be undertaken by the Agricultural Engineer.

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64393. What have you found the attitude of the cultivator towards the department and towards sound advice to be?—I have found that the cultivator is ready to take up any improvement after he has been convinced that it is an improvement. I have not found any difficulty in working with the cultivator.

64394. In a precarious tract, I take it, the improvement must be substantial, otherwise it really does not attract the cultivator? Is that, broadly speaking, the principle?—I see your point there; the difficulty is one of really obtaining the improvement owing to the precariousness of the agriculture.

64395. If a particular improvement costs effort in terms of labour and money, both may be lost at the end of a bad season; and unless in the good season you can make up leeway to some considerable extent, over a series of years there may be no advantage from the cultivator's angle?—There are certain improvements which do not entail any increased labour or cost, such as our improved selection of cotton for instance. If he gets a good crop he commands a better price for it.

64396. In answer to Question 16 (a) (iii) you give us your opinion about the desirability of controlling the breeding of cattle so as to improve the strain. It is the case, I suppose, that in the meantime those who want good cattle have really no idea of selecting the parents at all?—There is practically no such idea at present.

64397. Do they pay as much attention to choosing the bull as they do to choosing the cow?—They do not pay much attention to choosing anything: very little indeed.

64398. Is any fodder other than straw stored in the lower area? Is there any grass for making hay?—They do make hay where grass is available.

64399. Is it nourishing?—Yes.

64400. But there is nothing in the way of growing fodder crops?—Yes; they grow *juari* (*Sorghum vulgare*, vernacular *pyaung*).

64401. *Juari* is grown as a fodder crop and is preserved?—In some parts it is grown entirely as a fodder crop; in other parts they grow it for the grain as well.

64402. Is it stored?—Yes; it lasts through the dry season and through part of the following rains.

64403. Is there any hope of the silo making any contribution to the fodder problem?—It can be done in the dry zone districts very easily by means of a pit silo. We did it at Mahlaing last year and the cattle enjoyed it very much indeed.

64404. Have you ever known a cultivator to dig a silo pit?—Never.

64405. *Sir Thomas Middleton*: You refer to the rapid spread of the *Theikpan* plough. Is it the reason that it so closely follows the model of the indigenous implement?—I do not think it is quite that reason; the reason is that we combine some of the advantages of the Western plough with a cheap frame.

64406. Is the draught lighter than the draught of the ordinary implement, or rather heavier?—It is not very much heavier; if anything, it might be a bit heavier.

64407. It is not a question of draught; it is a question of the efficiency of the work?—Yes; the efficiency of the work.

64408. To what depth does the indigenous plough work in this district: three or four inches?—Are you dealing with paddy land or dry land?

64409. I am dealing with dry land for growing millets?—Very often they do not use the plough at all.

64410. Do they not plough when the monsoon breaks?—No; very often they use the harrow. In some places they use ploughs, which go to a depth of four or five inches.

64411. In that case the *Theikpan* plough goes to the same depth, I suppose?—It goes a little bit deeper.

64412. Is there any crop which makes a demand for deep ploughing?—Cotton is one.

64413. Is it from the cotton districts that the demand for the new plough comes chiefly? Or does it come quite generally from all sides?—Generally from all sides.

64414. You seem to be badly placed in the matter of seed-drills. You refer to an improved seed-drill?—I shall show you one to-morrow; it is a simple implement made of wood and bamboo.

64415. Have you had any difficulty, in getting the cultivators to use this seed-drill?—There is one little difficulty in connection with seed-drills, and that is the seed-drill leaves a furrow, and if you get heavy rain, after sowing, as you frequently do in the dry zone, it fills the furrow up with soil and the seed does not come up. That is one great drawback; otherwise it has advantages every way.

64416. Is there no light harrow that can follow the drill?—I have been trying to evolve one, and I have succeeded in opening it up to a certain extent by cross-harrowing with an iron-toothed harrow.

64417. In this district are the plough-cattle mainly Burmese breeds?—Yes.

64418. Do you ever get them crossed with Indian cattle?—We do.

64419. Do you use the cross between the Indian bull and the Burmese cow as a plough-bull?—We do.

64420. Do you find any difference in working qualities between the cross-bred animal and the pure Burman?—Talking purely of cultivation purposes, I do not think the first crosses are good; I think when you get to about one-eighth it becomes debatable; but I do not think that we have experimented enough on that to give a definite opinion.

64421. Your own view is that you should select indigenous cattle?—We certainly should carry out selection on the indigenous breed, and we might also experiment separately with a little admixture of Indian blood.

64422. Do the Indian cattle have better milk producing qualities?—Yes, and they have greater size and weight.

64423. I am told that in Burma little or no importance is attached to milk and very little milk is drunk; does that mean that the calves get all the milk?—Practically all.

64424. It is an advantage which they do not have in India. Have you any idea of how much milk a Burmese cow produces? Have you made any tests?—About one to two *viss* a day. (A *viss* is 3.65 lb.)

64425. Bullocks are becoming much dearer, I am told?—Yes.

64426. With the increase in price have you seen any tendency to treat them better?—In my opinion the Burman has always been extremely careful of and good to his working bullocks. There is a wide distinction to be drawn between the working bullocks and the breeding cattle.

64427. The breeding cattle he leaves to themselves?—He leaves them more or less to themselves.

64428. Does he feed concentrated food regularly when they are in work?—He feeds a little groundnut and sesamum oil-cake.

64429. We have got estimates of the cost of maintaining plough-cattle from your department, and I see that in the busy season a certain amount of concentrates is fed?—Yes and also when there is no green grass.

64430. *Mr. Calvert*: Do you suggest that the local traders should take up the sale of improved implements?—I think that is a possibility after we have demonstrated their usefulness and effected a certain amount of distribution ourselves.

64431. In answer to a previous question you rather pinned your faith on co-operative societies?—That is for the purpose of getting our improved seeds distributed.

64432. You mention seeds and implements?—Yes; that would be one agency; but I do not see any reason why we should not have local traders as well.

64433. On what terms would the local traders come in?—They would require at least probably something like twenty-five per cent profit.

64434. What credit would they require from you?—I was not thinking of their getting credit from me; I was thinking of their getting credit from firms like Messrs. Charles Cowie & Co.

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64435. You were thinking of big traders?—I was thinking of wholesale trade. Messrs. Charles Cowie & Co. will sell to the local traders and they will sell to the cultivators.

64436. Is there, at the present moment, any working system of improved implements being sold by local traders?—I cannot say; of course the ordinary Burmese plough is sold by local traders.

64437. Locally made ones?—Both locally made and imported ones. I mean the share which is stuck on to the front of the wooden frame.

64438. A large firm gives credit for three months only; the local traders require six months; that is the trouble in getting the implements sold by local traders?—They do sell these Burmese ploughs.

64439. Could you give us the details?—I could not.

64440. *Dr. Hyder*: With regard to the *Theikpan* plough, from whom does the cultivator buy now?—From the department.

64441. In answer to Question 12 (i) and (ii) you say: "There are matters under enquiry by the department which have not yet reached the stage of definite recommendations yet except in the case of *Theikpan* ploughs, line sowing, drill-sowing with use of seed-drill, inter-cultivating, and much can be done with these." Is there any chance of the department evolving definite implements for these operations?—These are all successes.

64442. These implements have been evolved by your department?—The seed-drill really originated from the department in India.

64443. Have you in mind any other implements which can be evolved after experimentation?—I have suggested in my answer to Question 14 (a), the following: an improved seed-drill, harrow or harrows; an implement for inter-cultivation, an implement for collecting cotton and *juar* roots, an implement for harvesting spreading groundnuts.

64444. You have not as yet constructed any implement with which these operations could be done?—We have evolved what, I think, is a satisfactory system for drill-sown cotton. We are using a blade-harrow between the rows and an iron-toothed harrow across the rows.

64445. Does the Burman use chaff-cutting machines?—He uses a lot of chaff-cutting machines in the dry zones.

64446. What are the improved implements which he uses?—None but those I have mentioned in answer to Question 14 (a).

64447. He is not conservative in regard to the use of machinery?—I do not think he is any more conservative than an agriculturist ought to be.

64448. *The Raja of Parlakimedi*: Is dry cultivation or dry farming, or cultivating their fields deep to preserve as much moisture as possible, a well-known practice among the Burmans in Upper Burma?—I am afraid that the dry zone is not really a dry zone for the purposes of dry farming; I do not agree to call it a dry zone; it suffers on occasion almost as much from excessive rainfall. We get thirty inches of rainfall in six months, but it is most irregularly and unevenly supplied, so that these dry farming ideas do not quite work out. Line sowing and inter-cultivating, of course, are on the lines of conserving moisture.

64449. Have they got special implements as we have got in India in similar areas?—They have a local plough and they have a wooden-toothed harrow; some cultivators have what we call a blade-harrow, and also a small wooden harrow which has two teeth for inter-cultivation.

64450. Do they have mixed cultivation?—They do.

64451. What do they usually grow together?—We have been trying to introduce the combined use of groundnut and pigeon pea.

64452. How do they usually sow?—They are accustomed to broadcast their mixtures.

64453. The seed-drill is not an indigenous implement?—No.

64454. It is newly introduced then?—Yes; it was introduced by the Agricultural Department.

64455. Do they attach any importance to the rotation of crops?—Yes.

64456. What do they grow after groundnut?—In the proper groundnut tracts I am afraid at present there is no rotation.

64457. Do they not grow millet or gram after groundnut?—Not in the *pucca* groundnut soils, where they grow the Burmese spreading variety of groundnut. They grow them almost continuously.

64458. The following year they cannot grow anything else except groundnut?—They could, but they do not choose to.

64459. *Professor Gangulee*: Is the work of your circle in any way hampered by lack of staff?—It has been up to date.

64460. For the work that you have in hand, how many men do you require?—There is a fixed establishment of two senior assistant agriculturists per district.

64461. In your view, they are not enough?—Below them I want a different type of man altogether. I want a practical cultivator, who has had a little training at our hands, to go and actually carry out the demonstration on the cultivators' holdings.

64462. What is your difficulty in getting such men?—The only difficulty so far has been money, more or less, but I think there should be permanent appointments, not temporary as at present.

64463. You told us that cultivators take to improved practices readily, if they are convinced that such practices are profitable. What are the agencies through which you distribute copper sulphate?—We have introduced it through our own agency up to now, but I hope to get beyond that.

64464. That is chiefly now in the hands of the department?—Yes.

64465. Not in the hands of the dealers?—I am hoping to do that. I have arranged for that with Messrs. E. M. Desouza & Co., Rangoon. On the packets we issue they put their name. I hope we may soon be able to have sales through private traders.

64466. Do you charge anything for the packet?—One anna. Messrs. E. M. Desouza & Co. supply them at nine pies.

64467. If you had an agricultural engineer in your circle, to what work would you put him?—I have not proposed having an agricultural engineer for my circle.

64468. Supposing you had an agricultural mechanic, or a man chiefly devoted to agricultural implement work, to what work would you put him?—I have suggested in my note the five implements which might be provided and improved. There is also the question of tube wells and other wells to be gone into.

64469. As carriers of disease and bringing in inferior breeds do you find that the importation of Indian cattle is a serious handicap to stock breeding in Burma?—With regard to disease, I do not think it is at all so. With regard to introducing inferior blood, it may become so. In certain localities it has already become a serious factor.

64470. We are told by the Deputy Director of the Eastern Central Circle that the uncontrolled importation of Indian cattle throughout the Province is to be regretted. Is that a problem in your circle?—Very little. It is only along the railways and near towns like Mandalay.

64471. I think your department has introduced Karachi gram in Upper Burma?—It has been a tremendous boon.

64472. *Mr. Calvert*: Is it Punjab gram?—It is known in the market as Karachi gram.

64473. *Professor Gangulee*: Is the cultivation of Karachi gram being extended?—Yes. The area under gram has more than doubled already.

64474. *U Ba Cho*: Up to a recent date you were in charge of the Myingyan circle?—Yes.

64475. Do the cultivators of that circle take any interest in the improvements effected by your department?—They do where we have been working, and, as I said, especially with regard to gram.

64476. Do they pay frequent visits to the farm?—The near-at-hand ones do. They come to us quite often, and we are on friendly terms with them.

64477. Have they organised a committee?—We have farmers' associations.

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64478. Is that committee doing any good work?—I think it is.

64479. It has been stated by one of the irrigation officers that in certain areas there was a surplus of water in the canals, especially during the cold season and dry seasons, and he suggested that instead of the ordinary *kaukyi* crops the *mayin* crops should be grown. Do you agree with that view?—I am sorry I have not had much experience of the irrigated territory. I understand that *mayin* is grown.

64480. Of course, *mayin* could be grown from the start of the cold season to the beginning of the hot season?—Yes.

64481. You said something about implements improved by your department. Could we see them to-morrow morning?—The Agricultural Engineer will have a display to-morrow morning, but these dry zone implements you will be able to see better at Mahlaing.

64482. In the Myingyan Circle the most important crop is cotton?—I would not say so.

64483. It is one of the important crops?—Yes.

64484. In your experience, do you find that the cultivators often have difficulty in getting seed for sowing?—I certainly think they do.

64485. Now that they are growing cotton on a large scale, they cannot get the seed except by purchase from the big ginners?—From the big gineries, small local gineries and brokers or traders.

64486. And they have to pay a pretty high price for their cotton seed?—Not when they get it from the big ginners, but from the local ginners and traders. The big ginner does not usually charge very high for the seed.

64487. Do you know the average price they have to pay for the seed from the millers or traders?—I think it is about five to seven rupees early in the season, and then it goes up to perhaps fifteen rupees later on.

64488. I have heard that it goes up to twenty-five rupees?—I think fifteen to seventeen is the highest.

64489. Do you know that some of the seed supplied by the traders or millers do not germinate?—Yes, it is sometimes extremely bad.

64490. The cultivator suffers on that score?—Yes.

64491. Do you not think that we should devise means by which the cultivators could be supplied with good cotton seed?—I certainly do. We are attempting to do that, but so far we have not made the progress we had hoped to make. I understood you were referring solely to germination. It is extremely bad.

64492. What I was driving at was this: Do you not think that the supply of good seed to the cultivators at a moderate price is a very important thing?—I thought you were referring to the germinating power as well as to the quality. The two are separate points. I agree with them both but they should be kept separate. The germinating power applies to the present supply of seed.

64493. Do you not think that if Government set up gineries in important places, for example, Prome and Myingyan, and took the cotton from the cultivators and returned the seed to them, it would be a very good scheme?—It might be a very good scheme but I would not suggest that at present in Burma. There are more gineries for cotton than there is cotton for them.

64494. Do these gineries supply good seed to the cultivators?—They do not take the trouble. It will have to be paid for in some way. One complaint of the gineries is that the cultivators do not come and take seed away early. If they took it away as soon as it was ginned, it would be much better. I suppose the difficulty there is financing. The cultivator cannot come and take it away early.

64495. Suppose Government come to the help of the cultivators, do you not think it would help matters?—Why not use the existing gineries? I do not see the point of building more gineries. What I think is that some rules or regulations might be made insisting on a certain standard of germination.

64496. The cultivators themselves cannot keep sufficient cotton to provide the seed?—They could if they wanted to but it means hand-ginning. That is rather a retrograde step. People would prefer to send it to the ginnery.

64497. *The Chairman*: Is there, in a bad year, a migration of labour in large numbers to reap paddy?—In a bad year there is.

64498. Do you think the railway is responsible for this migration?—Yes, partly; they go by river and by bullock cart too.

64499. Do you confirm the view that improved means of communication would facilitate the movement of labour from an area of surplus to an area of shortage and would contribute towards the solution of the economic difficulties?—The only lack at present is good roads. They are putting up a new railway just now from Myingyan across to the main line here through the dry zone.

(The witness withdrew.)

The Commission then adjourned till 10 a.m. on Thursday, the 10th November, 1927.

Mr. H. F. Robertson]

Thursday, November 10th, 1927.

MANDALAY.

PRESENT :

The MARQUESS OF LINLITHGOW, D.L. (*Chairman*).

Sir THOMAS MIDDLETON, K.B.E., C.B.	Raja Sri KRISHNA CHANDRA GAJAPATI
Sir JAMES MACKENNA, Kt., C.I.E.,	NARAYANA DEO of Parlakimedi.
I.C.S.	Professor N. GANGULEE.
Mr. H. CALVERT, C.I.E., I.C.S.	Dr. L. K. HYDER.
	Mr. B. S. KAMAT.

Mr. H. O. REYNOLDS, I.C.S.	} (<i>Co-opted Members.</i>)
U. BA CHO.	

Mr. J. A. MADAN, I.C.S.	} (<i>Joint Secretaries.</i>)
Mr. F. W. H. SMITH.	

U SEIN, Manager, The Burma Provincial Co-operative Bank, Limited, Mandalay.

Replies to the Questionnaire.

QUESTION 22.—CO-OPERATION.—(a) (i) The Government should provide funds at a reasonable rate of interest, without which co-operation in Burma will never be successful. The present rate of interest of ten per cent charged by co-operative banks to societies (and fifteen per cent by societies to members) is excessive. This rate has accordingly in my opinion ruined the societies instead of giving help. No doubt, it is a cheap credit in comparison with *sabape* rates, *chetties'* rates and local moneylenders' rates. These rates will ruin cultivators quicker and fifteen per cent co-operative societies' rates will strangle cultivators by slow death. Perhaps, some people might argue that, during the olden days in Burma, people used to borrow at even fifty or sixty per cent. To a certain extent, that is correct. At that time, the people in Burma were self-supporting and contented people; they cultivated their small fields, they pounded their paddy, they collected fuel for their own use, they carried water by themselves, they planted *kapas* in Upper Burma, and they wove their own cloths. This I witnessed in Lower Burma also when I was a boy; they stitched their own coats or jackets. Owing to straightened circumstances if they were compelled to take advances from wealthier people they usually borrowed only small sums of Rs. 25, Rs. 50 or the most Rs. 100, at fifty or sixty per cent but they were able to repay it as the sums were small, and the repayment was also made quickly, and they had also no special calls for other expenses.

Owing to the present advanced civilisation with different kinds of modern luxuries, people have to divide labour and extend their business to keep pace with the advancement. When anybody is forced by circumstances to extend his business* he certainly requires a large amount of capital. The cultivators were then obliged to borrow from moneylenders at the usurious rates of interest of the present day, or to take advances on crops. This is the reason why many people have lost their lands and industries, and the *chettiers* have become landlords and mill-owners. Some luckier cultivators joined the co-operative societies with prospects of relieving pressure for a certain time, but the ultimate end at the present rate of interest is just the same as others. The co-operation of fifteen years ago

* No one can live according to the old standard. In this connection, I remember seeing one of His Excellency the Governor's speeches in the papers, saying that people should live according to the times.

was not the same as the present-day co-operation. Circumstances have changed a great deal. In Germany, where co-operation is undeniably successful, the rate of interest is three and a half or four per cent and the labourers and cultivators are much more skilful men than those of Burma. About fifteen years ago, the value of land in Upper Burma was Rs. 10 to Rs. 50, whereas the present value is Rs. 50 to Rs. 250. In Lower Burma also, the value of land per acre about fifteen years ago was Rs. 50 to Rs. 150; now the price has gone up to Rs. 250 to Rs. 350. Formerly, labour was cheap, the standard of living was not so high, the necessaries of life were quite cheap, and there were also not so much luxuries as at present. Towns-people who have capital have become rich at the expense of poor cultivators of the rural areas. An economic survey of society members will show that their earning capacity is not sufficient to pay even interest. A cultivator who invests his money for productive purpose can never get more than eight or nine per cent after deducting expenses; therefore, it is impossible for him to pay even interest. It can easily be ascertained by the fact that new societies could repay bank loans regularly for the first one or two years, and in the third year they found it rather difficult to pay even interest. When, however, there is a flood or failure of crops on account of scarcity or excess of rains, they lose heavily, with the result that they are not able to recoup that loss even in three or four years of successive good crops, because the capital sunk in productive purposes, unlike speculation, yields only a very small margin.

(ii) Propaganda work should be carried out by non-official agencies, but the control should be entirely in the hands of the Government.

(b) (i) Credit societies are not successful owing to high rate of interest, insufficient finance and lack of long-term loans; explanation can be given in detail if desired.

(ii) Purchase societies or consumer societies are not many in Burma. I think we should start among the members of credit societies of good standing after reformation.

(iii) Societies for sale of produce and stock would be successful if introduced in credit societies of good standing, after reformation, whose members are not in urgent necessity of disposing of their produce. At the same time, the societies should have godowns or granaries of their own to store their produce, i.e., they should be built with their own money or from the intact reserve funds of credit societies, and not with borrowed money.

(iv) Societies for effecting improvements should be tried in the areas of irrigation. I have induced two societies to dig drains for irrigation and found it successful. As for making *bunds*, I think it is too expensive for co-operative societies to attempt. Perhaps, if a large number of villagers in the flooded areas can be induced to form a society, the scheme might be successful, but I do not think it is possible, as the people rely too much on Government to whom they all look to do the job.

(v) I have had no experience of this in Burma, but I have studied the subject during my visit to India in 1922. As far as I understand, it would not be of much use in Burma as there are very few fragmented holdings to be consolidated.

(vi) Societies for the co-operative use of agricultural machinery would be very advantageous provided such machinery can be purchased with their own money, and not with money borrowed from the banks. There are many reasons which can be explained, if desired.

(vii) It is too early for joint farming in Burma. This should be introduced when co-operation is successfully established. The question of unity is the most difficult problem. This is the reason why I suggest introduction when co-operation is successfully established.

(viii) The idea of cattle breeding in Burma is very good, but progress is retarded for want of sufficient capital and owing to religious obstacles. I understand there is no hindrance to a slaughter-house licensee buying cattle from the breeding farm, although the original idea is to breed plough-cattle.

(ix) I think societies for cottage industries should be introduced among the housewives of rural areas, and exhibitions of their handicraft should be held once a year at the district headquarters.

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(c) I think a trial should be given by forming societies to make improvements in rural life before introducing legislation.

(d) No. I do not think any of the agricultural credit societies are really successful.

QUESTION 23.—GENERAL EDUCATION.—(b) (i) I would suggest that the following subjects be introduced in village lay schools:—

(a) A subject on scientific agriculture, with occasional practical training and demonstration;

(b) a subject on co-operation; and

(c) to teach thrift among the school children by introducing a system of savings bank collections out of their pocket money. (The youth of to-day are the nation of to-morrow.)

(ii) I prefer legislation for compulsory education in rural areas, although it may be faced with some difficulties at the start. Only proper education will reduce crime.

(iii) The reasons for the small proportion of boys in rural primary schools who pass through the fourth class are the poverty of their parents who cannot afford to keep their sons at school, although free education is given, because parents want their children to help them in their daily labour, and also they do not realise the advantages of higher education. Parents think some knowledge of reading and writing is quite sufficient for rural life.

QUESTION 24.—ATTRACTING CAPITAL.—(a) I do not think it is advisable to allow capitalists to take to agriculture because, if they are allowed to do so, in course of time the *bona fide* cultivators will be extinguished, the small cultivators will become only landless tenants. The capital required should be given freely by the Government as in the case of some foreign countries. We have heard of many instances in which *bona fide* cultivators are nothing but labourers to capitalists. We should not lose sight of the troubles arising out of the feudal system which have prevailed throughout Europe from the eighth century to modern times. It remained in Russia until 1861, and its last vestiges were not stamped out in Germany until 1851.

In Great Britain and Ireland the Small Holdings and Allotments Act of 1908 had to be passed so as to enable the Government of Great Britain to take land which any individual owns in England and Wales in excess of 50 acres, and to sell or lease it to a farmer or labourer.

In Burma, although there are many plots of waste lands, yet there are also many cultivators landless for want of capital. If capitalists were allowed to take to agriculture there would be not a part or parcel of land in course of time for *bona fide* cultivators. Perhaps one might argue that it would take a long time for *bona fide* cultivators to work all the waste land, but with the development in agricultural enterprise and the prospects of improvements in the co-operative system to give reasonably cheap credit, the landless cultivators may be encouraged to work all waste lands. I think it is only a question of time; it must come one day.

(b) Factors tending to discourage owners of agricultural land from carrying out improvements are due to lack of capital.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(a) I do not think any improvement in hygiene can be made with the present state of villages in Burma, which are without drains and where the cattle are kept near or underneath the houses. However, I would suggest the encouragement of the homestead system by which improvements can be made in many ways; they are as follows:—

(i) By staying near his cultivation a man can attend his cultivation more frequently than when living in the village, thereby getting better crops.

(ii) By staying near his cultivation, the fertility of the soil can be greatly improved as his cattle will be tended in his fields after harvest.

(iii) By keeping the cattle at the farmstead there will not be much cattle disease. Even when there is any epidemic disease in other farmsteads, there is very little chance of it spreading, as cattle will be kept in their respective farmsteads.

(iv) By staying near the cultivation, he will have free ventilation, his surroundings will be more hygienic, and in consequence he and his family will be more healthy.

(v) By staying aloof from other villagers he will take care of himself by not keeping his money or jewellery with him, and there will be a great decline in crime, which is more important. As long as there is no bait, no dacoits will attempt to commit crime.

(vi) Last, but not least, when a man lives outside the village by himself, he will surely find a safe place to keep his valuable belongings, he would not be encouraged to buy more jewels, and he would also incline to dispose of the jewels which he had already got. To keep his cash and valuable property safe he will readily find a place in village co-operative banks, central co-operative banks, the Provincial Co-operative Bank, joint stock or exchange banks—by which the bulk of the nation's wealth will be in a place of depository from where it can be utilised profitably for the nation's welfare. In this connection, I would state that there is a great deal of surplus money lying idle in the ground, in safes, in boxes, in the pockets of many people and in bamboo holes. This farmstead, or homestead, system is the only means to get the money invested in banks, and also to reduce crime.

(b) Certainly I am in favour of conducting economic surveys in typical villages, and in fact, it is my long-cherished desire. Without this, the Government can never realise the hardships undergone by the villagers who are in the grip of moneylenders. The scope and methods of such enquiries should, I think, be as follows:—

The enquiry committee should visit prosperous villages, as well as middle class and poor villages.

The enquiry committee should enquire into the earning capacity of a village family, consisting of husband, wife and two children (say a son about 17 years of age and a daughter of 10 or 12 years) who can give material assistance to their parents.

Indebtedness and its cause should also be enquired into.

What were the landed properties their forefathers left for them, and whether the lands were mortgaged to others by their forefathers, and if so, how much and what is the present indebtedness?

If there is any increase in debt, and if so, the reasons why?

Whether their forefathers' debt had been liquidated, and if so, with what source of income the present family has done so?

Are there any extra lands bought or waste lands cleared and leases obtained? Where do they get capital? If they borrow from others, whether they are able to repay the loan? And at what rate of interest?

What is their earning capacity after deducting necessary expenses?

The formula would be to ascertain the acreage that a family consisting of husband aged 40 years, wife aged 37 years, a son aged 17 years and a daughter aged 12 years, can cultivate.

Whether the land the family cultivate is free from encumbrances? If not what interest they are paying?

Whether they have a sufficient number of plough-cattle? If not, what would be the hiring charges? If they buy them by borrowing from others, what interest they are paying?

The amount required for buying seed-grains.

The amount required for expenses in cultivating the lands.

The amount required for food for a whole year.

The amount required for clothing for the family for one year.

The amount required for miscellaneous unavoidable expenses, such as subscriptions to charity and funerals, for one year.

The amount required to pay land tax and water tax if there is any.

The amount of interest to be paid on borrowed money.

Earnings.—Sale-proceeds of produce.

Subsidiary earnings, such as cart-hire, sale-proceeds of hay, sale-proceeds of products of cottage industries, if there is any.

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I think an enquiry should also be made with regard to a family who work entirely on borrowed capital.

(c) I have made several enquiries and found that the largest earning of a family after deducting expenses is about Rs. 20 or Rs. 30, which is not sufficient even to pay interest at fifteen per cent for the loans taken for food, seed-grains and cultivation expenses only. If the family has to borrow money for the purchase of cattle or land there is no chance of being able to pay interest at any rate more than five per cent. In this connection, I would mention here that political economists like Adam Smith and Jean Sismondi contended that capital sunk in the purchase of real estate can never be recovered because its returns are sufficient to pay only the interest at the lowest rates.

Oral Evidence.

64500. *The Chairman* : U Sein, you are Manager, of the Burma Provincial Co-operative Bank, Limited, Mandalay?—Yes.

64501. We have a note of your evidence. Do you wish to add anything or make any corrections at this stage?—I would like to press for State aid.

64502. In what form exactly?—In the form of lending money to the society through the co-operative banks.

64503. *Mr. Calvert* : Government money, is it?—Yes, at a rate of not more than five per cent.

64504. *The Chairman* : Will the public or the commercial concerns lend at that rate?—The average bank rate is five per cent.

64505. Do you think the security of the co-operative movement is as good as the security offered by the banks?—The unlimited liability of the members and the earning capacity of the members are quite valuable.

64506. Will the public lend their money to a co-operative bank at five per cent?—The public have not got the money to lend to the societies.

64507. What you wish is that the tax-payer should subsidise the co-operative movement to an extent equal to the difference between what the public will lend at and five per cent?—Not exactly that. I understand that the Government of Burma are in a position to obtain loans from the Government of India at four per cent. If we can obtain such loans from the Government of India we can finance the societies at the rate of five per cent. I would submit that it is the duty of every Government to see to the welfare of the people. Agriculturists form the mass of the people in this country. I would therefore suggest State aid at a reasonable rate of interest for a lengthy period; this has been done in every country by their respective Governments. I can produce many authorities. I would also like to state that cultivators of Burma, unlike those of other Provinces in India, had over nine crores in rice control profit on which the agriculturists in Burma have some claim, but I am sorry to say that they have no direct benefit out of this big sum.

64508. What is the capital of your bank?—Over six lakhs.

64509. Paid up?—Yes.

64510. Is there share capital?—Yes.

64511. Debenture capital?—No debentures.

64512. How many directors have you?—Twelve altogether in Mandalay and two in Rangoon.

64513. Will you tell us, quite shortly, what are their professions?—Most of them are rice millers, some are jewellers; one is running a press. They are business men.

64514. What are you yourself?—I am the Manager of the bank.

64515. That is a whole-time salaried post?—Yes.

64516. Will you tell us how your bank operates? Do you ever lend money to individual cultivators?—No.

64517. Only to primary societies?—Yes.

64518. Do you examine the claims of members of primary societies for loans, or do you leave that to the primary society?—We leave that to the primary societies entirely. In fact we are guided by the maximum borrowing limit fixed by the officers of the department.

64519. To what extent do you examine the working of the primary societies?—In fact we have got nothing for our guidance except that a few years ago we had audit abstracts from the societies. These abstracts are not very reliable because the assets of the members are never verified.

64520. Do not you find it very difficult to decide whether a society is deserving of a loan unless you have some means of knowing how that society is conducted?—We are solely guided by the officers of our department who fix a maximum borrowing limit. They are the inspecting authorities of the societies.

64521. Do you find that the advice given you by the department is, as a rule, sound?—Yes; of course we cannot judge from the present state of the societies. The societies were quite all right; their credit was good; but owing to successive failures of crops and the increase in the standard of living about seven years ago the societies have come into bad times especially in the dry tracts of Upper Burma, and they are not able even to pay the interest.

64522. Have you had to write off any of the loans?—Yes, a pretty big sum in the case of a co-operative ginning society; besides that we have had to create an interest compounded reserve to which we transfer all our profits and a certain amount from our general reserve. The interest compounded reserve is now over six lakhs. I have sent my report to be printed, but it is not read yet.

64523. Are many societies in arrears?—Many, mostly from upper Burma.

64524. Can you give us an indication of the total of your arrears?—Of loans?

64525. Yes?—About thirty lakhs.

64526. How much have you out altogether?—Altogether about eighty-five lakhs.

64527. That is a high percentage. Do you think the movement is making any headway now; or is it going back?—It is going back.

64528. Do you anticipate a financial crisis?—I do.

64529. How soon do you think it will come?—Next year, unless Government give us some help. The interest due last year was eight lakhs, out of which we recovered only four lakhs.

64530. That is apart from the arrears of loans?—Yes, apart from the arrears of loans.

64531. Have Europeans placed any deposits with you?—Yes.

64532. To what extent?—About fifty-seven or sixty per cent.

64533. What class of Europeans?—Mostly Government servants.

64534. Are you familiar with the history of co-operation in other Provinces of India?—You mean, have I studied the history of co-operation in India?

64535. Yes?—I have.

64536. Do you know whether there is any difficulty in raising the necessary capital from the public in other Provinces in India?—There is, but Madras has been greatly favoured by having deposits from the local bodies.

64537. If your proposal were followed the greater part of the capital would come from Government?—Yes; it would come from Government.

64538. Do you think you can maintain the co-operative spirit if you depend upon Government to that extent?—Of course it is against the

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co-operative principle, but in the present circumstances of the co-operative societies in Burma, I think we must have State aid; otherwise the movement will be a failure. State aid was freely given in other countries by their respective Government.

64539. Let us have it quite clear once again. You pay your depositors at what rate?—Seven-and-a-half per cent.

64540. At what rate do you lend to primary societies?—The bank lends to the societies at ten per cent. And the societies lend to members at fifteen per cent.

64541. Who carries out your audit?—The bank's accounts are audited by chartered accountants.

64542. Are you satisfied that it is impossible for you to reduce the margin of five per cent on which you operate?—Our margin is not five per cent; our margin is the difference between seven-and-a-half per cent and ten per cent, that is, two-and-a-half per cent. We have to provide liquid assets for which we have to invest a large sum of money in Government securities at an average rate of four-and-a-half per cent; this provision of fluid resources reduces our margin of profit also.

64543. And the primary societies get a margin of five per cent?—Yes.

64544. Do you not think that that is too high?—Provided the societies can get the interest from their members regularly, it is very high. But as they are not getting it regularly and at the same time there are so many calls on the societies (for instance, the societies have to pay the audit fees, pay towards the maintenance of the union inspectors, the district association and so on) I think that five per cent is not too much.

64545. Do you attribute the troubles of the co-operative movement to any particular cause?—I have given my reason in answer to Question 22 (a) (i). "Owing to the present advanced civilisation with different kinds of modern luxuries, people have to divide labour and extend their business to keep pace with the advancement." They want a larger amount of capital to extend their business, and they are unable to pay the higher rate of interest charged.

64546. Do you think any part of the trouble has been due to the early removal of official advice and surveillance?—I do.

64547. In answer to Question 22 (b) (iii), you suggest that credit societies should undertake the business of selling produce and stock. Do you see any danger in combining the two functions in one society?—None, because even at present some societies, although they are not registered as sales societies, are conducting both businesses, and they are thriving very well.

64548. Do you mean combining the two businesses in one society; would you keep your accounts separate?—Yes. There is no danger in selling their produce collectively. This is not speculation.

64549. You would not ask your credit society members, as such, to take any share in the risks of trading?—I would not suggest that.

64550. Have you read of the better-farming and better-living societies in the Punjab?—I have studied the subject while I was touring in India.

64551. You think there is some hope for that movement in Burma?—Yes, if we can get the Agricultural Department to co-operate with us.

64552. Do some of your members of primary societies borrow both from the primary societies and the moneylenders?—They do, because when there is failure of crops they cannot repay bank loans and the bank refuses to issue fresh loans. They are then obliged to borrow from outside moneylenders.

64553. At what rate do they borrow money from the moneylenders?—Between thirty-six and sixty per cent.

64554. As against fifteen per cent from the society?—Yes.

64555. If they are unable to borrow at a profit at fifteen per cent, that is to say, if their agricultural operations are handicapped by being financed at fifteen per cent, how comes it that they can afford to borrow at thirty and fifty per cent?—Necessity forces them. In fact, they are no more than slaves. They are in the hands of the moneylenders, and although the

moneylenders realise that they will never be able to repay the loans with interest, still they finance them knowing that they will get all there is.

64556. You estimate the net return on capital invested in agriculture at about nine per cent?—Eight or nine per cent.

64557. How do you come by these figures?—When we go round to the societies we make economic surveys of the societies, and we find that in the case of each family the excess of income over expenditure is about eight or nine per cent. Not only I, but other co-operative officers also have made these enquiries, economic surveys of the society's members, and they have found the same thing.

64558. Are you giving there full value for the man's own labour and for his children's labour?—Everything is included. I even allow for their subsidiary earnings when they do other work out of the season.

64559. And have you deducted taxation?—Yes. If you will allow me, I should like to put in my note * on co-operative finance in Burma.

64560. *Sir Thomas Middleton*: Your economic enquiries have satisfied you that a cultivator cannot afford to pay more than nine per cent?—Yes, nine per cent is their net profit.

64561. This means that, in order to carry on business in the way in which you are conducting it now, your bank working on a basis of two and a half per cent profit, and the societies working on a basis of five per cent, you would have to be able to borrow at three-and-a-half or four per cent?—Unless the bank can borrow at three-and-a-half or four per cent, the societies cannot work.

64562. Does not this deduction from your economic enquiry suggest that your figure of nine per cent must be wrong, because the whole experience of Burma shows that the cultivator has been borrowing at much higher rates, and has been able to repay?—I do not think that they can pay any higher rate. That is the reason why the cultivator has now become a landless tenant.

64563. We have been told that he has been paying to the *chetty* at least twenty-four per cent?—This is the reason why there is such a big indebtedness in the Province.

64564. Do you know what the indebtedness in Upper Burma is? Is it serious as compared with the Indian Provinces?—It is serious. I do not know much about Indian Provinces.

64565. Are eighty per cent of your people seriously indebted?—Perhaps more. In fact, the small owners of land have now become landless tenants. That shows that they are in a bad way on account of the high rate of interest at which they have to borrow from the moneylenders.

64566. I want to get from you your opinion as to the extent of serious indebtedness. Do you think that four out of every five persons are seriously indebted in Upper Burma?—I think so among agriculturists.

64567. What means have you of forming an estimate?—I have been meeting most of these cultivators, and when I make enquiries of them they make the same complaint.

64568. The evidence we have so far had is that there is not serious indebtedness to anything like the extent which you indicate?—Is that the evidence of people who are really in touch with the poor class of cultivators?

64569. Has the debt position become much worse in the last ten years?—Certainly.

64570. I have seen it stated somewhere that, relatively, the cultivators of Upper Burma have been doing pretty well in the last ten years, owing to the extension of the growing of groundnut, which has brought in a large amount of money?—That is only in Pakokku district. There is great relief in that district, I admit, but not in other districts.

64571. Has not the price of sesamum seed gone up very much?—It has gone up from Rs. 7 to Rs. 13 and Rs. 17.

64572. Is not that a very great assistance to the cultivators in Upper Burma?—But they have got other calls on their purse from other sides.

* Not printed.

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64573. Your evidence shows that you are fully aware of the necessity of getting down the rate of interest. You yourselves cannot work on a less margin than two-and-a-half per cent?—No; we ought to work on three per cent.

64574. The primary societies allow themselves a margin of five per cent. What do they do for that five per cent? Is the five per cent intended to cover risk of bad debt? Does it pay for inspection? What does it pay for?—There are so many calls on the society. They have to contribute to the Burma Co-operative Council.

64575. How much?—About ten years ago, the societies had to contribute about Rs. 20. Now they have to contribute Rs. 100. There are so many other calls on them. It is due to relaxation of Government control.

64576. If you state that contribution in terms of percentage, is it not very small?—I think it comes to about three per cent.

64577. Is it as much as three per cent?—Yes, including audit fees and other things. It affects, a great deal, societies with small working capital.

64578. If these expenses amount to three per cent, the balance of two per cent must cover risks?—Yes, but, as I have stated in my written evidence, the members of the societies cannot pay fifteen per cent interest, and the societies are not allowed to take this unrealised profit as profit.

64579. You prove that two per cent to cover risks is much too small a figure?—Yes, especially when the members cannot pay fifteen per cent.

64580. *Mr. Calvert*: In your written note you propose that Government should provide you with funds. To what extent, do you think, should Government provide funds?—Seventy-five per cent.

64581. Seventy-five per cent of the working capital of the societies?—Yes, on borrowed capital.

64582. Would you make it a very lengthy period, or would you pay it in a definite number of years?—That depends on the formation of the Land Mortgage Bank. If the Land Mortgage Bank is not going to be established soon we want it for a longer period, say, about thirty years.

64583. You think that Government would have to provide seventy-five per cent of the working capital for about thirty years?—Yes, seventy-five per cent of borrowed capital.

64584. You give figures showing the great rise in the value of land?—Yes.

64585. You also mention the rise in the standard of living?—Yes.

64586. This rise in the value of land has increased the credit of the people?—Certainly; their credit has increased.

64587. And they are using that credit to borrow?—Yes, because they must have bigger capital to extend their business to keep pace with the advancement.

64588. And they are using their borrowings to raise their standard of living?—Not only for that; they have to buy seeds, agricultural implements and other things. Things are rather expensive now. Cultivators cannot afford to spend their earnings on luxuries; the necessaries of life are too dear.

64589. But you think that the rise in the price of land has something to do with the increased borrowings?—Yes.

64590. Would you say that the members of your primary societies are well educated in the principles of co-operation?—Yes, I think so.

64591. Taking that famous paragraph 3 of the Maclagan Committee's report, do they understand it?—I should say most of them understand it. They are not lagging behind in education. Almost every member knows the main points on co-operation.

64592. Do you say that your members are willing to repay if they have the money?—They are.

64593. The fact that they do not pay is not due to lack of willingness, but lack of ability?—Yes.

64594. Who, do you think, should be responsible for the education of members of primary societies?—Both officials and non-officials, mostly non-officials. In fact co-operation is not an established subject. I say the policy ought to be revised at least once in three years, according to time and circumstances, but we have not done so.

64595. Who should conduct the education of your members; Government or non-official unions?—Government has done it. The education that they got previously was through Government agency, but it is now being spread by non-officials also.

64596. Do you think the non-payment of loans indicates any weakness of character in your members?—No, certainly not. I should not think so.

64597. You take sureties from individual borrowers. Are these sureties ready to repay?—When there is no income, they cannot pay.

64598. You told the Chairman that one of the reasons why people were not repaying was a succession of bad seasons. Are you not aware of the ordinary banking experience that you borrow in time of prosperity and repay when times are bad?—I do not follow you.

64599. The point is this: When there is a boom in trade, the bank rate goes up and when there is slackness, it goes down. Do you not get the same thing here?—No. It is not applicable to members of co-operative societies; they have no spare money like capitalists.

64600. I think you told the Chairman that your bank lends out to primary societies. Are there no central banks between you and the primary societies?—In certain places we have them.

64601. Are the moneylenders working against the co-operative movement here?—No. We cannot expand our business to a large extent and that is why it does not affect the moneylenders.

64602. The moneylenders do not regard the co-operative movement as a serious danger to them?—Not at present.

64603. Have you, in your bank, much money deposited by primary societies?—No.

64604. You would like the State to deposit money with you in order to bring down the rate of interest?—That is the idea.

64605. Which do you think is a better method—that interest should be reduced by the State advancing money or that interest should be reduced by the societies accumulating shares and reserves of their own?—What I should like to propose is that the reserve should be kept intact and not utilised for working capital. The Maclagan Committee recommended that reserve fund can be utilised in working capital. The societies took advantage of that and they used the reserve in their working capital but they overlooked a proviso there which said "provided societies have sufficient liquid reserves." Now, they have no liquid assets. Formerly the practice was that all the reserve funds of primary societies to be deposited with the banks. Had they done so, most of the societies would have been independent. Their deposits would have covered their borrowings. At present they have got none. There should be some rules for compulsory saving for the society.

64606. You have a compulsory saving by way of your shares?—They are all utilised in their working capital. That is no use.

64607. What rate of interest would be necessary in order to attract local deposits?—At present the rate is four-and-a-half per cent.

64608. Are you getting sufficient deposits to meet all your requirements at four-and-a-half per cent?—At present there is no expansion in the co-operative movement. At one time I carried a surplus of about thirty lakhs. I had to reduce the rate. I have had to refuse fixed deposits.

64609. You can get local money at four-and-a-half per cent?—Yes for one year. Formerly we offered as much as eight per cent for three years and we are carrying fifty lakhs of that money still.

64610. If you can get money at four-and-a-half per cent, why should Government advance the money?—We can get only a small amount at that rate, about three or four lakhs. In course of time I expect to get all our requirements even at three per cent and two-and-a-half per cent on current account. It will be dangerous for the co-operative bank to carry large amounts of short-term deposits or money at call.

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64611. In your new Act you have a new section whereby the contributions fixed by the liquidator can be recovered as arrears of land revenue?—That is only when the Registrar thinks that such a step should be taken. The liquidator, so far as I know, has no power to force that unless he can get the consent of the Registrar.

64612. The Act gives the liquidator power?—Yes, with the approval of the Registrar.

64613. Was that new clause put into the Act because, without it, the liquidator could not recover the sums due?—Not only that. In ordinary civil cases, in executing decrees, it takes a long time to recover money. In fact liquidation has been dragging on for six or seven years.

64614. Is that long liquidation due to the laziness or the incompetence of the liquidator?—Formerly the liquidators were selected from the elders of societies and lawyers and they did not take much interest. We then had to appoint paid liquidators. They took some interest but they were not so useful. We are now taking another course. We are appointing junior Assistant Registrars as liquidators and we are getting our money back in that way.

64615. First you had non-official liquidators and they could not recover the money?—No.

64616. You then amended the Act so as to enable the liquidator to apply to the Deputy Commissioner to help him and you are now employing official liquidators?—Yes.

64617. Do you have, in Upper Burma, any co-operative conferences?—We have.

64618. Are they district, township or provincial conferences?—We have district as well as provincial meetings. Formerly we used to have a conference for the whole Province once in two years. Now, we are having them once in four years; this is what I have heard unofficially.

64619. When do you have your district conference?—Once a year.

64620. In your district conferences, is the question of standing arrears discussed?—We had no chance of attending it. I do not think the subject was ever discussed.

64621. I think you went to the Punjab and when you came back you wrote a report. In that report the only criticism you made was that there was too much official supervision. What is your opinion now?—It is better. I have changed my idea.

64622. *Dr. Hyder*: Who pays the salaries of the official liquidators?—They are paid by the Government.

64623. The societies do not have to pay the amount?—No.

64624. Are they salaried servants of Government?—Yes.

64625. *The Raja of Parlakimedi*: In your note you say that the present financial condition of the village is very much lower than what it used to be. Apart from lending money, may I know in what other ways your societies have been trying to ameliorate the condition of the people?—According to the co-operative principle they try to improve the condition in many ways. They do their best for the uplift of the people.

64626. Will you mention some of them?—They do some sort of collective savings. Every member has to put all his produce after harvest into the godown.

64627. Are they doing that?—Yes but unluckily in one case about eight years ago they tried to do it but they did not have a godown. They put all their paddy in an open space and unluckily we had early rains and all the paddy was spoiled and they had to sell their paddy at a very low rate. They were demoralised. With regard to this, as far as I know, the Government of Madras made an advance of one lakh of rupees to build godowns, and that advance was to be repayable in thirty years at the rate of five or six per cent. Without a godown no wholesale society can be carried on successfully.

64628. But in your case you have such a surplus amount that if you would only lend it to these societies at a reasonable rate of interest in order to enable them to build godowns for storing paddy and sell it in the proper seasons, would that not be a good thing?—Yes, but it must be a

long-term loan repayable in ten years; the shortest period should be ten years. The bank cannot afford to issue these loans and make them repayable in ten years because our fixed deposits extend over a period of four years and that is the longest period with us.

64629. Cannot you extend the loan over periods of four years? You can lend the money in the first instance for four years, and then after that period is reached a further application is made and you extend the period over another four years. Does not the Act allow you to extend the loan in that manner?—We cannot possibly take that risk because the bank will be liable to be called upon for the return of the deposits at the expiry of four years, and if we cannot get the money back from the society we will naturally be faced with very great difficulties.

64630. Have you approached the Government for funds for this work?—Only three months ago I saw something about Government rendering help in Madras, and I at once wrote to the Registrar suggesting that the same proposal might be adopted here, but I have not yet received any reply.

64631. How long ago was that?—It was recently, and my impression is that action is being taken.

64632. If this money were available, how many storage places would you be able to start?—As a matter of fact I have received an application from one of the unions asking for a loan of Rs. 1,000 to build a godown. This union has over 6,000 baskets of paddy to be stored, and the applicant is one of the witnesses to be examined before this Commission.

64633. Have you included a good many such storage places in your estimate?—Taking the present position of the societies into consideration I do not think there will be many, because they are rather in a bad way especially in Upper Burma. Most of them are bad societies so that they cannot build godowns.

64634. Have you been interesting yourself in any way in improving indigenous cultivation, for example, making artificial manures available to the various societies, or giving them improved strains of seed?—We have not got the time for this; we confine all our energies to financing the societies. Occasionally, when I visit the societies, I offer them advice as to how to approach the Agricultural Department with a view to getting better seeds and information about better methods.

64635. In another place you say that the people expect everything to be done by the Government. Why is that the case?—It is so, simply because it is hereditary with them.

64636. Because this used to be the case in the olden days, I take it?—Yes.

64637. You suggest that compulsory education should be enforced. Do you think that the country is ready to bear this burden?—If you mean that there will be any extra expenditure involved in imposing compulsory education, then I would say that I do not think so. In every village they have got a monastery and if the people simply send their children to the monastery that in itself would be quite sufficient. As a matter of fact the Burman is not very far behind in the matter of literacy; there are very few illiterate people. What we want really is modern education as explained in my answer to Question 23 (b) (i).

64638. You want it to be given in the shape of free education?—Yes.

64639. *Sir James MacKenna*: What is the cash position of the bank at the present time?—I think it is quite sound, because we have got sufficient fluid resources to go on with for one year more in case we do not get any repayments from the societies for that period.

64640. And no repayment at all is a very gloomy view to take, is that not so?—Yes.

64641. Is the bank taking any steps to improve the present position?—The bank has sent a long report to the Government making certain suggestions towards improvement.

64642. Was it to the effect that Government should lend them some money?—Of course the Government should grant the loans on the recommendation of the Government officers, because the bank has been working in the dark. Except repayment we have not got anything for our

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guidance. We have to rely on Government for the maximum borrowing limit fixed. I do not think that the Government officers will fix the maximum borrowing limit without first knowing the credit-worthiness of each society.

64643. Your view is that, as loans to primary societies or to district banks are made on the authority of the Registrar who is a Government official, Government is liable?—Yes, but the cash credits for district banks are fixed by the Provincial Bank.

64644. In the case of the primary societies the borrowing power or limit is fixed by the Government official?—Yes.

64645. *Professor Gangulee*: You have a system of guaranteeing unions?—Yes.

64646. How is that system working?—I am not quite satisfied with the guaranteeing union system.

64647. What is your criticism?—So long as the members' pockets are not touched they do not care much, that is to say, so long as the liability devolves on the society, the members do not care.

64648. Would you like to see that system abolished?—I think it would be much better to abolish it.

64649. You have a committee of management in each primary credit society?—Yes.

64650. Could you tell the Commission how these committees are working?—At certain times of the year they have to prepare forecasts; in those forecasts they have to enter the earning capacity, the amount of loan that is estimated to be repaid and the amount of requirement for the next year. All these have to be put up before their committee and then a decision is made. Then the union forecasts are sent to the Government officer for sanction. After he has satisfied himself as to the requirements, this officer fixes the maximum borrowing limit. He sends four copies, one to the bank, one to the union, one to the society and one to the Assistant Registrar in charge.

64651. Who sanctions the loans to individual members?—The Committee of Management.

64652. In your view, these committees take sufficient interest in the primary societies, I take it?—I think so.

64653. If that is the case, why do you say in reply to Question 22 (d), that you do not think that any of the agricultural credit societies are really successful?—In reality they are not successful. The fact of the matter is that they are not indifferent but when the members cannot pay their interest the society naturally will not be successful.

64654. What are the difficulties?—The difficulty there is that their income is not sufficient to pay the interest. Any payment of interest or principal must be made out of a return from the soil; so when the return from sales is not sufficient to enable them to pay the principal and interest, the society naturally cannot be successful.

64655. You suggest that propaganda work should be carried out by non-official agencies?—Yes.

64656. Have you any such non-official agencies in Upper Burma?—Yes, we have honorary organisers.

64657. What propaganda do they carry on?—Mostly propaganda for the formation of societies and sometimes they preach better farming methods, education and better living. But I submit that no amount of preaching will be of any use unless there is sufficient capital to work with and get a profit.

64658. When you say that propaganda work should be carried on by non-official agency but that control should be in the hands of Government, what is it that you mean by control? What control do you desire?—Strict supervision in every respect.

64659. Strict supervision of the work of the honorary organiser?—Supervision over the societies.

64660. I see that you are in favour of such investigations?—Yes.

64661. You have visited the Punjab?—Yes.

64662. Have you acquainted yourself with the Punjab Board of Economic Inquiry?—Yes, I am familiar with it.

64663. What agencies would you employ for such inquiries; non-official or official?—I think a mixed committee will be best, because we cannot dispense with the non-official bodies.

64664. You yourself, I understand from your replies to Question 25 (c), have made several inquiries. Have you published any of your inquiries?—I have not published them, but I posted a copy to the officers of the department for their information. We are allowed to inspect the societies as a matter of grace only. According to the Act we are not allowed to have access to the books of the societies, so we can only give them advice.

64665. What was the nature of the inquiries which you undertook?—Inquiries into the economic position of the society members. I reported the result of my inquiries to the Registrar.

64666. You found that the largest earning of a family was about twenty to thirty rupees. Is that an annual figure or a monthly figure?—That is an annual figure.

64667. You are in favour of the homestead system; what are the difficulties in the way of encouraging that system in Burma?—We have the village fence system; people are not allowed to live outside the village fence. That is a great hindrance now.

64668. You think it is necessary for administrative purposes?—I do not think so; it is Government who think so. There will no doubt be some difficulty at first as in all other cases newly introduced, but these difficulties will be overcome in time and the subsequent result would be excellent. We must not be afraid of the difficulty to begin with, which will be nothing in comparison with the subsequent benefit to be obtained.

64669. Are you aware of the preponderance of crime in this Province?—If a man is treated as a child and put in an enclosure, he thinks it safe to keep valuable things with him, and that attracts dacoits; if he lives outside he will use his commonsense and he will not keep valuables by him, and there will be no crime.

64670. As regards compulsory education, you say you may have to face some difficulties at the start; what difficulties do you envisage?—When you want to introduce anything new you will have to face some difficulties; but in course of time, when people realise that it is to their advantage, they will welcome it.

64671. But you say that in your Province you have the monastic schools and that people are familiar with the idea of education?—Yes.

64672. Then what are the difficulties?—When they find that Government are forcing a new system on them, certainly they will raise difficulties at the start.

64673. Are you familiar with the district councils?—You mean the district boards?

64674. Yes?—I know district educational boards.

64675. You say that the monastic system of education is very popular in your Province; but that system of education has not reduced crime, has it?—It has had some effect. On the other hand, you have to consider this: that necessity knows no law; when people are driven to starvation by poverty they take the law into their own hands. Moreover, there are many temptations to modern luxuries.

64676. You say that compulsory education will reduce crime; that is not quite true then?—To some extent yes, but not totally.

64677. You talk of religious obstacles to cattle-breeding; what are the difficulties?—The Buddhists are not supposed to kill anything; when they come to know that the breeding of cattle is for the purpose of sending bad bullocks and surplus cows to the slaughter-houses, certainly they will object.

64678. Have the Buddhists any objection to using milk, butter, etc., as food?—No, because they can be got without killing.

64679. *Sir James MacKenna*: From where did you get the idea that the cows bred will be sent to the slaughter-house; is that from the Cow Convention?—There is no breeding farm now; when there is one, the surplus cows might be sent to the slaughter-house.

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64680. I wanted to know where you got that idea from?—I made some enquiries.

64681. *Mr. Kamat*: You have read the Land Mortgage Bank Bill which the Burma Government want to pass?—Yes; in fact I was one of the members of the committee that went into it.

64682. Will you favour the Commission with your views on one or two points on that Bill?—If you will refer to the report, you will find my objections to the proposed scheme there; I have written a minute of dissent.

64683. That report has not been circulated to members of the Commission. In the proposed Bill the existing co-operative banks and primary societies are to be kept separate from the operation of the new Bill; what is your view on that point?—I object to that principle.

64684. On what grounds?—I will read out from my minute of dissent. "With regard to this system of land credit, it cannot be denied that the co-operative banks have, since their formation, been carrying on this business before anybody had any idea of forming a land mortgage bank. In fact the co-operative banks in Burma have been inundated with such long-term loans. Theoretically, these are re-payable in four years, but experience has taught that no such loans can be repaid out of the returns of the soil within so short a period. Now Government is contemplating the formation of a land bank which will be quite independent of the present co-operative banks. The result will be that the proposed land bank will take over the long-term loans by degrees from the existing co-operative banks, i.e., members who have any real estate will transfer their tangible security to the land bank after settling debts contracted with co-operative banks on the security of their lands. This means that co-operative banks will, in course of time, have no tangible security for loans of shorter terms. On the other hand, our proposal is that Government should, instead of running a separate and independent institution for long-term loans, give State aid to the present co-operative institutions to replace the loans that have been issued for land redemption or for the purchase of land. We should like to place our counter-proposal before Government and ask it to reconsider its decision, because Government's proposal, if adopted, will certainly have an adverse effect on the existing co-operative banks. If, however, our proposal is accepted there will be many advantages, some of which may be summarised as follows:—

(a) Government advances, if made through the existing co-operative banks, will be much safer than if made direct to individuals or to newly organised associations, because the co-operative banks, which have now firmly established themselves with their capital and reserves, will, in addition to actual borrowers' lands, form good security for the money.

(b) Government will have the advantage of using a trained staff for the work.

(c) The work can be carried out at a much lower cost than if run by the Government itself, and consequently a given amount of money would furnish more loans for hard-pressed cultivators.

(d) The liabilities of members of co-operative societies and those of members of the land mortgage societies will certainly clash against each other, as both of them are unlimited.

(e) Cultivators who have already onerous duties to perform for a co-operative credit society would not like to do more for another society of land credit because this means more interference with their agricultural work."

64685. I follow what you have to say on that point. Now, there is another point emerging out of that, and that is with reference to the running of land mortgage banks through your agency. The funds which Government will place at the disposal of your bank are expected to be very large; do you think you can run a bank with such large funds with efficiency and safety with the present type of staff, which you call trained staff, at your disposal?—Government are not going to give us all the money immediately; they are going to give it gradually. If Government are going to start on a big scale, then we must have a larger staff.

64686. The Bill contemplates the handling of large funds by the bank?—The idea was that Government should start on a small scale, at the most with

three crores, which is not very large considering the indebtedness of the nation.

64687. You would not consider three crores as very large?—Three crores is the limit; they might start with ten lakhs, which will not be very large.

64688. The investigation of title deeds relating to the lands calls for a certain amount of expert knowledge; do you think you will be able to manage that without the help of the Government staff?—Everybody, whether Government or a bank, must refer to records in Government offices. In Burma none of the title deeds are registered. A man may possess land now, but he can go to the Registering Office to-morrow and transfer the ownership without the knowledge of anybody else. I think, in comparison with the untrained Government staff, the co-operative staff which includes officials and non-officials has better knowledge in these matters.

64689. Would you not invoke, to a certain extent, the assistance of Government officers for the investigation of titles?—Yes.

64690. Except for that, you would be able to manage the organisation without Government assistance?—Yes.

64691. In the Bank Bill it is contemplated to have a board of control, and at the present stage at any rate the board will consist of certain officers of Government and, at most, a few non-officials but nominated by Government; that is to say, there will be no element of elected representatives on that board of control, either on behalf of the public or on behalf of the societies. Do you approve of that principle?—I object *in toto* to the present constitution of the board. In any way there should be an element of elected representatives on the board of control.

64692. Assuming that a board is to be created for the control of this bank, how would you like the board to be constituted?—The best thing is to have one board, with branches. As it is proposed to enact that, if one bank defaults, the other banks will pay, there should be one board with banks at district headquarters as branches. Unity is better than competition.

64693. Although you object to the proposed constitution, would you not recognise that, since this bank is to deal with large funds, a certain amount of responsibility rests on the board of control, and therefore officials like the Registrar of Co-operative Societies, the Director of Agriculture and the Financial Commissioner (men who have a wide experience in administration) should be on the board?—They should be; I think I do not object to the constitution of the board; I object to the whole system.

64694. Supposing one or two non-officials are put on the board to give voice to non-official ideas, would you be satisfied?—Officials should not dominate the board; non-officials must have an equal voice. If there are five officials, there should be five non-officials.

64695. Have you experience of non-officials managing large banks in this Province?—Yes; The Burma Provincial Co-operative Bank which is the largest co-operative bank in the whole of India with a working capital of Rs. 1,30,00,000, is managed by purely non-official Directors, none of whom are officials; they are business men. Directors of District Central Banks are also non-officials and also I think we have a trained staff in our managers of the branches of our bank and the District Central Banks.

64696. For instance, there may be a number of managers of district banks, men who have handled crores of rupees?—It depends on whether the man knows the principles of banking. It does not matter whether he handles one rupee or a hundred, or a lakh; it is just the same.

64697. *The Chairman*: Is it the same when he loses?—It is not the same when he loses. What I mean is that a trained man has less chance of losing.

64698. *Mr. Kamat*: On the question of your enquiries into the earnings of families, when you say that twenty to thirty rupees is about the annual earnings of a family, do you mean that it is the sum total of the earnings of the four or five members of the family?—Yes.

64699. You think that thirty rupees represents the average earnings, taking the average of a family of five?—That sum is the profit, after deducting all expenses.

64700. It is the net profit?—Yes.

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64701. Divided by five, it gives six rupees per head per annum?—Yes.

64702. Eight annas a month is the total saving of a man in Burma?—It comes to that, because he has to pay a high rate of interest; otherwise, he would save a bigger amount. As you know in Germany the rate of interest was three-and-a-half per cent; they are skilled labourers.

64703. On the question of indebtedness, there is a statement in the official memorandum submitted to the Commission to this effect: "If a peasant has to borrow to buy, say, new plough-cattle, when he could have saved the money by retrenching on superfluities, then in effect he has borrowed to buy those superfluities, and not for productive purposes." Supposing a man had to borrow to buy a bullock for productive purposes if he has not saved money by retrenching on superfluities, that is to say, suppose instead of buying a cotton *lungi* he buys a silk one, then, in effect he has to borrow for buying the bullock because of the silk *lungi*, because he did not save by purchasing a cotton *lungi*. If he had exercised economy, probably he could have saved the money to buy a bullock?—Do you mean to say that the cultivators are not practising economy.

64704. This is what is alleged, and I am asking your own view, because you know life in Burma better than I do?—I think the cultivators are practising thrift. They are not bent on luxuries. The people who are bent on luxuries are those who are in the towns, the well-to-do people, the moneylenders living in the villages who exploit the rural classes of people.

64705. Your statement is that the moneylenders are not thrifty, but the cultivators are thrifty?—Yes; the moneylenders have sufficient income.

64706. And the suggestion, therefore, that in Burma thrift does not appeal to the ordinary cultivator and that he spends on superfluities is not correct?—It is not correct.

64707. The copies of your economic enquiry results were sent up to the Registrar?—Yes. I reported the result.

64708. Were they published by him?—No; they were for his information only.

64709. How many families did you investigate?—I made an enquiry with regard to about ten families this year.

64710. These were rural families?—They were in the rural area and not in the towns.

64711. And you found in these cases that eight annas was the saving per man per month?—Yes. It will be so, so long as they have to give a high rate of interest.

64712. *U Ba Cho*: You say that the co-operative movement in Burma is at a standstill?—No; it is going backwards.

64713. Have you made enquiries from the people who are interested in the movement as to the reason why it should be so?—I have made enquiries.

64714. Several people gave several reasons?—Yes, there are many reasons.

64715. Do you not think that we should form an enquiry committee to go into the point and see what are the real causes for the set-back to the co-operative movement in Burma?—In 1923 we suggested it, and before that too we sent many letters to the Registrar asking for an enquiry. In 1924, at the conference, we suggested the same thing for inclusion as one of the items on the agenda. Very recently too we sent up a proposal to hold an enquiry.

64716. Do you mean to say that persistent requests were made by the co-operative people for an enquiry of this nature?—Yes.

64717. Speaking about the deposits in the Central Banks by local bodies, you know that as a result of the agitation in the Legislative Council an Act has been passed, whereby local bodies can deposit their money in the co-operative banks?—Yes, it is Act V of 1923.

64718. Up to now, no effect has been given to this?—No. In fact, there is an objection on the part of the Government. They object to the deposit of the funds of local bodies in co-operative banks.

64719. When the proposal went up to Government for sanction, they objected?—Yes.

64720. Did they assign any reason for refusing to give sanction to the proposal?—You know the reason given in the Council.

64721. I want to get it from you?—I know the reasons, but I do not wish to disclose them.

64722. Did the Government assign any reason for refusing to give their sanction to it?—There was no reason assigned, as far as I know.

64723. You are talking about the many calls upon the societies, mostly on primary societies, under the present system. Are you in favour of audit being done by the societies, or by the Government?—I think it is better, especially in the present circumstances of the societies, that audit should be done by Government, as it is done in some Provinces in India.

64724. Can you give any reason why audit should be done by Government now? What will be the benefits?—The public will have more confidence in the societies. At the same time, societies in straitened circumstances should be relieved of the burden of contributing any audit fees. If Government conduct the audit, of course the societies will be relieved of the burden.

64725. In answer to the Chairman, you said that the Government should give loans to the banks at a fairly low rate of interest. Do you mean to say that Government should go on giving loans for ever?—Not for ever; I never meant that; but I think that at the present juncture, State aid should be granted. In fact, I would rather have a State bank, as they have in Germany.

64726. You remember, the Maclagan Committee of 1914 spent fully a month in Burma, going to every corner where there were co-operative societies, and they came into direct touch with the people in the societies?—Yes.

64727. At the time of the Maclagan Committee, the co-operative movement in Burma compared very favourably with that of any other Province in India?—Yes.

64728. And now we are lagging behind?—Yes. I can give you the reasons. Time and circumstances have changed a great deal. Burma is not like India. The people are far advanced. They have had a glimpse of advanced civilisation which has gripped them and the national standard of living has become high, whereas their income is very small.

64729. You said that you had been to India to study the co-operative movement in other Provinces. How do you think the average Burman or the average cultivator in Burma compares with his brother in India, in point of literacy, intelligence and knowledge of co-operative principles?—Our people are much better; they are far advanced, and they are far better than Indians.

64730. In Burma, we have no caste system?—There is no caste system.

64731. There is no *purdah* system?—No.

64732. The people have practically one religion?—Yes.

64733. And they are mostly a village population?—Yes.

64734. And, with all this, the co-operative movement has not gone ahead here; it has not been very successful?—The essence of the business is capital. Without capital you cannot do anything. In Burma, we have no national banks of our own except co-operative banks, and so the wealth of the people has not come to the banks. We are also much behind in banking education. So, our cultivators have not got sufficient capital to finance their operations.

64735. Do you not think that the check to the co-operative movement in the last year or two is due more to the very bad report about them made by the Registrar of Co-operative Societies in his annual report? The people come to know that the co-operative societies are not doing very well, and so they have become shy of putting their money into the societies?—I think we could get any amount of deposits, if we could give a reasonable rate of interest, but I do not think we can get reasonably cheap credit for members of co-operative societies; this is the reason why I suggest State aid. It is not on account of the bad report; it is because the societies are really bad.

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64736. You admit that the Registrar has reported that the societies are in a bad way?—It is not their fault that they are in a bad way. As I said, co-operation is not an established subject. It ought to be revised according to times and circumstances. If we do not do so, there will be failure.

64737. What I mean to say is, co-operative societies are not so bad as the Registrar thinks?—They are bad.

64738. Are they as bad as he thinks, or worse?—I think they are as bad as they are painted. In fact, to tell you the truth, I think the societies are in a very bad way in the dry tracts.

64739. When you say that there is no improvement in the societies, are you speaking from the pecuniary point of view, or do you mean that there is a falling off in the knowledge of co-operative principles?—It has nothing to do with co-operative principles. We are quite all right in regard to education.

64740. From the reports which I see from time to time I gather that the co-operative movement in Burma is not going ahead as it ought to. Is that due to the fact that the capital is going down or is there a lack of knowledge of co-operative principles?—So far as knowledge and education are concerned the people are all right. What we want is reasonably cheap credit.

64741. By establishing land mortgage banks, the difficulty of getting money will be relieved to a certain extent?—Certainly that will give relief.

64742. From the report of the working of the society for the year ending June 1926, I find that you have over six lakhs subscribed capital and you have very nearly thirty-four lakhs invested in Government paper?—Yes. We have invested over thirty-four lakhs in Government paper securities, and our subscribed capital is over six lakhs.

64743. These investments do not pay you more than five per cent?—The average is four-and-a-half.

64744. Do you not think that you have invested too much in Government paper?—In the present conditions of the society I think it is small.

64745. Practically you are investing all your money in it?—This is a co-operative bank only in name. It cannot be really co-operative so long as we have to rely on the public. We must safeguard the interests of our depositors by having a high standard of resources.

64746. What is your working capital?—It is one crore, thirty lakhs.

64747. Do you contemplate a big and unexpected call upon your bank?—No. But we have to watch the situation carefully.

64748. There is no fear of a sudden rush upon the bank?—Our bank can go on without receiving any money from the societies for one year. Otherwise the bank would have been landed in a very great difficulty.

64749. So, really, you do not want a large investment in Government paper, which is bringing in only a small rate of interest?—We do want it because the whole system in Burma, including all district banks and urban societies, has to rely upon the Provincial Bank for their liquid resources. That being the case, we must keep this large amount of Government money so as to provide them with the amount they require. The position in Burma is that we have to provide for every society and association.

64750. Since the introduction of the co-operative movement, we have been having conferences, provincial, co-operative and agricultural, in Burma every two years?—Yes.

64751. Up to the year 1925?—I think 1924.

64752. I think it is 1925. This is not going to be the case in future?—I was given to understand unofficially that the conferences which met once in two years did not serve the purpose they were intended to serve. I think the idea is to hold them on a bigger scale once in four years.

64753. These conferences are doing a great deal of work in Burma?—Not so much as we expected.

64754. Do you not think that a certain amount of good has been done?—Yes. They have done some good.

64755. Do you not think it would be a good idea to have conferences every two years?—I think the suggestion to hold it on a bigger scale once in four years is better.

64756. You would favour that?—Yes

64757. *The Chairman*: Do you, in Burma, accept as the ideal of the co-operative movement the motto "Each for all and all for each."?—That is ideal co-operation.

64758. It involves a certain amount of discipline to live up to that?—We are trying to reach it but we have not reached it yet.

64759. You have detailed many of the excellent qualities which your countrymen show. Do you think the capacity for discipline is one of those qualities?—Yes.

64760. *Mr. Calvert*: In the profit and loss statement which is included in your annual report, you show all the profit accrued as actually paid?—That is only up to 1925, not for the last two years.

64761. Then, that is not correct?—It is a trifling matter. The interest will be due next year and it will not make much difference. Supposing we took interest for three months as interest received, this amount will be due in the coming year.

64762. The statement that you recovered the whole of what is due is not correct? You took a paper credit? You did not get it in cash?—We should say that in certain items we got it in cash. For instance, interest on Government paper was due for a certain period when we drew up our balance sheet, and although this sum was not actually received at that time, we can take it as having been received because the amount was credited by the Imperial Bank to our account on due date. It entirely depends on the nature of accrued interest.

64763. You did not recover the interest due to you from the societies but debited it as principal against them and showed it as capital?—We create a reserve for this; it amounts to that; we usually show the receipt on one side and we credit a reserve against that; that equalises.

64764. It was not paid in cash. It was a book debit and credit?—We did not take it as a profit because we create a reserve against that sum.

64765. You show that this sum was actually received when it was not actually received?—We create a reserve against that sum; we are not taking that as a profit.

64766. You have taken book credit for three lakhs of interest due to you?—We provide a reserve for that.

64767. When you get a repayment from a society do you first credit it to interest?—Yes.

64768. Where your recovery is most satisfactory, you credit yourself the full rate of interest?—Yes.

64769. I cannot make out from your figures whether your recoveries were thirty-four or sixty-five lakhs. Are these actually recovered in cash or do you also have book adjustments?—We took only the cash payment, not the book adjustment.

64770. You only take the actual cash receipts?—Yes, we do not take the book adjustments. I have just one point more which I should like to place before the Commission. I wish to propose that provincial central banks and co-operative banks should be allowed to open a personal ledger account in the Treasury.

64771. *Mr. Calvert*: But you could at present deposit your funds in the Treasury although not with the Treasury?—We are to keep our safe in the Treasury. What we want to do is to be able to put it into the Treasury as a personal ledger account, just the same as the municipal district boards and the Forest Department are doing.

64772. What is the difference between putting your money in a safe in the Treasury and putting your money in the Treasury safe itself?—For instance we have got our branches at certain places. In the evening they should be allowed to credit all their money into the Treasury where there is no branch of the Imperial Bank.

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64773. What exactly is the difference to you?—We could check the branch account more thoroughly in that case.

64774. At the present moment your branch manager puts the balance into your safe and deposits the safe in the Treasury and he then sends you a post-card saying that he has done so?—Yes.

64775. What you want is that he should put the money into the Treasury's balance and that the Treasury should write a post-card saying that the money had been deposited?—Yes. Entries will be made in the pass book.

64776. Does that mean that you do not trust your branch manager?—No, I do not mean that. The work can be checked better. I do not mean to suggest that I do not trust my branch manager. The work should be done on business principles as much as possible. All I mean to suggest is that the work can be better carried out under this system.

(The witness withdrew.)

U AUNG DUN, A.T.M., Rice Miller, Daingtau, Mandalay.

Replies to the Questionnaire

QUESTION 2.—AGRICULTURAL EDUCATION.—(i) As regards the teachers they are fairly sufficient. As regards the students, the number is not yet sufficient.

(ii) The majority of people in every district of Burma earn their livelihood by cultivation and therefore all the districts desire agricultural education. There are yet very few persons among the cultivators who are well informed about any crops that would be profitable to them, according to the nature of the water and soil in their locality, other than the crops grown by their forefathers.

(iii) The reasons why teachers are not available at present from the agricultural classes are as follows:—Very few children of the cultivators acquire an English education and very few of them know English. None of the lessons taught in agricultural schools are taught in Burmese. Persons having educational qualification lower than the tenth standard in English cannot properly follow the course of lessons. It is quite unusual for persons who actually earn their livelihood by cultivation in Burma to be acquainted with the various lessons now taught. For these reasons the number of persons desirous of joining the school does not increase.

(iv) I understand that as large a number of students as is required cannot be procured at present. This happens so because a person who wishes to serve the Government and who has already passed through the tenth standard has to study hard for about four or five years in the agricultural school and still it is difficult for him to pass an examination and gain the knowledge. Besides, a man serving in the Agricultural Department thinks that he is a little inferior to others who are serving in other departments. The actual cultivators who are the most immediately concerned do not care to study English even for the first standard, let alone the tenth standard, in order to study agriculture. It is therefore difficult for them to study agriculture, and naturally the school cannot flourish.

I am of opinion that in a school where agriculture is taught, there should be three classes. Those who wish to serve the Government and who pass the examinations of the first and second classes ought to be given appointments according to their educational qualifications. Those who have studied for the said classes and failed ought to be considered as not inferior to persons of the third class. As regards persons who are to be in the third class, they should be drawn from the Burmese cultivators who wish to join the school. There ought to be just enough provision for them in the school and they ought to be given scholarships and taught. After they have thus learnt and acquired the knowledge, the honest and skilful persons should be selected and should be divided into parties of five persons each. Each party should be made to cultivate not less than

250 acres of waste land. Then, after forming them into societies, if the Government would give them freehold grants and help them with expenses, cattle, seeds and provision and also loans at a small interest and on long-term credit and take measures to control and supervise them, it is possible that the number of students attending school would increase.

(v) As an incentive to induce and encourage lads to take to agricultural education, it should be made to form part of the curriculum in all the vernacular schools which are now existing in villages, as well as in all the anglo-vernacular schools according to the standard, as an important subject in place of other subjects which are considered superfluous. Steps having thus been taken to give effect to the suggestions mentioned above in all the schools which are in the towns and villages, special attention should be paid to, and notice taken of, the practical work done in school farms, and suitable rewards should be given according to the merits of the case. The elders of the towns and villages should also collect children at night time once in a month and give lectures to them on this subject, as though they were relating to them some story, in order to impress it on the minds of the children. Another method to arouse the interest of the children is to make films after the manager of the dramatic films now being produced, depicting the scenes of people in agricultural life who have attained success and progress as a result of their venture as pioneers in growing and cultivating crops that are profitable, and exhibit the same free of charge before the children in each township. By doing so it will become popular before long. I am of opinion that this suggestion ought to be made to producers of films.

(vi) Pupils from such classes are not available.

(vii) Modifications are called for. The medium of education in agriculture now being English, the same should be translated into Burmese in order to bring it within the understanding of cultivators in Burma.

(viii) (a) With reference to nature study it is fairly satisfactory.

(b) The school plots need extension.

(c) School farms also need encouragement for the attainment of a full measure of success. At present they are merely termed school farms, but no special improvement has been made in order to attract the minds of the students. It will be much better if teachers would take the students occasionally to places where cultivators are actually working and show the same to them and awaken their interest.

(ix) The majority of them become salary earners.

(xi) Suitable improvements have gradually been made, according to the condition of the tracts.

(xii) In order to popularise it in the tracts, small experimental farms should be opened in every district or in each township and the headmasters of schools, Township Officers and the officers of the Department of Agriculture should hold exhibitions in co-ordination with one another once a year. By doing so it is possible that it can be popularised in rural tracts. Another important factor is that it would be much better if the Township Officers were to acquire a knowledge of agriculture.

(xiii) The children of cultivators should now be selected, they should be taught agriculture in Burmese in the schools and those who have acquired the knowledge and who are earning their livelihood honestly should be formed into societies. If they have no land of their own they should be granted waste lands. If they have lands which their ancestors have placed under mortgage these should be redeemed for them, by granting them advances at a low rate of interest. If they are required to serve the Government new posts should be created for them in places suitable for their employment. If facilities be given in this way by the Government progress can be made before long. It would also be much better if the Government help them with their expenses in the shape of stipends for the three years during which they are studying.

(a) The number of officers in the Agricultural Department is insufficient. It would be advisable to appoint a full complement of staff of Directors of Agriculture, etc., in each jurisdiction of a Divisional Commissioner, further augment the staff of second-class subordinate officers in every district and also appoint third-class officers and subordinate itinerant officers in every township for touring and giving instruction by practical demonstration.

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(b) Everything will be simplified if the granting of advances to agriculturists be delegated to the charge of Township Officers and control exercised over them by the Department of Agriculture.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(a) In the matter of prosperity of the cultivators the following derogatory factors have arisen and progress and advancement can only be made if Government assist in the matter.

There are few persons who own lands with actual possession thereof. To cover the initial outlay for procuring seed-grain, cattle and paddy for subsistence and the expenses of cultivating, loans have to be taken from the landlords at heavy rates of interest as advances for the supply of paddy at the harvest. Such paddy advances are usually taken at the rates of from Rs. 100 to Rs. 120 per hundred baskets of paddy to be delivered. Whatever may be the market price, the paddy when harvested has to be delivered to the creditor in satisfaction of the debt. When the paddy is harvested, it is found impossible to store it and it has to be disposed of at any price named by the brokers and persons whose business it is to store paddy. In cases where money is taken in the shape of loans an interest of not less than Rs. 5 is charged on Rs. 100 and it has to be repaid to the creditors immediately after the sale of the paddy. The use of fertilisers has not as yet been quite freely and adequately resorted to by most of the cultivators and therefore the yield is poor. The impossibility of planting paddy in time in the areas where paddy lands are irrigated by canals and the insufficiency in the supply of water required by the plants also account for the shortage in the yield. Therefore progress can be made only when measures can be taken to safeguard against these important factors.

These measures are:—

- (1) Opening of land mortgage banks.
- (2) Granting of agricultural advances, at a cheap rate of interest, sufficient to cover the cost of nursery plants, etc., after making enquiry as to the needs and requirements.
- (3) The use of fertilisers on the lands already brought under cultivation should be strictly enjoined.
- (4) The officers of the Irrigation Department should see, according to the nature of their charge, that water is supplied without fail when it is required.

(b) If the process found to be advantageous after a test made by the department concerned be shown to good effect by means of practical demonstrations carried out, say on an acre or two of land taken on a year's lease from amongst the area of land owned by the cultivators in the jurisdiction of any particular village headman, the cultivators living in the neighbourhood will be able to visualise and appreciate it.

It will be much better if about ten such plots of land are allotted for the said purpose in each township.

(c) To make the cultivators amenable to the instructions and directions given by the Agricultural Department it will be far more satisfactory if the above-mentioned advances are given out by the Agricultural Department, when all the requirements can be fully met.

As an instance of success obtained and benefits thereby gained to the cultivators as a direct result of personal demonstration undertaken and shown by me while I was in service I cite the following:—

They are—

- (1) *Theikpan Ngasein Taungdeikpan* paddy known as 2104 and *creman* sugarcane in Kyaukse district.
- (2) *Cambodia* cotton, *pindarung* groundnut and *Karachi* gram in Mōnywa district.
- (3) Wheat, onions and sugarcane in Shwebo district.
- (4) *Ngasein* paddy, *Taungdeikpan* paddy and grams in Mandalay district.
- (5) Grams and *Pwinyu* cotton in Sagaing district.

As I have not been to these places lately I do not know whether these are in a progressive or backward state. As regards the species of *Ngasein* paddy, I have learnt that the cultivators have grown less quantity of *Theikpan* paddy in this year in Kyaukse district as water could not be obtained at a time favourable to the crops, and owing to insufficiency in the supply of water.

(i) With regard to the time for sowing, nursery plants are grown in the month of *Kason* and *Nayone*.

(ii) Transplanting is done in *Wazo* and up to the full moon of *Wagaung*.

(iii) After the transplantation operations are over, a continuous flow of water is supplied to the paddy lands, any superfluous water being drained off. Only if and when the above-mentioned requirements and conditions are fulfilled, will the outturn of paddy be improved both in quality and quantity and a good price obtained for the same. Otherwise it would result in poorness of yield and the preponderance of inferior grains usually marked with black spots or flaws and, as is well known, the price fetched would be considerably lower.

QUESTION 4.—ADMINISTRATION.—(a) The weather and the conditions in Burma are different from those in India. Therefore only the Government officers who have been in service in Burma for a long term of years can know about the weather and conditions of Burma. I therefore prefer the management of the Government of Burma.

(b) Many experts are required in every place. But it will be proper that Burmans who study and gain knowledge in Burma should be selected and appointments given to them. As it is in Burma all the cultivators are Burmans. The work will be facilitated in every respect if persons of the same race give advice to one another, as such advice can easily be understood and adopted.

(c) (i) It would be far better if the Government would add a department for collection, sale and purchase of paddy to the Agricultural Department in order to afford relief to cultivators.

(ii) The railway and steamer services are not unsatisfactory.

(iii) Many roads accessible to the cultivators from and to the places of their work are still wanting.

(iv), (v) & (vi) These services are not unsatisfactory.

QUESTION 5.—FINANCE.—(a) If the Government would grant loans sufficient to cover the requirements of the cultivators for their actual expenses, at a cheap or moderate rate of interest, it would confer a boon on them. There is one other matter: in the case of a man who has done his work honestly and well but has failed as a result of some calamity, the recovery should be made on a long-term basis, so as to enable him to redeem his land or else to acquire other land for cultivation; in this way only a great benefit will be conferred upon the cultivators.

(b) As the loans granted and issued under the provisions of the Agriculturists Loans Act are mainly for the expenses of cultivation and cost of seed-grains, and as the Agricultural Department alone is in a position to be conversant with the actual details of expenses, the true state of affairs with regard to such items of expenditure could be arrived at only if the work of granting such loans were transferred to the management of Agricultural Department banks.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(a) (i) Want of money on the part of cultivators for buying cattle and redeeming lands.

Want of money for seed, for plucking and transplanting, for cultivation.

For the above-mentioned items of expenses as well as for the purpose of buying cattle and redeeming lands, loans have to be taken in the months of *Tagu* and *Kason*.

(ii) & (iii) To meet these expenses money has to be borrowed from the creditors in the months of *Nayone* and *Wazo*, according to the custom prevailing in their districts, at the rates of Rs. 80 per hundred baskets of paddy, or at the rates of from Rs. 100 to Rs. 120 per hundred baskets to be delivered promptly at the harvest. Some cultivators have to take loans on interest at the rate of Rs. 3 to Rs. 5 per cent per mensem,

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Generally loans are taken on the *Sabapay* system, i.e., to deliver paddy in satisfaction of the debt. Although they have to repay their creditors on such hard terms as these, cultivators have to cringe for the same and they can only get the loans when there are persons who are willing to go surety for them, howsoever they may be trusted. In the case of some of the cultivators who could not pay up in full satisfaction owing to irregularity of rain or some such cause, the value of a hundred baskets of paddy, calculated at the current price of Rs. 160 or Rs. 180, would be noted up against them as the principal amount due. This system is called "*Ngwe-pyan-toe*."

(b) Legislation to afford protection against such illegal lending and borrowing can properly be undertaken only if, and when, the Government can grant sufficient advances. If such legislation be introduced before a sufficient amount of loans can be made, the cultivators will have to encounter still more difficulties, because the creditors will not lend them the money.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(a) It would be very difficult to consolidate separate holdings. As the conditions of holding these lands are not the same, it would be very difficult to effect an exchange.

If it is at all necessary for the Government to interfere in the matter, it would be possible only if new allotments can be made after these holdings have been resumed. Therefore it is extremely difficult to do justice in this matter.

(b) I do not think it necessary to take any special measures in this respect. In fact, cultivators in Burma have only from five to ten acres of land each, requiring the use of one pair of bullocks. While the middle-class cultivators have no more land than can be worked by two to three pairs of bullocks, there is much land in the hands of persons who do not work the same personally but let it out to tenants and live on the rent. I do not think that any special measure is necessary.

(c) As regards minors and women who cannot go to the courts I am of opinion that legislation is necessary for directing the courts to recognise the decisions made by respectable persons of their respective localities and to make enquiry into and to confirm the same. If one of the parties, not being satisfied with the decision, appeals to the court subsequently, statements of elders who intervened in the matter should be confirmed if considered fit to be so confirmed. As regards rejecting the same, they are to be so rejected only for some very special reasons.

QUESTION 8.—IRRIGATION.—(a) (i) Canals from Zawgyi creek in Kyaukse district are now supplying water. But as there is much land and as the rainfall is scanty, lands which are irrigated by canals do not get a sufficient supply of water. Therefore cultivation cannot be done early enough in the season; as there is no change of water from hot to cold in the paddy lands, which have already been cultivated, the yield decreases as the paddy plants get heated. Therefore the cultivators are grumbling over this a great deal. As there is less water in the canals, small canals called "water-courses" are dug in order to economise the use of water. I have noticed that this method does not meet with the cultivators' approval.

There are two methods of cultivating paddy: wet cultivation and dry cultivation. As regards wet cultivation, the plants cannot thrive if there is a lack of water for the land from the day of ploughing up to the time the crops are about to be reaped. For the paddy lands which have been cultivated dry, also it would be much better if the long-standing water were replaced by fresh water in the months of *Tawthalin* and *Thadingyut*. If such change cannot be effected the plants get heated by the hot water and therefore the yield decreases. If it is desired to economise the use of water, it would be much better to give a supply of water to the lands after they have been cultivated under the dry cultivation system, similar to the method adopted in growing wheat in Taze Township, Shwebo district, as suggested by me formerly.

QUESTION 10.—FERTILISERS.—(a) As regards natural manures, they can be applied only if water is available early in the season. As regards artificial fertilisers, there is no difficulty about them and they are good.

(b) I have found that it is advantageous to a great extent to use a mixture of the two kinds of fertilisers, viz., bonemeal and cowdung.

(c) In order to popularise fertilisers which are advantageous, an acre or two should be marked off and taken up from any suitable person out of his already ploughed land in the jurisdiction of any village headman. Then one part should be treated with manure, leaving the other part without any such treatment. Thus if two plots of land, measuring one acre each, be selected and worked simultaneously by way of a demonstration and watched over until the crops have been reaped and measured, the results can be understood and appreciated by the cultivators.

Of all the fertilisers already tested I find that bonemeal, superphosphate, potash and sulphates are good. The profit derived from the yield of the land treated with these fertilisers does not cover even the cost of these fertilisers and is not commensurate with the expense incurred. As it is now difficult to get sufficient cowdung, in places where there are rice mills the cultivators manure their lands with ashes of paddy husks and this is a good substitute.

(d) It is now definitely known that the use of cowdung alone would be profitable in Kyaukse and Mandalay districts.

(e) Owing to the high cost of these chemicals which is not commensurate with the increased yield of paddy, it is not profitable to use these fertilisers.

(f) The majority of people do not use cowdung as fuel. The Brahmin Indians and those who make carts use cowdung as fuel. It is possible that this practice can be stopped by the Public Health Department as it is dangerous to health in towns and villages.

QUESTION 11.—CROPS.—(a) (i) As improvement has now been made by the Agricultural Department in the matter of good and pure seed, rice mills buy it at an enhanced price. As the seed is pure the crop is uniform and ripens simultaneously. It is evident, for these reasons, that there must be an increase in the yield of paddy.

(ii) Of the seeds imported from foreign countries, Karachi gram is appreciated by all the cultivators who cultivate it. I have noticed that it has become more popular as its use has become more and more extensive year by year. As regards a species of millet known as saccoline used as fodder for cattle, it is known that both the ear and stalk are liked by the cultivators. This seed has become popular gradually and has now spread amongst the cultivators.

(iv) As regards the question of preventing damage by animals, it is possible to prevent it if the Township Officers, having in view the damage caused to the cultivators, would take the trouble of taking measures for protection.

(c) Besides paddy, crops such as sugarcane, cocoanut, plantain, Indian corn, tobacco, onions, groundnuts, gram and betel are profitable according to the condition of the soil.

QUESTION 12.—CULTIVATION.—(i) Cultivators are now not in a position to use improved implements.

(ii) It is profitable to practice rotation of crops, but at present cultivators have not sufficient knowledge for adopting these methods. Knowing that mixture and rotation of crops are profitable, I have made demonstrations in agricultural tracts. In places where rainfall is irregular it is worked on a small scale; in places where rainfall is regular, some of the cultivators adopt these methods.

QUESTION 14.—IMPLEMENTS.—(a) At present a better suggestion than the one given by the Agricultural Engineering Department cannot be given.

(b) The adoption of implements by cultivators will only be hastened if a good implement can be obtained at a cheap price and can be used easily.

(c) It will be accelerated if the cadre of subordinate officers is increased in the districts and encouragement given by practical demonstrations, in the same way as the Agricultural Engineering Department has now been doing.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(a) Formerly some of the cultivators did not have leisure even for a single day. I now find that cultivators rest for about 100 days out of the 365.

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Oral Evidence.

64777. *The Chairman* : U Aung Dun, you are in business as a rice miller at Mandalay?—Yes.

64778. Would you give the Commission an idea of the extent of your own business?—I can mill some 1,000 baskets of paddy into 150 baskets of rice a day.

64779. Do you buy rice from cultivators through your own agents direct?—I buy through the brokers.

64780. Do you ever act as a broker yourself?—Sometimes I do act as a broker, and I buy direct also.

64781. Do you act as a broker for other millers or do you act as a broker for your own business?—I do not act as a broker for other mills.

64782. Do some villages measure in larger baskets than others?—In the same village there are several baskets of different capacities.

64783. Do you think that it would be a good thing if arrangements could be made for everybody to measure rice in the same size basket?—Under the present circumstances it is not possible to standardise the basket. By and by a standard size basket will be introduced.

64784. Why is it not possible at this stage to standardise the basket?—It all depends on the stipulations made by the sellers of paddy. Each seller of paddy insists that the paddy shall be sold in his own special basket.

64785. But surely these stipulations only hold good from crop to crop?—There are stipulations with regard to all the various crops, for example, sesamum, gram, etc.

64786. But surely the stipulations as to the size of basket to be taken as the measure only apply to one season ahead?—We buy and sell and we agree among ourselves as to which basket is to be used for measuring.

64787. I do not see, if these objections are valid, why you should expect that standardisation will be possible in the future?—The basket that is used in the villages apparently has to conform with the basket used in the rice mills. About ten years ago the difference was about ten baskets in every hundred baskets. At present the difference is only about three-and-a-half to four per cent. The basket is becoming standardised gradually.

64788. On what basis does the broker operate for you?—I have to pay two rupees brokerage on a hundred baskets of paddy.

64789. Do you sell any unmilled paddy?—I do not sell unmilled paddy, only rice.

64790. What is the unit upon which you sell?—I sell by the bag.

64791. Were you in the Agricultural Service at one time?—Yes, I have served in the Agricultural Department.

64792. In what capacity?—I worked as a farm superintendent and I have also worked in five districts.

64793. Do you attach great importance to the cultivators getting a premium for an improved quality of rice?—Yes, I do attach importance to that.

64794. In order to encourage the cultivator to grow better qualities?—Yes.

64795. Do you think that the difference in the size of baskets by which paddy is sold and the consequent risk of confusion very often leads to the cultivator getting less for his rice than he ought to get?—The cultivators do not get less than they ought to get, because the brokers pay for the paddy according to the size of the basket.

64796. Do the brokers buy from the individual cultivators in every case, or do they sometimes buy from a group of cultivators?—At the harvest time, brokers buy from individual cultivators, but later they buy from people who store paddy.

64797. And these latter very often mix the lots of various cultivators; is that so?—Some mix them, but some keep the lots separate; the majority mix them.

64798. Do you understand the principle of the open market?—No.

64799. Do you think that it would be possible to arrange that rice should be sold by the cultivators in a market where practices are controlled and where measurement and weight are made by neutral tallymen?—Under the present circumstances, no.

64800. Brokers do business for a few buyers, but they buy from many cultivators; do you think that brokers are inclined to favour a buyer rather than a seller?—Generally they favour the sellers.

64801. Why?—They get their brokerage only from the sellers; that is why they are inclined to favour sellers.

64802. If you thought that one of your brokers was favouring a cultivator (the seller) to your detriment, would you do further business through that broker?—Generally I have to depend upon the brokers to get my paddy.

64803. Do you mean that if you had the choice you would do business not with the broker but with the cultivator?—If I do not do business with a broker, that broker will find other buyers.

64804. *Dr. Hyder*: You say that the cultivators used to work 300 days but that they now work only 100 days; the cultivator is now much better off than he used to be?—The cultivators are perforce idle for about 100 days out of 365 days in the year because there is no work for them.

(The witness withdrew.)

U SHWE, Schoolmaster, Representative of Co-operators of Upper Burma.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(a) (i) The majority of the agriculturists in Burma are accustomed to cultivate only the usual and customary kinds of crops, grow unseasonal crops, stick to one particular kind of crop only and use bad implements. They do not select pure good seed grain for sowing. The result is that much time is wasted and the outturn poor.

(ii) In rearing animals also they do not pay much attention to them and there are none who are acquainted with the methods of guarding them against diseases. So, under their care, cattle do not thrive.

(b) In order to impart agricultural knowledge to agriculturists, it is necessary: (i) to educate the children of the agriculturists in the science of agriculture, (ii) to propagate and spread the said knowledge through the agency of experts, and (iii) to enable the cultivators of every locality to avail themselves of the best methods of agriculture.

(c) In connection with research not at present being investigated to which attention might usefully be turned, I would suggest—

(i) To enlist those who are earning their livelihood lightly by means of work other than that of agriculture in the agricultural villages and make them work without interruption.

(ii) To take strict measures to make it compulsory for the children of the agriculturists, living in villages, to study agriculture and learn handicraft.

QUESTION 2.—AGRICULTURAL EDUCATION.—(i) The number of teachers and institutions is not sufficient.

(ii) The extension of teaching facilities in the districts is an urgent need.

(iii) Teachers in rural areas should be drawn from the agricultural classes.

(iv) The attendances at existing institutions are not as numerous as I would expect in the present circumstances. This is due to the fact that the parents of the children have no faith in the idea that it is more advantageous for their children to carry on the work, handed down from generations, after they have completed the various courses of education. It is only by the administrative authorities of the Local Government and not by mere common education that the demand for instruction can be stimulated.

(v) The main incentives to induce lads to study agriculture are to make the pupils do gardening work themselves and give aid and encouragement to those whose crops are the best.

(vi) Yes, pupils are mainly drawn from the agricultural classes.

(vii) Yes, modifications are necessary in the existing courses of study. These are the inclusion of—

(a) Garden plantation, and

(b) Handicrafts, such as wood, cane and bamboo work.

(viii) (a), (b), and (c) should, I think be studied.

(ix) The majority of students who have studied agriculture are employed only as paid servants, for example, as agricultural demonstrators and farm superintendents, after they have left college.

(x) Agriculture can be made attractive to the middle-class youths in this way: They should be given education so that they may take interest in agriculture and realise that agriculture is the means of one's own progress and success in life, and the Local Government should encourage the work of those who take up agriculture as their means of living.

(xi) There are no recent movements for improving the technical knowledge of students who have studied agriculture.

(xii) Adult education in rural tracts can be popularised in this way: the Local Government should recognise the services of those who are educated in preference to those who are not, and should give differential treatment in social dealings.

(xiii) For better educational facilities in rural areas, I would suggest the following schemes:—

(a) The Government should take a list of children between the ages of 4 and 15, find out in what work they are employed and how they are brought up and take action against those children who do not take up education.

(b) The children of really poor parents should be educated as boarders in school and their expenses paid.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(a) The measures which in my view have been successful in influencing and improving the practice of cultivators are only those laid down by the officials of the Agricultural Department.

(b) For increasing the effectiveness of field demonstrations, I would make the following suggestions:—

(1) To point out and demonstrate the methods of agriculture to the agriculturists.

(2) To encourage and recognise the services of those who adopt the methods of agriculture as pointed out and demonstrated.

(c) Cultivators may be induced to adopt expert advice as follows:—

(1) Agriculture is of great importance and should be looked up to by all.

(2) One reaps real advantages by duly adopting improved methods of cultivation. Due recognition should be accorded to those who adopt such methods. This arrangement and advice would increase the number of cultivators adopting expert advice.

(d) (1) The success of demonstration and propaganda work is so small in the district that it can only be just said to have been adopted, with the result that no real advantages have accrued yet.

(2) As regards the success of the said work, the rural population may be called paddy and *ya* cultivators; they adopt the old methods of cultivation handed down from their forefathers and have not got through, even the preliminary course of education, which they are required to study. They do not recognise the existence of agricultural education and do not even understand the demonstration and propaganda work.

QUESTION 4.—ADMINISTRATION.—(b) I am of opinion that expert scientific knowledge could be supplied to a greater extent than is the case at present by increasing the scientific staff of the Government of India.

(1) The types of work which would benefit by pooling the services of experts are—

In every rural tract persons should be chosen from amongst agriculturists, and those who can take the lead should be encouraged and arrangements should be made, to form agricultural societies in each tract.

(2) The said work should be controlled in the same manner as in the cases of the Co-operative and Agricultural departments.

(c) I am not satisfied from the agricultural standpoint with the services afforded by the following departments. Directions in which these services might be improved or extended are—

(i) As regards the extension of the Agricultural and Veterinary services, arrangements should be made so that every agriculturist should get thoroughly acquainted with the lower standard lessons of the departments concerned.

(ii) Regarding railways and steamers, arrangements should be made to facilitate the consignment and carriage of crops and to reduce the rates of such consignments.

(iii) The arrangements made at present with regard to roads still require much improvement. Much more improvement is still required in the communication services between the districts and townships and village-tracts.

(iv) As regards the procedure adopted by the Meteorological Department at present, only the departments of Government know anything about them. As these matters concern the agriculturists very much, arrangements should be made for the agriculturists of every village-tract to know and understand them.

(v) Posts and Telegraphs are in existence at present only in large towns. Arrangements should be made for them to be in existence in every village-tract.

QUESTION 5.—FINANCE.—(a) I am of opinion that steps should be taken for the better financing of agricultural operations.

The arrangements for repayment in three or four instalments of the loans now advanced on mortgage of substantial security do not yet help much to improve the conditions of the agriculturists. As a higher rate of interest is charged for the amount borrowed for the cultivation and consumption expenses of the agriculturists yearly, if the Government would issue loans for repayment the same year at the rate of ten per cent per mensem, the agriculturists would very much profit by this arrangement.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(a) (i) Most agriculturists, when arrangements are at first made for cultivation, have no paddy land of their own and have therefore to take land on rent. Further, they have no cattle nor do they have seed-grains for sowing, nor do they have paddy for consumption for the whole year round. So, they have to take loans and invest the same from the very beginning of their work. Such arrangements tend to decrease the outturn. The cultivation and consumption expenses are great, they are unable to pay in full the loans which they originally took and this is how they get indebted.

There has been no practice amongst the agriculturists of making careful estimates of income and expenditure beforehand; their liabilities become greater than their receipts, and so they are apt to get into debt; therefore they have to take loans.

(ii) Those agriculturists who have little or no security to offer can take loans only from the landowners and well-to-do people of their villages. Those agriculturists who have adequate security to offer have to take loans either from the *chetties* or from the Chinamen. In the case of loans taken in the village-tracts where co-operative credit societies have been formed, it can be said that such loans are taken from such societies and spent; but, as a matter of fact, the loans taken from such societies are not sufficient and therefore the agriculturists have in addition to take outside loans.

(iii) I am of opinion that measures should be taken to facilitate the redemption of mortgages, and to cancel the debt after payment of interest equal to the original principal as well as the principal itself.

(c) Measures should be taken to restrict or control the credit of cultivators, such as limiting the right of mortgage and sale.

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QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(a) It is true that there is loss in agricultural efficiency attendant upon the excessive sub-division of holdings. In order that such things may not occur, measures should be taken providing for the owners of adjacent holdings having the right of pre-emption. Then, only, such fragmentation of holdings will decrease.

(b) The obstacles in the way of consolidation of holdings are—

The agriculturists, whenever they are in need of money, split up their land and sell or mortgage a portion to the moneylenders.

In order that such things may not take place, measures should be taken providing that, in transactions of mortgage and sale of paddy land, only the owners of adjacent holdings should have the right of pre-emption.

(c) Yes, I consider legislation necessary to deal with minors, etc.

QUESTION 8.—IRRIGATION.—(a) The districts in Burma in which new irrigation schemes should be adopted are—

(1) Shwebo, (2) Mandalay, (3) Kyauksè, (4) Meiktila, (5) Thazi, (6) Pyawbwe, (7) Yamèthin, (8) Minbu, (9) Myingyan and (10) Pakòkku. It is more suitable to adopt such schemes in the said districts. Except in Myingyan and Pakòkku, irrigation schemes are in operation. New canals should be constructed in Pakòkku and Myingyan districts and arrangements for irrigation should be made there. In the eight districts in which irrigation schemes are being adopted, there is still great need for extension or improvement in the existing methods of irrigation.

(i) It is necessary to make arrangements for extension or improvement of perennial and non-perennial canals for storage of water.

(ii) It is desirable to make arrangements for extension or improvement of tanks and ponds.

(iii) It is desirable to dig wells on high land.

The obstacles to the extension or improvement of irrigation are—

(1) hilly districts and (2) sandy districts.

(b) The *ya* and paddy cultivators are supplied with water from canals. I am not satisfied with the existing methods of distributing canal water to cultivators.

Methods which should be employed to prevent wastage of water by evaporation and by absorption in the soil are—

Arrangements should be made in the irrigation district (1) to have reservoirs in existence and (2) to cultivate gardens and plant large trees.

For the fair and equitable distribution of water to the cultivators of paddy and *ya* lands lying within the area irrigated by a canal, the method adopted is to distribute water by means of concrete pipes of dimensions proportionate to the area irrigated. So far this method has not yet been attended with any success. To improve the distribution of water so as to ensure fairness and equity, arrangements should be made to regulate the period for supply of water according to the area of land and the quantity of water used, and to ensure reliability in the opening and closing of the distribution pipes (sluices). The officers of the Canal Department should be made to do their duty according to the rules and regulations without taking bribes, and the agriculturists should be made to understand the methods of distribution of water.

QUESTION 9.—SOILS.—(a) (i) Water should be drained from low-lying land. Canals should be constructed and irrigation water conveyed to the areas having homogeneous tracts of coarse soil. The soil then gets mixed up with silt and by this means soils can be improved.

(ii) Alkali (*usar*) or other unculturable land can be reclaimed by mixing with sand and silt or with soil composed of some other matter. The process of mixing up can be facilitated only after a canal is cut and water is let in and out.

(iii) For preventing erosion of surface soil by flood-water, arrangements should be made to stop or deviate the natural watercourses, or to store up water.

(b) (i) Soils which, within my recollection, have undergone marked improvement are the tracts which are under paddy and *ya* cultivation by means of irrigation.

Water is one of the principal fertilisers of soil and also the distributor of silt and minerals that are carried down from other places.

(ii) Soils that have suffered marked deterioration are the hot and dry paddy and *ya* lands that are left fallow and the lands situated in the dry sandy tracts where there is scarcity of water. In dry and hot tracts, as no rain water can be obtained and no trees grow or thrive, no green manures can be obtained.

(c) The measures which Government should take to encourage the reclamation of areas of cultivable land which have gone out of cultivation are—

(1) To irrigate those areas which admit of irrigation.

(2) In the case of high lands which do not admit of irrigation, by suggesting a change of crops, by the cultivation of crops suitable to such areas and by practical demonstrations as an experiment.

QUESTION 10.—FERTILISERS.—(a) In my opinion, greater use could be profitably made of natural manures or artificial fertilisers. It would be well if the cultivators had faith in, and understood, the methods of using them. This can only be achieved by demonstrations.

(b) The adulteration of fertilisers can only be prevented by the examination and analysis of chemical experts who are well versed in the process of preparation and blending of the same.

(c) Arrangements should be made to popularise new and improved fertilisers by making the cultivators realise, by means of demonstration, the marked improvement in the growth of crops sown on manured land.

(d) There are no localities in Burma in which a considerable increase in the use of manures has recently taken place.

(e) The effect of manuring with phosphates, nitrates, sulphate of ammonia and potash manures is not known as these things are not used here in Burma.

(f) To discourage the practice of using cowdung as fuel, arrangements should be made to explain the usefulness of cowdung as manure and to instruct the cultivators on its use as such.

QUESTION 11.—CROPS.—(a) (i) To improve the existing crops, manuring and punctual cultivation of crops according to season should be adopted.

(ii) New crops, including fodder crops, should be introduced by demonstration.

(iii) The distribution of seeds can be facilitated, if the agriculturists are made to realise the high prices fetched by crops as a result of using good pure seed.

(iv) With regard to the prevention of damage by wild animals, this can only be done by the Local Government in some parts where much damage is caused.

(b) I want to suggest the cultivation of some heavy yielding food crops in replacement of the present crops. The fertility of the soil in any locality should be examined and the crops most useful in Burma, as well as those used in foreign countries, should be grown.

(c) In improving crops or substituting more profitable crops, only those who have received instruction from experts in such methods of agriculture would be successful.

QUESTION 12.—CULTIVATION.—(i) The existing systems of tillage are very defective. It is necessary to manure the soil and to get a longer period of tillage before dry crop cultivation, as such cultivation tends to deteriorate the soil. As regards tilling instruments, those made under the new methods should be used in preference to those made under the old methods.

(ii) The customary rotations of mixtures of the more important crops should be adopted. But it is still necessary to instruct the agriculturists on the mixtures of crops consisting of tall trees, plants and creepers, the cultivation of crops with regard to the periods for planting and their period of blossoming and bearing fruit.

QUESTION 13.—CROP PROTECTION, INTERNAL AND EXTERNAL.—(i) The existing measures for protection of crops from external infection, pests and diseases are not yet effective and sufficient.

There are few agriculturists who understand how to select and store up seed-grain, to clear and remove bushes, creepers and trees close by their paddy and *ya* cultivation wherein insects could take refuge, the fact that insects breed in impure soils, and the profitable methods of cultivation. Arrangements should be made to instruct them in these matters.

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(ii) The adoption of internal measures against infection is desirable.

As at present the agriculturists have not only not adopted the methods suggested by the Agricultural Department but have also not yet adopted the very easy method, in common use amongst themselves, measures should be taken to give them instruction in these methods by practical demonstration.

QUESTION 14.—IMPLEMENTS.—(b) With regard to the steps that may usefully be taken to hasten the adoption by the cultivator of improved implements, I am of opinion that as the agriculturists have to work their land mostly by means of cattle in Burma, the use of their present implements results in lessening of energy, loss of time and poverty of outturn. Therefore they will get on better with their work, if they make use of implements by which a greater amount of work can be done in less time.

(c) There are some difficulties which manufacturers have to contend with in the production of agricultural implements and their distribution for sale throughout the country. To remove such difficulties, I would suggest that the Local Government should make arrangements to provide the agriculturists with funds to enable them to buy agricultural implements easily and to have them repaired immediately when necessary.

QUESTION 15.—VETERINARY.—(a) The Civil Veterinary Department should be under the Director of Agriculture and should not be independent.

(b) (i) Dispensaries are under the control of local district boards. It is not proper to keep them under the local district boards.

(ii) The need for expansion is not being adequately met.

(iii) I would advocate the transfer of control to provincial authority.

(c) (i) Agriculturists do not make full use of the veterinary dispensaries. Agriculturists will make use of the veterinary dispensaries if they are under the control of the Director of Agriculture.

(ii) Agriculturists do not think that touring dispensaries distribute medicines without charges; as it appears that the Veterinary Assistants do not tell them anything about free distribution, they do not make use of it.

(d) The obstacles met with in dealing with contagious diseases are due to the arrangements made by the Veterinary Assistants who are generally partial in their dealings and take bribes. I do not advocate legislation dealing with notification, segregation, disposal of diseased carcasses, compulsory inoculation and prohibition of the movement of animals exposed to infection. If the Civil Veterinary Department were an authoritative head under the control of the Director of Agriculture, I think this separation of functions would improve the existing conditions.

(e) There is no difficulty in securing sufficient serum to meet the demand now.

(f) With regard to popularising preventive inoculation, the Veterinary Assistants do not explain matters but use such powers as would tend to act as obstacles in the way of treatment. Though no fee is publicly demanded for such inoculation, it has been customary to pay without fail, and this acts as a deterrent.

(g) (i) & (ii) Yes, I consider that the provision of further facilities for research into animal disease is desirable.

Such further facilities should take the form of—

(i) an extension of the Muktesar Institute, or

(ii) the setting up of provincial veterinary research institutions.

(h) (i) & (ii) I recommend that special investigations should be conducted by—

(i) Officers of the Muktesar Institute, or

(ii) research officers in the Provinces.

(i) I recommend the appointment of a superior Veterinary Officer with the Government of India.

I am of opinion that the appointment of such an officer conducting all researches and investigations would result in improving the health and in increasing the number of animals, as Burma is a country where only animals are employed in cultivation.

QUESTION 16.—ANIMAL HUSBANDRY.—(a) (i), (ii) & (iii) Arrangements should be made regarding (a) age-limit for labour and (b) time-limit for labour according to season and time fixed for food and drink.

(b) (i) to (v) Special arrangements should be made to prevent the existing causes of injury to cattle.

(c) The months of the year in which fodder shortage is most marked in our districts are the months of *Tabaung, Tagu, Kason and Nayone* (March to June).

Such scarcity of fodder usually exists for 120 days. After this period of scarcity ends, about one month elapses before young growing cattle begin to thrive.

(d) I suggest the following for improving or supplementing the fodder supply in our district:—

(1) To increase the number of pastures in forest reserves.

(2) To take strict measures not to burn straw and dry grass in the pastures in the dry season.

(3) To construct weirs in fisheries, streams and channels and to store up water.

(e) Landowners should be induced to take a keener practical interest in these matters by instructing them on the subject of grazing grounds for tenants' cattle and on the methods of collection and storage of fodder.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(a) The work done by an average cultivator on his holding during the year occupies about eight months. The cultivator who has got sufficient foodstuff in store would do manuring work, chop down and clear jungle or under-growth, set up a weir or dig a channel on his holding in the hot season. As soon as he finishes this work, he would ply a cart for hire or be employed as a cooly.

(b) I want to suggest means for encouraging the adoption of subsidiary industries. Arrangements should be made to enable the cultivators to continue cultivating cold and hot season crops on the damp areas and on the areas where water is available in the hot season. I want to suggest some new subsidiary industries which could be established with Government aid, to occupy the spare time of the family.

(c) There are no obstacles in the way of expansion of such industries as bee-keeping, poultry-rearing, fruit-growing, sericulture, pisciculture, lac-culture, rope-making, basket-making, etc.

(d) Yes, I think that the Government should do more to establish industries connected with the preparation of agricultural produce for consumption, such as, oil-pressing, sugar-making, cotton-ginning, rice-hulling, utilisation of wheat-straw for cardboard, utilisation of cotton seed for felt, fodder, oil and fuel, utilisation of rice-straw for paper, etc.

(e) Subsidiary employment could be found by encouraging industrial concerns to move to rural areas. In this connection I would suggest taking the initiative in the establishment of industries in rural areas.

(f) Yes. I recommend a more intensive study of each rural industry in its technical, commercial and financial aspects with a view, among other things, to the introduction of improved tools and appliances.

(g) With regard to measures which might lead to greater rural employment, I would suggest that special arrangements should be made by the Local Government, as required, for various kinds of employment according to the village tracts.

(h) With regard to means whereby the people could be induced to devote their spare time to improving the health condition of their environment, I would suggest that they should be induced to do so by teaching them how to take up physical exercises and pointing out their beneficial effects.

QUESTION 18.—AGRICULTURAL LABOUR.—(a) Measures which should be taken to attract agricultural labour from areas in which there is a surplus to areas under cultivation in which there is a shortage of labour are to encourage (a) co-operative credit loans and (b) agricultural loans. Measures which should be taken to attract agricultural labour from areas in which there is a surplus to areas in which large tracts of cultivable land remain

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uncultivated are (a) allotment of land enough for cultivation as a separate holding and (b) loans issued by the Local Government for investment in cultivation.

With regard to suggestions designed to relieve seasonal unemployment, there is now a practice of migration of the agricultural population.

(b) There is a shortage of agricultural labour in this Province of Burma. This may be attributed to insufficiency of funds for investment in cultivation. If the Local Government make arrangements to advance loans to agriculturists so as to enable them to invest a sufficient amount of money, the number of agriculturists will increase.

QUESTION 19.—FORESTS.—(a) No. I do not consider that forest lands, as such, are at present being put to their fullest use for agricultural purposes.

I would suggest immediate arrangements to be made to grant (1) extensions of cultivable forest areas; (2) grazing facilities for adequate supply of fodder to agriculturists and (3) licences to extract timber and bamboo for making tools and appliances used by agriculturists for constructing dwelling houses and cattle-sheds, and for firewood. These should be granted and extended as much as they want.

(b) My suggestion is that the forest areas in the neighbourhood of agricultural localities should be in proportion to the number of cattle.

(c) There is no instance of soil erosion on account of deterioration of forests.

There is no instance of soil erosion and damage from floods.

(d) I want to indicate (some) methods by which the supply of moisture in the soil, the rainfall and supply of canal water can be increased and regulated by afforestation or by the increased protection of forests so as to benefit agriculture. Arrangements should be made to plant trees also in the village tracts of the agriculturists and measures should be taken to protect existing trees.

These methods are useful in preventing the destruction of agricultural land by erosion.

(e) There is an opening for schemes of afforestation in the neighbourhood of villages.

(f) Forests are not suffering deterioration from excessive grazing. Soil erosion cannot thereby be facilitated.

QUESTION 20.—MARKETING.—(a) I do not consider existing market facilities to be satisfactory. The object should be to put Burmans into direct touch with foreign merchants in respect of the sale of crop produce, timber and other commodities of Burma.

In such sales, I would suggest that measures should be taken to establish direct transactions between the producers and the merchants.

(b) I am not satisfied with the existing system of marketing and distribution. I cannot be satisfied with the present system in which the producers have to sell beforehand at the places where the various kinds of crops are produced, because the system is not at all productive of any advantage to the agriculturists.

The agriculturists in Burma have not money enough for cultivation expenses at the time of preparing the land for sowing and are obliged to sell the produce beforehand to the well-to-do people at a low price. When the creditor collects the crop at harvest time, the price comes up even to Rs. 50 per cent profit within eight months and so the well-to-do people get on. In three or four months there come sale transactions between the creditors and merchants. Then, what originally cost the creditor Rs. 100 is worth Rs. 75 more and is sold to the merchant; the merchant now sells the same at the rate of Rs. 50 per cent profit to a foreign country. The result is that the producers of Burma are getting only one-third of the price paid by the foreigners.

I wish to make the following suggestions: If steps be taken to keep the producers or cultivators in sufficient funds to obviate the expediency or necessity of making "advance" sales at the cultivation season, and thus enable them to sell their produce to the traders direct at the time of harvest at the prevailing market price, the producers will be greatly benefited.

(d) I am of opinion that more effective steps might be taken to place at the disposal of cultivators, merchants and traders information as to market conditions, whether Indian or overseas, crops returns, complaints as to Indian produce from wheresoever originating and agricultural and marketing news in general.

QUESTION 21.—TARIFFS AND SEA FREIGHTS.—The existing custom duties, both import and export, and sea freights do affect the prosperity of the Indian cultivator adversely.

As a remedial measure for the amelioration of, and relief from, this undesirable state of affairs, I wish to suggest that the levying of customs duties on both import and export and custom duties on sea freights should be stopped, and free trade should be permitted.

QUESTION 22.—CO-OPERATION.—(a) (i) & (ii) To encourage the growth of the co-operative movement the steps as stated below should, I think, be taken by (i) Government and (ii) non-official agencies:—

(i) Steps should manifestly be taken by the Government to take notice of, and look into, the matters of the occupation and work of the members of co-operative societies, their taking of loans and repayment of the same in localities where co-operative societies have been formed, and to see that the touring officers pay attention to these matters.

(ii) The steps that should be taken by the non-officials to encourage the growth of the co-operative movement are: the reposing of trust and confidence in the members of the societies, having dealings with them and rendering help and assistance to them.

(b) (i) Special steps should be taken to see that, as regards the credit societies, the grant of loans and repayment are made punctually at the periods fixed.

(ii) Steps should be taken for the purchase societies to be linked up with the cultivators so that they can dispose of their produce either in a foreign or home market, and reap benefits thereby.

(iii) Societies formed for the sale of produce or stock are not yet in existence in Burma; I am of opinion that the formation of such societies is advisable.

(iv) Societies for effecting improvements, e.g., the digging of wells and the construction of *bunds*, walls and fences, or the planting of hedges, are not in existence in Burma; I am of opinion that it would be advisable to form such societies by way of an experiment.

(v) It is advisable that a society for the aggregation of fragmented holdings, and their redistribution in plots of reasonable size, should be formed.

(vi) The scope of co-operative credit societies should be extended so as to include the co-operative use of agricultural machinery as an additional object in each society.

(vii) Steps should be taken to popularise such societies by their formation by way of experiment.

(c) With regard to the co-operative schemes for joint improvement, such as co-operative irrigation, co-operative fencing or a co-operative consolidation of holdings scheme, which cannot be given effect to owing to the unwillingness of a small minority to join, legislation should be introduced in order to compel such persons to join for the common benefit of all.

(d) So far there is nothing yet to lead me to consider that those societies of which I have personal knowledge have, in the main, achieved their object.

QUESTION 23.—GENERAL EDUCATION.—(a) (i) As the seeking of higher or collegiate education has in view the sole object of securing highly paid appointments, it should be compulsory on those who have passed out of such schools or colleges to serve in the Agricultural Department for one year to undergo a course of training in agriculture before they are transferred to other departments.

(ii) & (iii) In middle schools and elementary schools, agriculture should form a distinct and special subject of instruction in the curriculum; and promotion to a higher class should only be given after a pass in the subject of agriculture.

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(b) (i) The methods I wish to suggest whereby rural education may improve the ability and culture of agriculturists of all grades, while retaining their interest in the land, are as follows:—

Agriculture should form a subject of instruction in rural education; it should be laid down that it is a subject which is to be passed in fact and should be compulsory.

(ii) With regard to education in rural areas, there is no such thing as compulsory education in Burma.

(iii) The small proportion of boys in rural primary schools passing through the fourth class is due to the fact that the parents have very little desire for their children to acquire education, to the fact that they are made to assist their parents in their work and also to the fact that children who are not required to give assistance to their parents are made to lead a sheltered, contented and happy life.

QUESTION 24.—ATTRACTING CAPITAL.—(a) With regard to the steps that are necessary in order to introduce a large number of men of capital and enterprise to take to agriculture, the science of agriculture should be imparted to them and the benefits to be derived from an agricultural occupation or calling should be made apparent to them.

(b) The factors which prevent the owners of agricultural land from carrying out improvements are the indiscriminate ways in which agricultural lands are let and made to change hands from one tenant cultivator or set of tenant cultivators to another.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(a) With regard to improving hygiene in rural areas, the Local Government should look into, and take steps and make regulations regarding, such matters as the building of houses in rural areas, breeding or keeping of cattle on the principal or main roads, the modes or customs of eating and living and the free use of water where water-supply is sufficient and ample. With regard to the promotion of the general well-being and prosperity of the rural population, steps should be taken to instil into the minds of the people the desirability of learning the arts or trades according to the needs and requirements of the locality, to encourage and assist them in such trades or callings and to establish them in the methods of thrift and saving.

(b) I am in favour of Government conducting economic surveys in typical villages with a view to ascertaining the economic position of the cultivators. The scope and methods of such enquiries should be as follows:—

(1) To distinguish as to whether an agriculturist is or is not a member of a co-operative society, is doing his work independently of any such society or has dealings with other capitalists.

(2) To distinguish between the landlords who personally work their own lands and those who work the lands on payment of rent.

(3) To appoint such a surveyor and an officer in each township.

(4) To make a survey once a year.

(5) At the end of each year, a report should be compiled, with a memorandum giving the state of progress made, and the same should be made known to all the people in the township.

(c) As a result of enquiries made by me as far as possible, I have arrived at the following general conclusions:—

(1) The agriculturists are wont to follow the hereditary callings and occupations of their parents.

(2) They have no faith in, and do not follow, the practice of cultivating the crops in rotation and according to the seasons.

(3) In the matter of raising loans they show an utter disregard for the amount of harm caused to them and have formed the habit of borrowing loans at high rates of interest and on the mortgage of their property.

(4) In the matter of expenditure they are reckless and extravagant, and without any practice of economy.

(5) Without keeping an account of their daily, monthly and yearly incomes and forming a budget estimate thereof, they have a habit of incurring expenditure on mere guesses.

QUESTION 26.—STATISTICS.—(b) The area of reserved forest in Burma should be ascertained. Statements of areas of cultivable land left uncultivated, and which can be used for cultivation, should be worked out.

U YIN GALE, Representative of Co-operators of Upper Burma.

Replies to the Questionnaire.

QUESTION 22.—CO-OPERATION.—(a) (i) The following steps should be taken by Government:—

The existing co-operative credit societies in Burma not having made the progress they should have made, a committee of enquiry should be appointed to inquire into the causes of their decline. Every encouragement for further progress should be given when the real causes are found out.

The facts are as follows:—

- (a) The majority of the members of the societies are Buddhists.
- (b) According to their religion, they possess the following virtuous characteristics, viz., love, sympathy and joy in the happiness of others.
- (c) Most of them are literate.
- (d) Most of them are related to one another.
- (e) Generally they follow the same kind of profession, such as agriculture.
- (f) In previous years, the number of societies has increased because people are keenly in favour of co-operation, most of them being of the five types mentioned above. Besides, according to the existing by-laws, all societies are unlimited liability societies and liability for loans is enforced jointly not only on the members of the society but also on the union, to the extent of the full amount of the outstanding loan or of half the share capital of the societies concerned.
- (g) At present the societies are not progressing as they ought to. It is, therefore, advisable to hold an enquiry to ascertain the cause of their decline. Also in the future, similar enquiries should be held in each Province every ten years.
- (h) In order to promote the co-operative movement and in order that co-operative societies may be acquainted with one another, conferences should be held at least once in two or three years so that societies may act on the resolutions passed, and benefit by them.
- (i) The Registrars of the Co-operative Department should be thoroughly acquainted with Burma and the co-operative movement, should take an interest in the co-operative work and should be kept on for at least for twelve years. It should be arranged not to have frequent transfers.
- (j) Arrangements should also be made to enable co-operative societies to deposit their money with Government treasuries and sub-treasuries, to withdraw from them and to remit money by transfer.
- (k) The rate of interest taken by the banks from the societies and the rate taken by the societies from their members having now become excessive, it should be reduced in the following ways:—
 - (1) Government should issue loans at a low rate of interest.
 - (2) Government should intervene to reduce the interest on deposits.
 - (3) Government should give assistance according to the rules, to make the societies economise their expenditure as much as possible or to guide societies in regard to their financial position.
 - (4) The banks should be given a wider discretion to enable them to loan money to societies according to their credit.
- (l) Payment of revenue should be postponed till the 30th June in order that the produce of the societies may be sold at more reasonable prices.
- (m) Repayments of loans may be spread over several years to enable members of societies to repay punctually money taken for redemption of their lands, for purchase of lands, for additional loan taken on the security of the lands and for old debts.

(n) Government should, to promote the success of the experimental societies besides the old established ones, assist them by advice and by pecuniary help.

(o) The lands which members of societies have inherited from their forefathers should not be auctioned but a law should be provided for repayment of the loans over a period of several years so that members may never fail to redeem their lands.

(ii) Non-officials should help in the following ways:—

(1) By the formation of societies to spread knowledge of the co-operative movement.

(2) By the issue of a co-operative newspaper.

(3) By the establishment of savings banks at the township and district headquarters.

(4) By opening schools to impart knowledge of co-operation and agriculture, or by having a temporary itinerant teaching staff for the purpose.

(5) By the formation of a central body to work for the success of the co-operative movement and of the societies, or for the benefit of the Province as a whole.

(6) By bringing the urban and rural societies into closer touch, so that the urban societies may act as savings banks for the deposit of the savings of the rural society members, so that the repayments due by rural societies at the time of harvest may be repaid punctually, and so that the urban societies may be able to undertake the storage of the produce of the members of the rural societies in order to obtain a better market for the produce and to obtain commission on the sale of the same.

It is desirable, in order to enable the people to do other subsidiary work between two agricultural seasons, that arrangements should be made in consultation with district officers and co-operative officers to secure work in connection with contracts for public works, pertaining to roads and irrigation, of such bodies as district councils, municipalities, etc.

Arrangements should be made to enable work to be done in connection with the supply of timber, sleepers, firewood and bamboos to the railway company and such other companies which are concerned with big undertakings.

To improve the weaving industry among women, arrangements should be made to encourage the industry by giving facilities for the purchase of improved looms of moderate price and to spread the knowledge of weaving.

(b) (ii) I have no knowledge of purchase societies. However, the village co-operative credit societies are ready to purchase the seed-grains such as paddy, cotton and pulses which agriculturists have to actually use. I am of the opinion that such a project may not be successful if there are no big shops or societies to undertake the sale of seed-grains. It will be successful if, in consultation with officers of the Agricultural and Co-operative departments, and with the assistance of Government shops run on co-operative lines for selling seed-grains are opened in suitable districts. If the project is successful, Government's further participation will be unnecessary.

(iii) It is understood that though societies for the sale of produce or stock were formed in the past, they have become defunct owing to financial reasons. Such societies will be successful only if they can raise loans from district co-operative banks or company-managed banks or the mortgage of their stock-in-trade.

(vi) If the Agricultural Department can undertake the advertising and demonstration of the use of suitable agricultural machinery, societies should be formed for the purchase of such machinery and arrangements should be made for the purchase or hire of the same by members of co-operative societies.

(vii) The Registrar should give advice on the ways and means of joint farming. Then only is there the possibility of societies springing up to give such farming a trial. At present, members of the co-operative societies are following the methods of mutual help in agricultural operations as adopted since the time of their ancestors.

(viii) It is advisable that Registrars of the Co-operative Department should circulate notes, giving advice in connection with the methods to be adopted by cattle-breeding societies, suitable to Buddhists as well as to others of different faiths. Then only there will spring up societies which will be willing to give cattle-breeding a trial. At present cattle-breeding is left to individual enterprise.

(ix) Arrangements should be made by Registrars of the Co-operative Department to form industrial and handicraft societies, cash saving societies, etc., in which housewives should join.

U NYUN, Representative of Co-operators of Upper Burma.

Replies to the Questionnaire.

QUESTION 2.—AGRICULTURAL EDUCATION.—(i) There are no teachers and institutions as yet.

(ii) There is an urgent need.

(iii) Teachers should be appointed for agricultural education.

(v) Recreations for lads should be arranged.

(vi) No agricultural education is yet given.

(vii) Modification is called for, to impart practical agricultural education side by side with the theoretical.

(viii) (a) Nature study is taught; schools which have items (b) and (c) are not in existence in my locality.

(ix) As there are no institutions, cultivators still follow their old pursuits.

(x) The allotment of waste jungle lands under *patta* (i.e., leased land) with periods of exemption from land revenue will make agriculture more attractive to them.

(xi) There has been no movement for improving technical knowledge as there have been no students who have gone in for agricultural studies.

(xii) If agricultural schools are opened in rural tracts, adult education will be advanced.

(xiii) The administration of schools should rest with the school committees and teachers, subject to the control of the Government and grants-in-aid for schools should be given by the Government.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(a) By using good and pure seeds distributed from the Agricultural College and by the advice given to use some sort of mechanical plough, known as *Gwin-set* (revolving harrow), extensive areas can be cultivated and outturns of crops increased.

(b) There may be means for increasing the effectiveness of field demonstrations.

(c) Cultivators may be induced to adopt expert advice if practical demonstration is given in the presence of the cultivators.

(d) Failure of demonstration in certain places was due to unlevel ground and insufficiency of irrigation canals.

QUESTION 4.—ADMINISTRATION.—(a) No suggestions, but the writer wishes to indicate directions in which Government of India may supplement the activities of the Local Government.

(c) No. The Government should grant the requests made by the Co-operative and Agricultural Conference.

QUESTION 5.—FINANCE.—(a) The method of financing adopted by the co-operative societies still requires to be modified and the Government should give closer supervision and more assistance than at present.

(b) It would be advisable if time for repayment of loans were extended for *bona fide* cultivators and if officers were empowered to lend out a larger amount of loans than at present.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(a) (i) The irregularity of rainfall, the destruction of crops by insects, the death of cattle from disease and the small profit obtained by the cultivators are the main causes of borrowing.

(ii) The sources of credit are co-operative credit societies, the Government, the *chettiar* firms and some wealthy people in the villages.

(iii) The reasons preventing repayment are the excess of expenditure over income due to less profit even when there is no destruction of crops, and high prices for articles required by cultivators.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(c) Legislation is required and it would be fair if arbitrators and village committees are empowered to decide disputes.

QUESTION 8.—IRRIGATION.—(a) (i) New canals should be constructed in Meiktila, Myingyan and Sagaing districts for irrigation with the water of the Paung-laung river by which Kyaukse district is at present irrigated. The perennial canals are often flooded, with consequent destruction of crops. Steps should be taken to prevent such floods.

(b) I am not satisfied. The department concerned can complete from 15th November to 15th March the necessary repairs and improvements in the existing canals. If distribution of water by turn is started from 16th March to the end of May, it will help *hnan-yin* (early sesamum), *kauk-yin* (early paddy) and plantains. If the water were to be distributed for *kauk-kyi* (main crops) from 1st June, the agriculturists would be able to extend their cultivation.

QUESTION 9.—SOILS.—(a) (i) Low-lying areas should be provided with canals for supply of water and drainage.

(ii) The advice of the Agricultural Department should be sought to deal with such lands.

(iii) The banks of the main canals and feeders should be raised.

(b) (i) I can give instances. The soil of the lands in our district is improved yearly as they are covered with silt when the canals overflow their banks.

(ii) The soil of lands which are irrigated by the water of the natural watercourse deteriorates. Consequently the cultivation has to be done in alternate years.

(c) *Bunds* should be constructed for the protection of low-lying lands. Lands for which water cannot be obtained in the cultivating season should be artificially irrigated, and leases embodying certain periods of exemption from assessment of land revenue should be issued.

QUESTION 10.—FERTILISERS.—(a) No other fertilisers except cowdung and silt are used.

(b) Fraudulent adulteration of fertilisers is not known.

(e) No. Such manures are not used.

(f) Firewood and charcoal should be used as fuel.

QUESTION 11.—CROPS.—(a) (i) To ensure improvement, the agriculturists should grow special crops solely for the purpose of seed-grain.

(ii) Paddy stubbles, *jowar* stalks and bean husks are used as fodder. No other fodder crops are cultivated.

(iii) Until it is generally known that a supply of seeds is obtainable from the Agricultural Department, each district should be provided with a depot for the distribution of seeds suitable for the district.

(iv) Wild animals are scared away by means of shooting with bows and arrows, by display of torches and by the beating of tin drums.

(c) The *Nga-sein-gyi*, a variety of long-lived paddy which is cultivated at the suggestion of the Agricultural Department, is successful.

QUESTION 12.—CULTIVATION.—(i) The plough known as "Gwin-set" is used in our district. The "Gwin-set" plough is a great improvement on the old implements in place of which it is used.

(ii) There is no practice of cultivating rotation or mixture of crops.

QUESTION 13.—CROP PROTECTION, INTERNAL AND EXTERNAL.—(i) The existing measures for protection of crops are not sufficient.

(ii) No internal measures against infection have been adopted as yet.

QUESTION 14.—IMPLEMENTS.—(a) No suggestion, except the use of a mechanical weed cutter.

(b) There should be exhibitions of samples of improved implements besides the improved plough referred to before.

(c) No.

QUESTION 15.—VETERINARY.—(a) The Civil Veterinary Department should be under the Director of Agriculture.

(b) (i) & (ii) There are no such dispensaries in my district.

(iii) If there were dispensaries they should be transferred to the provincial authority.

(c) (ii) Yes.

(d) Legislation dealing with preventive measures is advocated.

(e) If the animals are inoculated wholesale on occasions of outbreaks of cattle disease, there will be difficulty in securing sufficient serum to meet the demand.

(f) No fee is now charged for preventive inoculation. Preventive inoculation is not popular, because some people have no faith in its efficacy.

(g) Not desirable.

QUESTION 16.—ANIMAL HUSBANDRY.—(a) (ii) There is no dairying industry in my district; therefore no suggestion is necessary.

(iii) The existing practice in animal husbandry should be improved.

(b) (i) There is no species of grass particularly for bullocks.

(ii) There are no enclosed pastures in my district.

(iii) Fodder is sufficient in my district.

(iv) There are no green fodders in dry seasons.

(v) There are no feeding stuffs for cattle except seeds and leaves of *pebyugale* which contain mineral constituents.

(c) Fodder is scarce in the months of *Tazaungmon* (October-November) and *Nadaw* (November-December) for eight weeks. The young cattle begin to thrive in the months of *Pyatho* (December-January) and *Tabodwe* (January-February).

(d) Fodder is sufficient in my district and therefore no suggestion is necessary.

(e) It is not necessary to induce the landowners to take a keener practical interest in these matters.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(a) In my district many kinds of crops are cultivated and therefore the field season continues throughout the year.

(b) No suggestion is necessary.

(d) Yes, Government should do more.

(h) Conditions of low-lying marshy lands should be improved so as to get pure fresh air.

QUESTION 18.—AGRICULTURAL LABOUR.—(a) (i) Government should take measures to get rid of malaria from areas where there is shortage of labour, so as to attract agricultural labour.

(ii) In areas where there are large tracts of cultivable land remaining uncultivated, new villages should be established with temporary dispensaries to get rid of malaria. Grants or *pattas* should also be issued, with appropriate periods of exemption from payment of revenue.

(b) As there is no shortage of agricultural labour in my neighbourhood, no suggestion is given.

(c) Besides the measures adopted by Government in colonisation areas of Myitkyina district, I cannot suggest any other measures that would facilitate the development of areas not under cultivation.

U Nyun]

QUESTION 19.—FORESTS.—(a) Reserved forest lands where there are no big trees, and which are cultivable, should be thrown open for agricultural and grazing purposes.

(b) If the above measures are adopted, there will be a sufficient supply of firewood and fodder available to the agriculturists.

(c) As there are no large trees in the forests, water from the hills runs down rapidly and floods the paddy lands. The condition of natural water-courses and drainage channels should be improved.

(d) Rain-water will flow down slowly and rainfall will increase by systematic afforestation at the sources of large rivers.

(e) There is no opening for schemes of afforestation in the neighbourhood of villages.

(f) As there are no grazing grounds in reserved forests as yet, no forests suffer from deterioration on that account.

QUESTION 20.—MARKETING.—(a) I am not satisfied with the existing market facilities because cultivators who earn their living by cultivation derive small profit from their produce. However, I cannot give suggestions for their improvement.

QUESTION 22.—CO-OPERATION.—(a) (i) To encourage the growth of the co-operative movement, Government should take charge of the present Co-operative Council.

(ii) Instead of leaving the responsibilities entirely in the hands of non-official agencies, Government should take charge of and encourage the Council's activities.

(b) (i) As regards the credit societies, the rates of interest on deposits given by the Provincial Bank are high. For the liquidation of short-term deposits Government should deposit money needed by the bank at the lowest possible rate, and for as long a period as possible.

(ii) No purchase societies are in existence at present.

(c) I do not think it will be feasible to compel unwilling persons to agree to co-operative irrigation by legislation.

(d) I do not think that the societies have succeeded as yet.

QUESTION 23.—GENERAL EDUCATION.—(a) (i), (ii) & (iii) I do not think that the education imparted is sufficient for the agricultural efficiency of the people.

(b) (i) If agricultural education were imparted in various schools and there was practical success in respect of agriculture and gardening in the shape of profits, there would be hope for improvement.

(ii) There is no compulsory education in rural areas. It will be feasible to make it so in suitable places.

(iii) There are few who pass the fourth class because they are made to leave the school as soon as they learn how to read and write, because the subjects in which the parents are interested are not included among those taught and because the parents are poor.

QUESTION 24.—ATTRACTING CAPITAL.—(a) The Local Government should give encouragement by imparting agricultural education and by showing the benefits arising out of it.

(b) It is due either to excess or want of water.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(a) For the promotion of the general well-being and the prosperity of the rural population, they should have clean water, pure air, fresh food and sufficient light.

(b) As the time has not arrived, it is not needed.

(c) I have not personally made an enquiry.

Oral Evidence.

64805. *The Chairman:* U Shwe, U Yin Gale and U Nyun, you are co-operators, all from Upper Burma?—(*U Shwe*) Yes.

64806. We have read the notes of what you wish to say; we propose to ask you some questions about co-operation. I understand that you, U Shwe, will answer for the party, but if your friends do not agree with what you say, I hope they will say so. Do you think that the fact that the liability of members of your credit societies is unlimited has been a good thing or a bad thing?—It has been a good thing.

64807. Are any of you on the committees of your primary societies or credit societies?—All the three of us are chairmen of unions.

64808. Are any of you also chairmen of primary societies, or have you ever been chairmen of primary societies?—All the three of us are chairmen of primary societies and we are also union chairmen. (*U Nyun*) I am chairman of the district association also.

64809. Do you think that the ordinary member of your primary society really understands all about co-operation?—Some do, and some do not.

64810. Do you think it very important that members should understand all about co-operation?—It is important.

64811. Apart from the question of Government assistance and its lowering of the rate of interest, do you think that you have had sufficient help and guidance from officials of the Co-operative Department?—We get help to a certain extent.

64812. Do you think it would be a good thing if you got more good advice and support from the department?—It would be a good thing.

64813. U Nyun, in your note you ask that Government should take charge of the Co-operative Council. What exactly is the Co-operative Council?—The Co-operative Council is the agency for controlling co-operation. At present the Co-operative Council has not got sufficient funds. If the Government can contribute funds towards the management of the Co-operative Council, its management by a non-official agency will become successful.

64814. We have been told that the present state of the primary societies in Upper Burma, in the dry tract, is unsatisfactory. We have been told that it is due partly to a series of bad seasons which have placed the cultivators, the members of the societies, in difficulties as to repayment, and that it has also been due partly to the absence of sufficient official guidance and advice. Can you suggest any other reasons for the disappointing condition of your societies?—(*U Shwe*) The Agricultural Department officers should also try to introduce new and better crops, and the area under irrigation should be extended as far as possible. The co-operative movement ought to be looked after by officials of great experience, and they ought to be attached to the Co-operative Department for a long time. In the cultivation of paddy usually we do not get water in time. We get it in September or October, too late for irrigation.

64815. Do you think that there are many opportunities for carrying out small irrigation schemes such as *bunding* streams or making small ponds, as to which expert advice might be very helpful to you?—Advice would be very helpful.

64816. Do you attempt, before the rains, to break up the surface of your land so as to make it receive and retain the water?—In the district I know well, the cultivators cannot cultivate their land before the rains because the cultivation of land is not the only occupation they have.

64817. Is the other work in connection with timber extraction?—We are doing other work which comes in our way. It is not timber extraction alone.

64818. Do you think that it would be worth while to prepare the land in the way I have described, as an insurance against the risk of light rains?—If it were possible to do such a thing, it would be very good.

64819. *Mr. Calvert:* In your written evidence you have proposed that Government should do certain things which you yourself should be able to do without Government assistance. Why do you think that Government should do things which you can do for yourselves?—I am of opinion that there are certain things which can only be done by Government and that is the reason why I have proposed it.

U Shwe, U Yin Gale and U Nyun]

64820. For instance, you propose that Government should convene co-operative conferences. Why do not the presidents of unions organise these conferences?—In the present circumstances they cannot organise conferences without the aid of Government.

64821. Have any guaranteeing unions been called upon to pay the debts of defaulting societies?—There are some unions which have had to pay.

64822. In your unions are there now societies under liquidation?—Not in our unions; but there are some societies in our district under liquidation.

64823. If you have guaranteeing unions which guarantee to repay the debts of defaulting societies, why has it been necessary to amend the Act so as to enable the Deputy Commissioner to collect the debts?—The unions have no power to enforce payments. Therefore it is necessary for some one with authority to enforce the payment of debts.

64824. Do you mean to say that the unions are of no use in securing repayment?—There is no law in the hands of the union to enforce payment.

64825. Do the unions actually bring about better repayment?—They try to get repayments to the best of their ability.

64826. What actually do they do to bring about better repayment?—They act only according to the rules and by-laws. They have not the authority in their hands to enforce payments.

64827. Can you tell me one instance where a guaranteeing union has brought about repayment from a defaulter?—When the primary societies are taken into the union the property possessed by the members is ascertained, and there is an understanding to the effect that on the society defaulting the members thereof should hand in their property to the union. This practice exists as a rule. As a matter of actual practice the union cannot take hold of the property of the members of the society. They have to go to the civil court for that.

(The witnesses withdrew.)

U YIN GYJ, Ohnbin Village, Mahlaing Township.

Replies to the Questionnaire.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(a) (1) Planting of seeds in lines with seed drills.

(2) Use of one-sided harrows called *arlein*.

(3) Commencement of the use of iron harrows with five teeth.

(4) Use of good and clean seeds selected and supplied by the Agricultural Department.

(5) Soaking the seeds in water diluted with vitriol in order to prevent *pyaunghaing* disease.

(b) If the good methods of ploughing and cultivation adopted by the Government Agricultural Department can be demonstrated directly on the separate *taungthu's ya* lands and if it can be shown how much more profits and how much more benefit may be derived, the *taungthus* will believe and by telling and teaching one another, the new methods can be soon improved.

(c) If the previously mentioned methods succeed, the *taungthus* can be easily persuaded by giving them lectures. Although demonstrating the method of planting seeds in lines with seed drills may be successful, it is difficult for the *taungthus* to follow that method. They have no practice in driving the ploughs for scattering seeds and in spreading seeds with them. Moreover it is difficult to change all of a sudden from one method to another.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(a) (i) On account of irregular rains the crops are poor. The crops produced fetch a very low price. The proceeds do not come up to the amount that ought to be obtained and the result is that they do not cover even the expenses incurred in the cultivation.

(ii) The advances are from the jungle traders, brokers, *chettiers* and the Government.

(iii) The cultivators are unable to repay because the yield from their labour is poor and the selling price is low.

(b) If the Government open land mortgage banks charging small interest, the *taungthus* will incur less debts.

It is desired that loans may be advanced by the Agricultural Department because the officers of the Agricultural Department know, better than the executive officers of the districts, the time when the *taungthus* desire to have the loans and the actual amounts that may be expended. Moreover, the officers of the Agricultural Department really wish for the prosperity of the *taungthus*.

(c) It is not proper to prevent the *taungthus* from mortgaging and selling their own lands.

U LU HMAW, Chairman, The Payitkon Central Co-operative Society, Limited, for the Collection, Sale and Purchase of Seed-Grains.

Replies to the Questionnaire.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(a), (b) & (c) It is advisable for the Agricultural Department to open farms for giving practical instructions to the agriculturists in good and proper methods of cultivation.

(d) The extensively successful propagation of good and pure seed-grains of Karachi gram, etc., in Lower Chindwin district.

This is due to the officers of the Agricultural Department first taking the initiative of establishing experimental or exhibition farms in various places, cultivating good, pure seed-grains and demonstrating the superiority of their seed-grains to agriculturists by practical methods.

QUESTION 4.—ADMINISTRATION.—(c) (i) The activities of the Agricultural and Veterinary departments have brought immense benefits to the agriculturists.

(ii) The incidents in the systems of railways and steamers giving cause for dissatisfaction are the unjust demands and exactions made by subordinate officials for wagon and freight charges, etc., from the agriculturists who are transporting their agricultural produce for sale from one place to another by one of these means of transport and the undue and excessive delay in the transport of their goods, occasioning the loss of market and untold evil to the agriculturists.

Another unsatisfactory feature is the enhanced rates in the schedule of freight charges on goods. A reversion to the normal state of affairs with regard to those charges cannot be too strongly urged. The best plan would be for the Government to take over the management of the said railways and steamer services.

(iii) For want of roads and communications or for want of proper upkeep and repair of such roads (as for example in the case of Palè-Min-taing-bin road which is impassable by carts during the rains owing to its muddy and slushy state) the agriculturists living in villages and hamlets, so adjacent to the big towns as to be within twenty or twenty-five miles of the same, are deprived of the facility and quick means of transporting their agricultural produce to the big towns and are therefore compelled to dispose of the same locally at inordinately lower prices.

(v) & (vi) For want of posts and telegraphs in the outlying small villages the mails or telegrams have to be sent on from the villages having post and telegraph offices. When the *dak*-runners cannot personally come over to the village of destination they are wont to pass on the mails through a casual traveller and therefore the mails and telegrams are sometimes either lost in this way or, if delivered, only after excessive delay.

QUESTION 5.—FINANCE.—(a) In recovering the agricultural loans and advances at present issued by the Government of Burma for purchase of seed-grains and cattle or for improvement of agricultural lands, it is advisable that a further concession should be given to the agriculturists to repay the same in instalments in four years. There should also be a reduction in the rates of interest charged.

With regard to the issue of the loans and advances referred to above, as the agriculturists are apt to apply the same for use in other ways than those intended, it ought not to be given out in cash, but in the shape of the required seed-grains and cattle, and the necessary documents made and executed merely for the amount of their values.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(a) (i) The high cost of cloth and material, food and the necessities of life; the incidence of the rainfall; holding-off of rain when wanted by the agriculturists and unseasonable downpour when not wanted, resulting in the wastage of two or three supplies of seed-grains, for failure to sow the same at the proper time, and in poor outturn; the want of regularity in the rainfall which should enable the agriculturists to raise the seasonal crops; and want of exercise of habits of economy and frugality on the part of the agriculturists commensurate with, and with due regard to, their income. It would indeed not be far wrong to say that there is an entire absence of knowledge and exercise of such habits.

(ii) Such of the agriculturists as are members of co-operative credit societies take loans from the societies on interest at the rate of Rs. 1-4-0 per cent per mensem, and besides this, some of the members of such societies yet take loans from moneylenders of their own localities at an interest of Rs. 2-8-0 per cent per mensem on security. In the case of agriculturists who are not members of co-operative credit societies, they take loans from the local moneylenders at an interest of Rs. 2-8-0 per cent on security and at an interest of from Rs. 3 to Rs. 5 per cent without security. Those agriculturists who are close to the *chetties* would take their loans from them on some form of security or other. Some agriculturists take loans of money, not as mere loans of money but as a kind of advance payment for a particular kind of crop or grain, to be repaid in kind at the harvest. For example, if from forecast and foresight it is thought that groundnut would be selling at Rs. 125 at harvest, it is a common practice to take loans of money in advance and against the harvest for supply of a hundred baskets of groundnut at the rate of Rs. 80. The same method prevails with regard to other kinds of crops and grains.

Of all the methods of taking loans, the co-operative method is the cheapest.

(iii) Inability to repay loans is due to the fact that, instead of utilising such loans for the object or purpose intended at the time the loan was taken, the money is employed on other and unprofitable objects.

(b) The extreme indebtedness of the agriculturists which prevents them from repaying their debts is in a way due to the exorbitantly or unduly high rates of interest charged, and therefore it is advisable to enforce the application of the Usurious Loans Act.

(c) A restriction ought to be put upon the agriculturists' unlimited right of mortgaging or selling their lands.

Further untold harm is done to the lands and *yas* by non-terminable mortgages; however, it is not yet opportune to prohibit this; any such measures ought, if at all, to be taken only after the Government has opened land mortgage banks.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(a) That the fragmentation of holdings has adversely affected agricultural efficiency is beyond any manner of doubt. This is due to the fact that, being *bobabaing* lands, the lands are partitioned off and distributed either at a division of inheritance or at the time of making gifts to the children, and also owing to the existence of the right of mortgage and sale.

(b) In case of State lands, as they are not subject to any such right of mortgage, sale or partitioning, they are not liable to be so split up. It is therefore advisable that the Local Government should resume all the *bobabaing* lands in occupation, and all such of the resumed lands as

are of similar area, value, class and kind and are contiguous to one another should be re-allotted, and a strict restriction placed upon mortgage, sale and partition.

(c) The distribution or allotment of lands should be decided by appointing local elders as *thamadis*, i.e., umpires or arbitrators.

QUESTION 8.—IRRIGATION.—(a) (ii) It is advisable that the Government should construct tanks in suitable places in Lower Chindwin district and that a suitable or reasonable water tax be levied on the lands irrigated by such tanks.

QUESTION 9.—SOILS.—(a) (i) Owing to the ruined state of the old tanks and weirs of importance in Lower Chindwin district at the present time, the *ya* lands and paddy lands have been ruined owing to inundation caused by the creeks and streams springing up there. Therefore the said old tanks and canals ought to be reclaimed and repaired.

(c) It is advisable that arable jungle land that can be cultivated but is left uncultivated should be brought under cultivation, formed into *yas* by the Government and sold to those who are willing to cultivate it, the price being recovered from them by allowing them to pay it off in small easy instalments out of the money earned by them as a result of their industry.

QUESTION 10.—FERTILISERS.—(f) It is advisable that the use of cowdung as fuel should be prohibited by law.

QUESTIONS 11.—CROPS, 12.—CULTIVATION, 13.—CROP PROTECTION, INTERNAL AND EXTERNAL, AND 14.—IMPLEMENTS.—For the success and attainment of the objects contained in these we look to the Agricultural Department. The advice and suggestions given by the said department have always been followed.

QUESTION 15.—VETERINARY.—(c) (i) The agriculturists freely make use of the veterinary dispensaries.

(d) Strict legislation by the Government is called for, providing for inoculation, and prevention of movement of sick and diseased cattle from one village to another, and forbidding the sale and consumption of carcasses of such cattle on the outbreak of an epidemic of infectious or contagious disease.

(e) The supply of sera is sometimes insufficient.

(f) No fee is charged for inoculation.

QUESTION 16.—ANIMAL HUSBANDRY.—(a) (i), (ii) & (iii) The Agricultural and Veterinary Departments are looked up to for animal husbandry.

(b) (i) There are no such things as grazing grounds or pasture lands in Chindwin district. Moreover, an individual agriculturist can afford to keep only about four head of cattle, whereas the non-agriculturist Indians keep several head of cattle, sheep and goats and consequently even a grazing ground for cattle is non-existent. In addition to the above, owing to the presence of these cattle belonging to the Indians, the stalks of millet and other fodder for cattle have gone up in price out of all proportion and consequently the indigenous agriculturists are hard put to it for want of fodder for their cattle.

(c) The scarcity of fodder for cattle in the months of *Tabaung*, *Tagu*, *Kason* and *Nayone* (March to June) is very much felt.

The cattle begin to put on flesh only after a lapse of about three months after the end of the period of scarcity.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(a) An average agriculturist would be engaged in his work intermittently for about 160 days in the year.

During the slack season he generally engages himself either in carting work or in selling his crops.

(b) Cattle-breeding is suitable.

(c) Poultry-rearing, fruit-growing, etc., may be profitable if carried on in suitable localities.

(e) Transfer of big mills to rural areas, although it may provide the agriculturists with work and employment, is not looked upon with favour.

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(g) The opening of handicraft or industrial institutions is desirable.

QUESTION 19.—FORESTS.—(b) If the reservation of forest compartments ceased, there would be a plentiful supply of firewood for fuel.

QUESTION 20.—MARKETING.—(b) With regard to the intermediary stages that a commodity will pass through in the course of the sale and purchase transaction, as between the producer and the consumer, until it finally reaches its destination in some foreign market, the following illustration as an instance in point will suffice:—

For example, the jungle or district brokers buy a hundred baskets of paddy from the agriculturists at the rate of Rs. 100 and then sell the same at Rs. 125 to the town brokers who, in turn, sell the same to the merchants at the rate of Rs. 150, when the latter again sell it to the big mill-owners at the rate of Rs. 175. In this way, while the agriculturists themselves could only get Rs. 100 for their hundred baskets of paddy, the price of paddy would go up to a figure of Rs. 175, thus causing a loss of Rs. 75 to the agriculturists on every hundred baskets of their paddy; this calls for some measure of relief to be brought about by the Local Government.

(d) If Government would come to the assistance of the agriculturists by devising ways and means for keeping the agriculturists well informed as to the prevailing foreign market price of the commodities concerned, the agriculturists would then be safe from the possibility of being unfairly treated by the brokers and merchants.

QUESTION 22.—CO-OPERATION.—(a) & (b) It is the duty of the Government to encourage co-operative societies.

(c) Where such schemes exist, those who do not join should be compelled to join by means of legislation.

(d) With regard to the societies that have attained success in the objects aimed at, the Payitkon Central Co-operative Society, Limited, for the collection, sale and purchase of seed grain, Mōnywa Township, Lower Chindwin district, the affairs of which I personally am carrying on as its chairman for the present, may be mentioned as one whose objects are—

To prevent admixture of the grains and crops forming the usual items of cultivation by the agriculturists, to provide facilities for getting good, pure seed-grains at cheap prices, and for the spread and propagation of good, pure seed-grains, etc.

QUESTION 23.—GENERAL EDUCATION.—(a) (iii) From the nature and circumstances of their avocations, it is not possible for the agriculturists to keep their children at school at all times continuously; the more immediately urgent needs at home have to be attended to, such as employing them for tending cattle, etc., resulting in a small percentage of passes. This being so, it is advisable that the Government should open schools for imparting instruction in handicrafts in rural areas.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(b) It is particularly desired that the Government should make enquiries as to the state and condition of the agriculturists, with special reference to their income and expenditure and their mode of living.

U YIN GYI, U LU HMAW and THUGYI U BA TIN, Representative Agriculturists from Upper Burma.

Oral Evidence (through an interpreter).

64828. *Sir Thomas Middleton (Chairman)*: U Yin Gyi, and U Lu Hmaw, I understand that you gentlemen are here as representatives of the agriculturists of Upper Burma?—Yes.

64829. Do both of you cultivate land yourselves?—Yes; both of us are cultivators.

64830. U Yin Gyi, how much do you cultivate?—(*U Yin Gyi*) I cultivate about sixty acres of land with five pairs of bullocks.

64831. What are the crops you grow on these sixty acres?—The chief crop is cotton (*wagyi*); the other crops are sesamum, beans and *juari*.

64832. U Lu Hmaw, how much land do you cultivate?—(*U Lu Hmaw*) About forty acres.

64833. What are the chief crops?—I have various kinds of soils and I cultivate a variety of crops, such as cotton, *juari*, beans, gram, and onions.

64834. Has there been established, in your district, a co-operative society for the sale and purchase of seeds?—Yes.

64835. For how many years has that society been operating?—About three years.

64836. How much seed did they sell this year?—The society has bought seed worth about Rs. 13,000 for distribution.

64837. Do they purchase anything else besides seed? Do they purchase implements?—They also buy ploughs from the Agricultural Department and distribute them.

64838. Both of you have told us, in your answers to the Questionnaire, that the Agricultural Department has done good work in your districts. U Lu Hmaw, you have mentioned the very successful propagation of good and pure seed of Karachi gram; U Yin Gyi, you have mentioned five different ways in which the department has assisted the cultivators in your district. Another agriculturist whose evidence is now before us answers Question 3 (d) in this way: "No measures have been taken by the department which have in my view been successful in improving the agriculture of the district." That gentleman does not agree with the statement you have made. Have you anything to say on that? Are you surprised at this statement?—We are surprised to hear it.

64839. You yourselves recognise what the department has done; you are convinced that it has been successful, and you have given us proofs. Have you heard, among your neighbours or among your friends, statements to the effect that no good result has followed?—We have never heard any such criticism; only very few criticise the work of the department.

(At this stage *Thugyi U Ba Tin* joined the other two witnesses.)

64840. This college in which we are met was built for the agriculturists of Burma. Why do so few students from among the agriculturists of Upper Burma attend it?—(*Thugyi U Ba Tin*) The cultivators do not yet know the value of agricultural education.

64841. Do you recognise its value?—We do recognise its value.

64842. U Lu Hmaw, you have told us that the Veterinary Department is assisting you in your district. In what way have you found the Veterinary Department helpful to you?—They effect the cure of animals in case of illness; they also segregate the animals in order to prevent the spread of contagious diseases.

64843. Have you got a veterinary dispensary in your district?—There are Veterinary Assistants, but I am not aware of the existence of any veterinary dispensary.

64844. Where does the Veterinary Assistant keep his medicines?—He keeps the medicines in his own residence.

64845. Does the Veterinary Assistant tour about in the district, or does he live in one village and get agriculturists to bring sick animals to him?—In case of any illness among cattle, a report has to be made to the *thugyi*, and the *thugyi* calls in the Veterinary Assistant.

64846. In answer to Question 6, U Lu Hmaw, you have told us something about co-operative credit societies, and you say "Of all methods of taking loans the co-operative method is the cheapest." In your opinion, why is it that the co-operative movement is making slow progress in this part of the country?—The reason is that the loans granted to the members are not utilised for the purpose for which they are granted. For instance, if a loan is granted for buying bullocks, the money is usually spent in buying other things, such as clothes, etc.

64847. Do not the societies exercise any supervision over the members to whom loans are granted?—The society does supervise the spending of the loans, but the committee usually comes to know about the position when things have gone too far.

64848. You are of opinion that the non-terminable mortgage does a great deal of harm in Burma?—They take more and more loans on the mortgage of the land.

U Yin Gyi, U Lu Hmaw and Thugyi U Ba Tin]

64849. You think they do great harm, but you also think it would be a mistake to try, by legislation, to prevent such mortgages being granted. What is your reason for thinking that there should be no effort to interfere with the granting of non-terminable mortgages? Is it your opinion that we ought to wait until there is a land mortgage bank? If these mortgages were interfered with do you think that the agriculturists would go without credit of any kind?—I do think so.

64850. How many pairs of oxen have you got?—Two pairs.

64851. Do any of you in your district breed your own cattle, or do you purchase your plough-cattle?—Sometimes we breed them and sometimes we buy.

64852. What is the common practice?—Mostly, plough-cattle have to be bought.

64853. We heard complaints in Lower Burma that plough-cattle had become very dear in the last few years. Have you found a great increase in price in the last few years?—The price has increased very much.

64854. I want to know what the price was ten years ago and what it is now?—Ten years ago a pair of bullocks would cost Rs. 200; at present they cost from Rs. 300 to Rs. 350.

64855. That is a much higher price than we heard quoted in Lower Burma?—That is the price we actually pay now here.

64856. *Sir James MacKenna*: U Lu Hmaw, you are the Chairman of the Payitkon Union?—Yes.

64857. Do the members pay back the loans they get from the society?—They usually pay back; only a few are defaulters.

64858. Do you think it is possible to make a living out of agriculture?—We cannot.

64859. Do you have a seed purchase and sale society?—Yes. We have one.

64860. Which is better, the seed purchase and sale society, or the co-operative credit society?—In my opinion the seed purchase and sale society is better.

64861. I should like to ask each one of you what benefits you have derived from the Agricultural Department?—(*U Ba Tin*) I have had the advantage of getting purer seed from the Agricultural Department. I have got varieties of paddy which thrive very much better now in Kyaukse where I have got land. (*U Lu Hmaw*) I have had the advantage of obtaining better varieties of gram such as the Karachi gram; I have also had a better variety of cotton called Cambodia in place of the indigenous variety. (*U Yin Gyi*) I derived the advantage of obtaining purer and selected varieties of cotton. I am living in the cotton tract. I have got seed which has a good germinating capacity.

64862. So, all of you think that the department has been of some use to you?—We think so.

64863. All three of you gentlemen do not grow departmental seed, do you?—We, U Lu Hmaw and U Ba Tin, grow departmental paddy.

64864. Do you get a premium price for the paddy that you grow?—Yes, we do.

64865. How much do you get?—About ten rupees per hundred baskets of paddy.

64866. There are various standards of baskets in Upper Burma; is that not so?—Yes.

64867. Would you like to see a uniform basket introduced?—That would be a most desirable thing.

64868. I think one of you gentlemen has said that you grow Karachi gram?—Yes, only one of us grows Karachi gram.

64869. How many acres of Karachi gram have you got?—(*U Lu Hmaw*) About five acres.

64870. Do you sell your produce of Karachi gram, or do you keep it for your own consumption?—I keep a little for seed and a little for consumption; the rest I sell.

64871. With regard to ploughs, may I know what ploughs all of you use?—We are just beginning to use *Theikpan* ploughs this year. We have obtained the ploughs from the department.

64872. Is it a better form of plough than you used before?—The work that can be performed by a Burmese plough in three days can be performed by the *Theikpan* plough in two days.

64873. *Mr. Kamat*: U Lu Hmaw, you have stated in reply to Question 4, as follows: "Another unsatisfactory feature is the enhanced rates in the schedule of freight charges on goods. A reversion to the normal state of affairs with regard to those charges cannot be too strongly urged. The best plan would be for the Government to take over the management of the said railways and steamer services." When were those rates enhanced?—They were enhanced after the War.

64874. When you refer to reversion to the normal state of affairs, do you mean before the War here?—I was referring to the normal rates before the European War.

64875. Are the railway freight expenses the same as they were before the War?—I do not know.

64876. Are the prices which you are getting for rice and other produce the same as they were before the War?—In the case of *pebyngale* (Rangoon white beans) I got a better price before the War.

64877. You are prepared for a better price, but you are not prepared to pay the enhanced rate which the railways charge owing to their having to incur enhanced expenditure. You make a suggestion about tanks and weirs and the question of their repair. Are there many such tanks in the tract you refer to?—There are quite a number of them in Payitkon village tract in the Lower Chindwin district.

64878. Have you drawn the attention of the Government officers concerned to the state of these tanks?—No.

64879. With regard to uncultivated lands, you suggest that these should be brought under cultivation and formed into *yas* by the Government and sold to people who are willing to cultivate them. Can you specify where waste uncultivated lands are situated for which there is a demand?—There are such lands in the Budalin township in the northern part of the Lower Chindwin district.

64880. You think that people would be willing to take up these lands on the conditions you suggest?—I think that there are people who would be willing to take up the land under the conditions specified by me, if payment of the price of the land could be made in instalments.

64881. We are told that much of the waste land is of such poor quality that little profit would accrue from cultivating it. Do you think that the land you are referring to could be worked at a profit?—I think so, as regards the land in my own district.

64882. You make the suggestion that, in recovering agricultural loans issued by the Government of Burma for the purchase of seed-grains and cattle, these loans should be repayable by instalments spread over four years. What is the present system?—The loan must be paid up in full in two years.

64883. *U Ba Cho*: You said that the price of a pair of bullocks in your part of the country is from Rs. 300 to Rs. 350. This is the price that you have actually to pay for your bullocks?—Yes, there is a vast difference between the bullocks that we use in our locality which cost us anything from Rs. 300 to Rs. 350 and the bullocks sent down to Lower Burma. We send down only inferior bullocks. A pair of bullocks which costs Rs. 150 in Lower Burma will be worth only Rs. 110 in Upper Burma.

64884. *Mr. Calvert*: U Lu Hmaw, could you tell me the number of members in your society?—(*U Lu Hmaw*) About 400.

64885. Are they tenants or owners, or both?—Some are owners of land; others are share tenants.

64886. From what area are they drawn; from one village, one township or a group of villages?—From an area of about two square miles.

64887. What is the liability?—The liability is limited.

64888. To what amount?—If they purchase a five-rupee share, they are liable up to twenty-five rupees.

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64889. Is seed given to members on credit or for cash?—On credit.
64890. Do you know that, under the new law, your society will now be an unlimited liability society?—I have not seen the Act; I do not know.
64891. If the liability is to be unlimited, will it do good or harm to the society?—It will do harm to the society.
64892. From what source do you buy the seed?—We buy the seed locally; if seed is not obtainable locally, then we buy from the Agricultural Department.
64893. By 'locally' do you mean from local cultivators or shop-keepers?—From selected cultivators, not shop-keepers.
64894. When you buy seed do you buy it on credit or for cash?—For cash.
64895. From what source do you get the money with which to buy the seed?—We get it from the share capital, and if that is insufficient, we borrow from the Provincial Bank.
64896. What is the difference between the price which you pay for the seed and the price at which you sell it?—This year we made a loss on one transaction; we bought paddy at Rs. 255 and sold it at Rs. 250.
64897. Was that an accident or a miscalculation?—The seed had to be sold at the price prevailing at the time of selling.
64898. On what system do you buy your seed? Do you collect indents from all the 400 members, consolidate the indents and then buy; or do you merely guess the requirements?—We get applications from the members, and we make a guess on the basis of the quantity applied for. If the members apply for 1,000 baskets, we buy a little extra, say, 1,200 baskets.
64899. You get applications from all members; you collect them together and then add up the amounts and afterwards buy the seed?—We add up the indents and then buy the seed.
64900. How many different kinds of seeds do you deal in; paddy is one; do you deal in other grains?—Yes; gram, *juari*, red beans, wheat, and *mungoo* beans.
64901. You mentioned that some of your tenants were sharing tenants; what share do they pay?—If the land is good land, the owner takes half; in other cases, the tenant gets three-fifths and the owner two-fifths.
64902. If a cultivator can afford to pay a rent of half the produce, why cannot the small owner pay half his produce towards his debts?—If the season is good and the harvest a success, the land-owning cultivator can pay half the produce towards his debts.
64903. We have been told to-day that he does not pay back the society's debts?—I am not in a position to answer that question.
64904. Do you gentlemen know, personally, of cases where cultivators' cattle have been attached and sold in execution of a decree in a civil court?—If the cultivator has more than a yoke of oxen and a bullock cart, the excess can be attached by the civil court. But we have not come across any such case.
64905. *Dr. Hyder*: How many baskets of rice did you gentlemen get last year as your share of rents or as the reward of your own labour?—(*U Yin Gyi*) I have no land under paddy cultivation. (*U Lu Hmaw*) I got 200 baskets of paddy last year. (*U Ba Tin*) I got 800 baskets last year.
64906. Of the total quantity of rice, how much did you give away in charity during the last twelve months? And how much did you gentlemen give away in a similar manner?—(*U Lu Hmaw*) I spent sixty to seventy rupees in charity last year.
64907. How many baskets of rice did you give away?—I do not cultivate paddy in a large scale. I sell peas and beans, and I spend in charity from the money obtained thereby. (*U Ba Tin*) I gave away 150 baskets of rice in charity.
64908. Do any of you gentlemen know what wireless is?—We do not know what it is.
64909. Would you like to have a cinema in your villages?—If there is anything novel, people will like it at first.

64910. Do you have to pay *bakshish* to the Veterinary Assistant? Government makes no charge, but does the Veterinary Assistant charge you anything?—No.

64911. *The Chairman (Sir Thomas Middleton)*: Do the crops in any of the districts from which you come suffer much from cattle trespass?—There are many cases of cattle trespass.

64912. U Lu Hmaw, could you give us an estimate of the damage which you yourself suffered last year from this cause?—That depends upon the number of bullocks trespassing. If a bullock trespasses into a paddy field, damage to the extent of a quarter of a basket is caused; if it trespasses into a bean field, one-eighth of a basket is the damage.

64913. Could you give us some idea of the amount of loss which you suffer from the trespass of cattle?—From fifteen to twenty rupees. (*U Ba Tin*) About forty rupees.

64914. On how many acres of land did that loss occur?—(*U Ba Tin*) On six acres of *jowar*.

64915. What is the total area of your holding?—A little over forty acres.

64916. Is there any other point which any of you wish to bring before the Commission?—(*U Ba Tin*) In my district there is a dam for irrigation. It has been washed away by the heavy rains last year, and I shall be glad if Government will go to the expense of restoring the dam.

64917. *Dr. Hyder*: Do the Chinese shopkeepers in your villages teach the cultivator bad habits like the smoking of opium or the drinking of liquor?—Chinese shops exist only in some villages, and if there are Chinamen in the village opium is usually smuggled in.

64918. Does the Chinaman keep the opium for his own use, or does he introduce it among the cultivators?—The cultivators also are contracting the habit of opium-smoking.

64919. On account of the Chinamen?—Yes. (*U Yin Gyi*) There is one point which I should like to bring to the notice of the Commission. I want some of the cultivators in my area to get the privilege of grazing cattle in forest reserves and also of extracting some wood for making cultivation implements.

64920. Is there anything else that you want to bring before the Commission?—I want land mortgage banks to be established in Burma so that the cultivators may get loans at cheap rates of interest, in order that they may make a living out of their holdings.

(The witnesses withdrew.)

The Commission then adjourned till 2-30 p.m. on Monday, the 21st November, 1927, at Patna.

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 _____, Responsible for maintenance of veterinary dispensaries ; assistant paid out of Provincial funds ; system does not work well (*Rippon*) (126).
 _____, Transfer of control of vernacular education to, has been successful in every way except financially (*Bulkeley*) (142) 62570-3.

ADMINISTRATION—*contd.*

- Ferry tolls, an oppressive tax (*Dunn*) (88) 61842.
 Fisheries inland, appointment of special officer (*Dunn*) (74) 61727-31, (104) 62004.
 Local self-government:
 Position of, in regard to road policy of Provincial Government (*Tun, etc.*) (217-8) 63292-301.
 Work in rural areas (*Tun, etc.*) (212) 63207-16, (214-6) 63248-70.
 _____should be Developed (*Dunn*) (70), (76) 61742, (87) 61835.

METEOROLOGICAL DEPARTMENT :

- Data required for: Commercial air traffic and ships (*Jevons*) (266).
 _____, New plants and crops (*Jevons*) (266).
 _____, Vital statistics and forecasting epidemics (*Jevons*) (266).
 Service: Bengal, example of (*Jevons*) (266), (267) 63821-4.
 _____, Experimental farms should take observations (*Jevons*) (266).
 _____, Inadequate (*Jevons*) (265); whole-time officer required (266).
 _____, Supervision required (*Jevons*) (269-70) 63843-50.
 Unsatisfactory: reports should be published in all vernacular newspapers and by radio (*Pan, etc.*) (196); (*Shwe*) (380); satisfactory (*Maung*) (171).

POSTS AND TELEGRAPHS :

- Services: satisfactory (*Pan, etc.*) (191); (*Maung, etc.*) (171); extremely unsatisfactory (*Pan, etc.*) (196); (*Shwe*) (380); dilatory or non-existent, a great handicap to agricultural population (*Tun, etc.*) (206); lack of facilities in outlying small villages causes loss and delay of mails and telegrams (*Gyi, etc.*) (396).
 Public Health District Organization (Coly) (161-3) 62729-60.

PUSA RESEARCH INSTITUTE (see under RESEARCH).

- Rice control, expenditure of profits from (*Dunn*) (99-100) 61954-7.
 Staff, scientific, of Government of India should be increased (*Maung, etc.*) (171).

SUPERIOR PROVINCIAL AGRICULTURAL SERVICE :

- No announcement as to (*McKerral*) (23) 61017-8; rules being framed (*Dunn*) (78) 61751-7.

TRANSPORT :

- Arakan and Tenasserim require increased facilities (*McKerral*) (6), (34) 61208-10.
 in Forests:
 Facilities improving (*Hopwood*) (124) 62335-7.
 Firewood supply mainly a question of transport (*Hopwood*) (115).
 Price of timber too low to make railways and roads profitable (*Hopwood*) (122) 62309-11.
 Rivers, use of, for drifting logs does not prevent use for irrigation (*Hopwood*) (125) 62350-61.
 Lack of, frustrates work of Agricultural and Veterinary Departments (*Tun, etc.*) (205).
 Motor, popular (*McKerral*) (23) 61031-2.
 Lorries, great number in rural areas (*Dunn*) (88) 61841.
 Prices of agricultural produce, effect upon (*McKerral*) (54) 61519-22.
 Provincial and district contributions to, and control over, figures (*Tun, etc.*) (217-8) 63292-301.
 Railway, Pegu Kayan, not much use to co-operative colony (*Maung, etc.*) (186) 62964-6.
 Railways insufficient (*McKerral*) (6), (23) 61028-30. Shan States, increased cultivation in, with increased railways (34) 61210.
 Railways and steamers, agriculture very poorly served by, owing to lack of roads and landing jetties (*Tun, etc.*) (206), (213) 63221-2; satisfactory (*Pan, etc.*) (191); insufficient (196); unjust demands made by subordinate officials, excessive delay and heavy freight charges; Government should manage (*Gyi, etc.*) (396), (402) 64873-7.
 Rice, transport of, by (*Edwards and Nelson*) (225), (236) 63529-30.

ADMINISTRATION—*concl'd.*TRANSPORT—*cont'd.*

ROADS:

- Bridges necessary (*Pan, etc.*) (191); insufficient; money wasted on motor roads instead of being spent on village roads (*Pan, etc.*) (196).
 Expenditure on (*Dunn*) (99) 61943-53.
 Feeders to railways more important than trunk roads; network of village roads required (*Jevons*) (271-2) 63867-8.
 Inadequate (*Lun*) (374).
 Lack of good village roads compels cultivators to sell their produce cheaply locally (*Gyi, etc.*) (396).
 Network required (*Tun, etc.*) (206).
 part of Profits of rice control being spent on road expansion (*Dunn*) (99-100) 6 954-7.
 Services: satisfactory (*Maung, etc.*) (171); unsatisfactory (*Shwe, etc.*) (380).
 Steamers, Burma very well catered for by Irrawaddy Flotilla Company (*McKerral*) (7).
 Veterinary Department: *see under that title.*
 Village committee: proportion of literates, powers as assessors in criminal courts (*Dunn*) (97) 61914-9.
 Wireless: can be of great service to agriculturists (*Pan, etc.*) (196); not known (*Gyi, etc.*) (403) 64908.

AGRICULTURAL DEPARTMENT.

- Advice of, has always been followed (*Gyi, etc.*) (398).
 Agricultural College, Mandalay (*McKerral*) (16) 60905. (*See under EDUCATION.*)
 Agricultural chemistry, botany and probably engineering should be administered provincially; entomology, mycology and bacteriology centrally (*Ghosh*) (299).
 Agriculturists, not in close touch with; no improvement in agricultural methods or conditions (*Pan, etc.*) (195).
 Agriculturists' Loans Act, should administer (*Dun*) (374).
 Branches required (*Jevons*) (266).
 Budget, small cuts (*McKerral*) (55) 61533.
 Central: Sericulture and bee-keeping, as separate departments, each with a specialist (*Ghosh*) (299).
 Claims of, as to improvements (*Tun, etc.*) (209-11) 63176-87.
 Committees for agricultural improvement, five started (*McKerral*) (42) 61325-7, (50) 61472-4.
 Co-operative Societies help in seed distribution (*Tin*) (106) 62035-6; and receive help from Department (110) 62109-11.
 Demonstrators: mostly graduates of Poona Agricultural College and have practical knowledge (*McKerral*) (16) 60910-3.
 Deputy Directors: when appointed have not sufficient knowledge of plant breeding (*McKerral*) (17-8) 60928-35; control experimental farms and district work (42) 61331-2; in touch with village life (47) 61411-2.
 Distribution of activities, fair as between demonstration and research (*McKerral*) (16) 60914-5; sufficient attention given to Lower Burma wet area and dry area of the mid-zone, but not much to Northern area (17) 60923-7; not much assistance given to planters (22) 61004-9.
 District farms for experiment (*McKerral*) (16) 60906.
 Education, agricultural, should be left to Department (*Pan, etc.*) (191).
 Engineers, agricultural, to be added to cadre of Superior Provincial Service (*McKerral*) (30) 61143-6; to improve implements (30) 61148. (*See under IMPLEMENTS.*)
 Engineering, agricultural, need for development (*Jevons*) (266), (274) 63899-901.
 Forestry Department does not come much into touch with (*McKerral*) (28) 61114-15.
 Indebtedness, not immediately concerned with (*McKerral*) (46) 61398-402.
 Legislative Council, friendly attitude of (*McKerral*) (42) 61339-40. (55) 61543-7.
 Myingvan Circle: interest taken by cultivators; farmers' associations organised (*Robertson*) (348-9) 64474-8.
 Peripatetic demonstrators, two senior agricultural assistants for each district (*McKerral*) (16) 60908-9.
 Personnel (*McKerral*) (16) 60905.
 See, paddy, supplied by Agricultural Department, premium of Rs. 10 per 100 baskets paid (*Gyi, etc.*) (401) 64863-5.

AGRICULTURAL DEPARTMENT—*contd.*

- Sericultural Section, four senior assistants and four fieldmen (*McKerral*) (16) 60905.
 Service : satisfactory (*Pan, etc.*) (191); (*Maung, etc.*) (171); unsatisfactory (*Shwe, etc.*) (380).
 Service : has brought immense benefits to agriculturists (*Gyi, etc.*) (395-6), (400) 64838-9, (401) 64861-2; owing to lack of communications, nothing done for cultivators; conditions the same as 50 years ago (*Tun, etc.*) (206), (209-11) 63176-87. (*See under CROPS AND CROP PROTECTION.*)
 ———, Remarkably good work in the circumstances (*Jevons*) (266). Work, considerable; should be strengthened (*Dan*) (240) 63575-9.

STAFF :

- Insufficient in subordinate grades; increased pay necessary (*McKerral*) (5); (22) 60999-61000; insufficient correlation with other departments (5); short term appointments inadvisable (21) 60990-1; promotion from subordinate service (30) 61151-3, (42) 61328; training abroad (42) 61328-30; vacancies to be filled by short term agreements (42) 61337-8; method of recruitment in England (43) 61346-8.
 Inadequate (*Dun*) (372); should be 5 times as large; European and trained Burman officers required (*Jevons*) (266), (274) 63902; more junior officers required for village work (*Tun, etc.*) (210-1) 63184-7; for research adequate (*Pan, etc.*) (190); junior Officers should be recruited from cultivating classes (205) 63164-6; trained labourer cultivators should be permanently appointed for demonstration (*Robertson*) (340); in Myingyan Circle (348) 64459-62.
 Superior Provincial Agricultural Service, no announcement as to (*McKerral*) (23) 61017-8; rules being framed (*Dunn*) (78) 61751-7.
 Tenasserim : planting problems mainly, department not in touch with quinine growing (*McKerral*) (22-3) 61010-4.
 Yamethin Township; farm benefits only the immediate neighbourhood (*Tun, etc.*) (209) 63176.

AGRICULTURAL INDEBTEDNESS,

- Agricultural Department not immediately concerned with (*McKerral*) (46) 61398-402; should administer Government loans (*Gyi, etc.*) (396).
 Ancestral indebtedness not serious (*Dunn*) (81) 61784; considerable (*Maung, etc.*) (182) 62887-9.
 Attachment of cultivators' cattle for debt (*Gyi, etc.*) (403) 64904.
 Bhamado : interest, charged by middlemen (*Dunn*) (93) 61877.
 Buddhist religious desire to repay loans (*Pan, etc.*) (196), (200) 63061.
 Causes of borrowing : (*Dunn*) (67); rinderpest (*Dawson*) (255), (257) 63703; thriftlessness, festivals, sickness, litigation (255), (259) 63731-2; want of banking facilities, high standard of living (255), (261) 63781-5; high cost of living and floods (*Pan, etc.*) (191); lack of means, crop failures, human and animal disease, high interest, thriftlessness and gambling (196); poor results of cultivation owing to irregular rains (*Gyi, etc.*) (395); high cost of living, irregularity of rainfall, lack of economy (397); improved standard of living and higher rate of interest (*Tin*) (104); crop failure, high prices, high wages and absconding labourers (*Maung, etc.*) (171), payment of rent in advance (173); poverty, loss of cattle, high price of cattle owing to slaughter by licensees, crop failures owing to drought and flood, fisheries, lack of irrigation (*Tun, etc.*) (206); not litigation, which is caused by indebtedness (223) 63367-70; need of expenditure before harvest, facile credit, improvidence, crop failure and loss of cattle (*Dan*) (237); lack of capital and having to rent land, failure to prepare estimates of future expenses and profits (*Shwe, etc.*) (380); recklessness and extravagance (387); irregularity of rainfall, insect pests, cattle disease, smallness of income (391); increased cost of living owing to introduction of civilised luxuries (*Sein*) (351); decreased incomes of cultivators, increased cost of land and labour (352). Net return on capital invested in agriculture 9 per cent; yet cultivators borrow from chetties at 24 per cent (358) 64556-63; rise in value of land has increased credit and so led to increased borrowing (359) 64584-9.
 Chettyars : press for repayment when paddy prices low (*Pan, etc.*) (198); interest 18 to 36 per cent; insist upon valuable security; not elastic (*Tin*) (104).
 Civil Procedure Code, provisions for protection of cultivators from harassment by cultivators, a dead letter (*Dunn*) (67); ignored by Courts (81) 61785-8.
 Competition among chetties prevents enslavement of borrowers (*Dunn*) (91) 61864, (93) 61875.

AGRICULTURAL INDEBTEDNESS—*contd.*

- Control of cultivators' credit by limiting mortgage and sale advocated (*Pan, etc.*) (191); (*Maung, etc.*) (171); not advocated (*Pan, etc.*) (196).
- Cotton: loans on growing crops (*Edwards & Nelson*) (225-6).
- Debt: Ancestral, considerable (*Maung, etc.*) (182) 62887-9; not serious (*Dunn*) (81) 61784.
- Extent of: eighty per cent of people seriously indebted and many have become landless tenants; position has become much worse in the last 10 years (*Sein*) (358) 64565-70.
- Greatest in richest parts (*Dunn*) (90-1) 61863-6.
- Increasing with value of land; cultivators not ashamed of being in debt (*Maung, etc.*) (182) 62887-93, (188) 62992-5.
- Important factor in relation to agricultural progress (*McKerral*) (23) 61025-7.
- Imprisonment for debt should be abolished (*Dunn*) (87) 61827-31.
- Attachment of plough cattle for debt, common (*Pan, etc.*) (204) 63153-4.
- Insolvency: court relief would make indebtedness worse (*Pan, etc.*) (196).
- Interest: heavy on subsistence and cultivating loans (*Dun*) (373-5); rates of chetties decreasing (*Dunn*) (73-4) 61726; but middlemen increase the rates of interest (93) 61877.
- Labourers, field, suffer by having to sell their paddy before harvest at a low price (*Dan*) (238); have to sacrifice half the price; are hired during the rains for baskets of paddy to be delivered at harvest; would benefit if they could borrow money at reasonable interest (239) 63554-60.
- Land mortgage banks charging low interest should be started by Government (*Gyi, etc.*) (396), (*Tun, etc.*) (207).
- Legislation: to protect cultivators from usury should be enforced after provision has been made for Government loans (*Dun*) (375); to restrict or control credit of cultivators inadvisable (*Dunn*) (67).
- Limitation of accumulated interest to an amount equal to principal (93) 61878-80.
- Measures to lighten agriculture's burden of debt: Improvement in production and marketing, joint purchase, reduced rate of interest, thrift, Usurious Loans Act, redemption of mortgages (*Tin*) (105); fixing interest and wages, and binding labourers so as to prevent loss to cultivators (*Maung, etc.*) (171); legislation prohibiting excessive interest, of which public must be informed; non-liability to attachment for debt of implements, etc. (174); protection against flood, long term loans, low interest (*Pan, etc.*) (191); Insolvency Court will make indebtedness worse (196); Usurious Loans Act, rigid enforcement of, land mortgage banks, extension of Government loans, co-operative societies (*Tun, etc.*) (207); better repayment would lower interest (*Dawson*) (255).
- Moneylenders: Co-operators borrow from, at 36 and 60 per cent after crop failures (*Sein*) (357-8) 64552-5; do not regard co-operative movement as a serious competitor (360) 64601-2; live in luxury by exploiting cultivators (367) 64703-6; high rate of interest: 36 to 60 per cent in cash and 100 per cent in kind; personal contact and elasticity (*Tin*) (104); not driven away by co-operation (*Maung, etc.*) (182) 62894-7, (186) 62954-63; not wicked (*Dunn*) (93) 61876.
- Mortgages: non-terminable, should be prohibited after Government has established land mortgage banks (*Gyi, etc.*) (397), (400-1) 64848-9; redemption should be facilitated, and should be cancelled by payment of principal and of interest equal to principal (*Shwe, etc.*) (380).
- Productive and unproductive borrowing, difficulty of defining (*Dunn*) (70-1) 61685-6.
- Reasons preventing repayment (*Dunn*) (67), (71) 61689-92; (*Tin*) (105); people live beyond their incomes (114) 62192-7; high interest and expenses of paddy land (*Maung, etc.*) (171), (173); crop failure due to floods, and high interest (*Pan, etc.*) (191); human and animal disease, thriftlessness and gambling (196); poverty, high interest, early sale of crops to pay land revenue in March, crop failure owing to drought and flood (*Tun, etc.*) (207); same factors as cause borrowing (*Dawson*) (255), (*Dan*) (237); high interest which exceeds return on capital invested in agriculture (*Sein*) (351-2), (358) 64556, (363) 64653-4 (see under Standard of living under WELFARE OF RURAL POPULATION); excess of expenditure over income (*Shwe, etc.*) (391), poor yield and low prices (396); unprofitable use of loans and exorbitant interest (*Gyi, etc.*) (397).
- Restriction of credit of cultivators, not advocated (*Tin*) (105). (*Dawson*) (255), (*Gyi, etc.*) (396) advocated (*Shwe, etc.*) (380); Usurious Loans Act should be enforced and non-terminable mortgages should be prohibited after Government has established land mortgage banks (*Gyi, etc.*) (397), (400) 64848-9.

AGRICULTURAL INDEBTEDNESS—concl'd.

- Sources of Credit: Village moneylender, *chetty*, co-operative society, local wealthy persons, Government banks, jungle traders, brokers (*Maung, et c.*) (171), (173); (*Pan, et c.*) (191), (196); (*Dawson*) (255); (*Tin*) (104); (*Tun, et c.*) (206); (*Gyi, et c.*) (395), (397); (*Dunn*) (67); landowners and wealthy villagers for those who have a little security to offer, *chetties* and Chinamen for those who have adequate security; co-operative loans are insufficient and have to be supplemented by other sources of credit (*Shwe, et c.*) (380), (391).
- Thrift: is practised by cultivators (*Sein*) (367) 64703-6; advantages of, not appreciated (*McKerral*) (13), (53) 61504-10.
- Usurious Loans Act: should be rigidly enforced (*Tin*) (105); provisions should be brought to the notice of Judges (114) 62198-200; should be applied with discrimination (*Pan, et c.*) (196); essential to enforce with more rigidity and more extensively (*Tun, et c.*) (207); should be enforced (*Gyi, et c.*) (397).

AGRICULTURAL INDUSTRIES.

- Bags and packing manufacture may be established with Government aid (*Pan, et c.*) (198).
- Basket-making: practise all over Insein District (*Pan, et c.*) (193); may be established with Government aid; obstacle is lack of knowledge (*Pan, et c.*) (198); most people can only do if paid a daily wage (*Dan*) (238).
- Bee-keeping: almost unknown (*Dan*) (238); religious objection (*Pan, et c.*) (193), (198); (*McKerral*) (11); Research necessary (*Ghosh*) (298); should be central as a separate department with a specialist; local bee not suitable; Italian bee should be introduced (299); no religious objection (330-1) 64208-11, (336) 64231-3; easy and profitable (332) 64241-9.
- Buddhist religious objection to taking life: in many places not strict (*Ghosh*) (300); no objection to bee-keeping and should be none to lac culture (330-1) 64208-13, (336) 64331-5; sericulture: tradition and economic pressure overcome religious objection (333) 64254-9; people sympathetic to efforts to destroy pests (336) 64316-22.
- Buddhist religion, an obstacle (*Dunn*) (68).
- Carting: in slack season (*McKerral*) (11); by agricultural labourers in industrialised areas of agriculture not affected by competition of railways and motor cars: (*Dunn*) (88) 61838-41.
- Cattle-breeding, a subsidiary industry (*Gyi, et c.*) (398).
- Co-operative societies for establishing cottage industries should be introduced among housewives (*Sein*) (352).
- Cottage industries dependent upon local supply of material (*Dunn*) (68).
- Cotton ginneries employ rural labour (*Dunn*) (68).
- Cutch: boiling in slack season (*McKerral*) (11); made in very large quantities (*Hopwood*) (124) 62341.
- Employment, rural, can be increased by irrigation enabling more than one crop to be raised per year (*Pan, et c.*) (198).
- Factories, establishment of, in rural areas, promising; Government should encourage (*Dunn*) (68).
- Fisheries, inland, appointment of special officer (*Dunn*) (74) 61727-31; clash of interests of fishermen and agriculturists (104) 62004.
- Forests: labour employed is agriculturist (*Hopwood*) (120) 62266-9; mainly local but some immigrant, 150 forest villages (121-2) 62300-8; large number of industries (124) 62339-41.
- Fruit-growing: Canning: nothing done by Government (*McKerral*) (52-3) 61503.
 ———— May be profitable in suitable localities (*Gyi, et c.*) (398); hampered by theft and low prices (*McKerral*) (11).
 ———— Scarcity of land an obstacle (*Pan, et c.*) (193); difficulty of transport and pests (198).
- Fuel cutting in slack season (*McKerral*) (11).
- Ghi: making in Sagaing District, probably originated by Indians (*McKerral*) (10).
 ———— vegetable, or margarine, not used in Burma (*McKerral*) (52) 61502.
- Government: could not do more than private enterprise has done (*McKerral*) (11); better without Government aid (52-3) 61498-503; can do little (*Dunn*) (68).
- Handicraft or industrial institutions advocated (*Gyi, et c.*) (399).
- Health conditions of villages: district health officers under district council (*Dunn*) (68); education and propaganda by vernacular pamphlets and travelling cinemas in the slack season to induce people to devote spare time to improving their health conditions (*Tun, et c.*) (208).

AGRICULTURAL INDUSTRIES—*contd.*

- Industrial concerns : establishment of, in rural areas should be encouraged (*Shwe, etc.*) (384); are set up in rural areas (*McKerral*) (12); intensive study of each rural industry would be useful; industrial inefficiency (12); rural wages affected by (19) 60965-6; would give subsidiary employment to rural population (*Pan, etc.*) (193).
- Labourers, field, unemployed for 3 months in the rains and 4 months in hot weather (*Dan*) (238).
- Lac culture: limited to particular areas (*Ghosh*) (328), (331) 64212-4; no religious objection (330-1) 64208-13, (336) 64335; made in very large quantities (*Hopwood*) (124) 62341; unprofitable on the plains (*McKerral*) (11); religious objection (*Pan, etc.*) (193), (198).
- Leisure period: Cultivation work from May to January; in slack season from January to May carting, collecting firewood, bamboo, thatching and manuring land; 80 days when cultivator has very little work of his own (*Dan*) (238); no connection between slack season and crime (240) 63570-4; 100 days in the year (*Dun*) (376), (378) 64804. Many fully occupied all the year (*Dunn*) (68), (79) 61766-9; in Insein District, field work 10 months in the year and carting fuel, bamboo, etc., during the remaining 2 months; cultivators have no spare time but labourers may take up subsidiary industries (*Pan, etc.*) (193). On the average, cultivator works about half the year and amuses himself during the other half (197). May to September cultivating work; October and November collecting grass; December to February cultivating; March and April, little to do, but collecting supplies (*Tun, etc.*) (208). Varies (*McKerral*) (11); (*Ghosh*) (299). Work on holding occupies 4 months; in the slack season cultivator does manuring, clearing, etc. (*Shwe, etc.*) (384); none in one district (392); cultivation 160 days intermittently; during slack season carting or selling crops (*Gyi, etc.*) (398).
- Mat-making: in slack season (*McKerral*) (11); from bamboo (*Hopwood*) (124) 62342-3; of straw, manufacture may be established with Government aid (*Pan, etc.*) (198).
- Mills, transfer to rural areas, not favoured (*Gyi, etc.*) (398).
- Obstacles: see "BURMA VILLAGE ACT".
- Oil pressing: Cotton seed used for oil extraction or sowing (*McKerral*) (11); mills European and Japanese (33) 61200-2; soap making in Rangoon (62) 61501; Government should help to establish (*Pan, etc.*) (193).
- Paper pulp: no manufacture (*Hopwood*) (124) 62344.
- Pisciculture, religious objection (*Pan, etc.*) (198).
- Poultry rearing: may be profitable in suitable localities (*Gyi, etc.*) (398); Buddhist religious objection (*Dan*) (238), (239) 63549; (*McKerral*) (11); (*Pan, etc.*) (198).
- Preparation of agricultural produce for consumption: remarkable progress without Government aid (*Dunn*) (68); should be encouraged by Government (*Shwe, etc.*) (384), (392); (*Pan, etc.*) (193) (198); (*Tun, etc.*) (208).
- Public works, roads, irrigation, railways, etc.: co-operative officers should arrange for cultivators to obtain subsidiary employment (*Shwe, etc.*) (389).
- Rice: making starch and flour, may be established with Government aid (*Pan, etc.*) (198).
- , Mills employ rural labour (*Dunn*) (68).
- , Straw: paper making and industrial alcohol not tried (*McKerral*) (11).
- Rope-making: Cultivators make ropes for their own use (*McKerral*) (11).
- , Most people can do only if paid a daily wage (*Dan*) (238).
- , Practised all over Insein District (*Pan, etc.*) (193); of Straw may be established with Government aid; obstacle is want of knowledge (198).
- , Sawmills in forests (*Hopwood*) (124) 62340.

SERICULTURE: see under GHOSH, C. C.

- Buddhist religious objection (*McKerral*) (11); (*Pan, etc.*) (193), (198).
- Certain localities only (*Lan*) (238), (239) 63549-50.
- Spinning, may be established with Government aid (*Pan, etc.*) (198).
- Standard of life apparently not improved by cottage industries (*Dunn*) (68).
- Straw-mats, bags and packing, ropes, boards, pulpware: manufactures may be established with Government aid (*Pan, etc.*) (198).

AGRICULTURAL INDUSTRIES—concl'd.

- Study, intensive, of each rural industry, advocated (*Dan*) (238); (*Shwe, etc.*) (384); necessary with a view to introducing improved tools and appliances (*Pan, etc.*) (193), (198).
- Sugar: improved furnaces, popular, but demonstration staff insufficient and small area under sugarcane (*Charlton*) (290) 64058-63; Government should help to establish sugar-manufacturing industry (*Pan, etc.*) (193).
- Thatching in slack season (*McKerral*) (11).
- Weaving, may be established with Government aid (*Pan, etc.*) (198).

AGRICULTURAL LABOUR.

- Attraction of, by allotment of cultivable land, advocated (*Pan, etc.*) (193); by labour agents, reduced fares and exemption from capitation taxes (*Tun, etc.*) (208), (221) 63332-42; by co-operative and Government loans and allotment of land (*Shwe, etc.*) (384-5); by taking measures against cholera (392).
- Colonisation Department: now Government Estate Department; should consider recruiting colonists from congested areas (*Dunn*) (68).
- Recruitment attempted (*Dunn*) (68).
- Successful colonies at Minbu and Sittang (*Dunn*) (93-5) 61883-91.
- Colonisation schemes advocated to develop areas not at present under cultivation (*Pan, etc.*) (194).
- Efficiency of Burman labour as compared with other Indian and with British labour (*Dunn*) (97-8) 61926-40.
- Immigration from Indian Peninsula during reaping season, might be reduced by one-third if gambling ceased (*Pan, etc.*) (194).
- Labourers, field, unemployed period (*Dan*) (238).
- Labouring population with little land being created while average size of holdings is increasing; legislation to prevent this would be ineffective without co-operative organisation of the small-holder (*Dunn*) (91-2) 61867-70.
- Machinery, introduction of, would oust manual labourer from his occupation (*Tun, etc.*) (207).

MIGRATION :

- of Labour to rice fields from Madras and Upper Burma (*McKerral*) (48) 61439-40
- No displacement on land of Burmese by Indians (48) 61441-3. Seasonal, well developed (*Dunn*) (68). Government and co-operative societies probably cannot control (68).
- Myitkyina District: colonisation measures adopted by Government (*Shwe, etc.*) (392).
- Public Works Department and district councils might employ cultivators during the slack season (*Pan, etc.*) (198).
- Roads, improved, and migration of labour (*Robertson*) (350) 64497-9.
- Shortage of labour: in Burma (*Shwe, etc.*) (385); no shortage in one district (392); not appreciable; due to gambling (*Pan, etc.*) (194); labour-saving machinery the remedy (198).
- Unemployment, a cause of the increase of crime (*Pan, etc.*) (198).
- Wages: for harvesting rice, in kind, in paddy (*Pan, etc.*) (204) 63152; Rs. 10 a month with food and clothing (*Tun, etc.*) (214) 63243-7; high: should be fixed by law and labourers should be bound to as to prevent loss to cultivators (*Maung, etc.*) (171).

ANIMAL HUSBANDRY.**BREEDING :**

- Cattle do not thrive owing to neglect (*Shwe, etc.*) (378), (384).
- Cattle-breeding entirely under the Agricultural Department (*Rippon*) (128) 62382; in the dry zone; Burmese bullocks a definite type. Indian cattle roam about the roadsides (130) 62414-20, 62430-8.
- Control, very little exercised (*Robertson*) (345) 64396-7. Education or legislation, or both, necessary (342).
- no Control exercised over (*McKerral*) (27) 61103-5; deterioration owing to crossing (28) 61109-13, (34) 61217. Government stock breeding farm opened but nothing done yet (41) 61313-4. Under the Agricultural Department (41) 61320-1.

ANIMAL HUSBANDRY—*contd.*BREEDING—*contd.*

- Cross-breeding, local cattle with English bulls (*Rippon*) (130) 62421.
 Horse-breeding transferred to Military Police (*Rippon*) (128) 62383-5.
 Indian blood: investigation of effect of slight admixture necessary (*Robertson*) (342); better milk, size and weight (346) 64421-2; introduces inferior strain but not disease (348) 64469-70.
 In Lower Burma, none owing to swamp conditions (*Hendry*) (59-60) 61577-84.
 Obstacles of lack of capital and religious prejudice (*Sein*) (352), (364-5) 64877-80.
 Profits: favourable (*Robertson*) (343); (346) 64425, much less profitable than agriculture (*Tun, etc.*) (220) 63327.
 Selection within Burmese breed advocated (*Robertson*) (342); give 7 lb. milk a day (346) 64417-24.
 Shows advocated (*Robertson*) (343).
 Buffalo: as a draft animal unpopular (*McKerral*) (26) 61082-5; numbers stationary and decreasing in proportion to bullocks (38) 61263-5.
 Castrations: a few at Insein Veterinary College but none in the districts: by the Italian method (*Rippon*) (128) 62396-9; no attempt made to encourage (*McKerral*) (27) 61103-5; Registration and compulsory castration of cattle of nomadic Indians advocated (28) 61109-13. People have no prejudice against (36) 61243.
 Condensed milk: imports of the value of 41 lakhs of rupees for the year 1925-26 (*McKerral*) (10), (27) 61098-102.

DAIRYING :

- Benefit doubtful (*Pan, etc.*) (193).
 None except at Sagaing (*McKerral*) (10) : insanitary conditions (11).
 No religious objection to using milk, butter, etc., as food (*Sein*) (364) 64678.
 Not usual owing to Burman religious objection (*Robertson*) (342).
 Deputy Director of Live Stock Breeding proposed (*McKerral*) (26) 61078-80.

DRAUGHT ANIMALS :

- Animals to pull heavier loads required (*McKerral*) (10); in the dry middle tract (20-1) 60977-82. More important than milk (26) 61081, (27) 61096.
 Mainly Burmese; first cross with Indian not good (*Robertson*) (346) 64417-20; treated better than breeding cattle (*Robertson*) (343) 64425-9; 2 pairs for 40 acres (*Gyi, etc.*) (399-400) 64832-3, (401) 64850; usually bought; price very much increased (401) 64850-5, (402) 64883.
 Satisfactory in Insein District; area ploughed by a yoke of bullocks (*Pan, etc.*) (201) 63075-85, (204) 63141-4.
 Epidemics: cause serious loss to agriculturists (*Tun, etc.*) (211) 63195-6.

FODDER :

- Bhoosi, high cost of, causes deterioration of cattle; export duty advocated (*Tun, etc.*) (208), (211-2) 63198-206.
 Burning of straw and dry grass in the dry season should be stopped (*Shwe, etc.*) (384).
 Crops: paddy stubble, jowar stalks and bean husks (*Shwe, etc.*) (391).
 Forest reserve pastures should be increased (*Shwe, etc.*) (384).
 Green: serious effect of almost total absence of, during dry season (*Robertson*) (343). Insufficient for breeding cattle (343).
 Hay is made (345) 64398-9.
 In Insein District sufficient grass and paddy straw; kaing grass available in dry seasons in lowland areas. Scarcity may exist for 4 weeks (*Pan, etc.*) (192-3), (201) 63084. Plenty in Lower Burma (197). In Pegu District shortage during working season; paddy straw stored but grass more nourishing (201-2) 63084-91.
 Insufficiency of (*McKerral*) (11); in the dry middle tract (20-1) 60978-80.
 Jowar: damaged by pest "Pwinbyu" (*striga lutea*); methods of resisting (*Robertson*) (343), is stored (345) 64400-2.
 Landowners need instruction as to (*Shwe, etc.*) (384).
 Manuring advocated (*Robertson*) (343).
 Numbers of cattle should be limited (*McKerral*) (11).
 Paddy straw should be more carefully conserved (*McKerral*) (11).
 Scarcity: due to Peninsular Indians, non-agriculturists, keeping cattle; scarcity very much felt from March to June (*Gyi, etc.*) (398); for 120 days from March to June (*Shwe, etc.*) (384); for 8 weeks from October to December (392).
 ———, Season of great shortage: March-May (*Robertson*) (343).

ANIMAL HUSBANDRY—*concl'd.*FODDER—*concl'd.*

- Silo, pit : advocated (*Robertson*) (343); has never known a cultivator to dig one (345) 64403-4; experiments successful but not adopted by cultivators (*McKerral*) (27) 61091-7.
- Storage (*McKerral*) (33) 61191-9.
- Water storage by weirs, advocated (*Shwe, etc.*) (384).
- Well-irrigated grass advocated (*Robertson*) (343).
- Goats are pests (*McKerral*) (26-7) 61086-9.
- Grazing : enclosed pastures, none (*Pan, etc.*) (193); absence of, not source of injury to cattle (197); none (*Robertson*) (343).
- Forests, *see under that title.*
- grounds, inadequate (*Tun, etc.*) (208).
- , no grazing grounds in Chindwin district (*Gyi, etc.*) (398).
- , over-stocking of common pastures, not cause of injury to cattle (*Pan, etc.*) (197).
- shortage, serious effects of (*Robertson*) (342).
- sufficient (*Pan, etc.*) (193).
- Horse racing, encouragement of, by Government officials, deprecated (*Tun, etc.*) (207-8).
- Import of cattle from Indian Peninsula should be stopped or controlled (*McKerral*) (10), (27) 61090. Trade not large (33) 61189-90.
- Indebtedness : caused by loss of cattle (*Tun, etc.*) (206), (211) 63195-6.
- Indians, non-agriculturists, keep half starved cattle in Burma (*Hopwood*) (119-20) 62261-4; should be heavily taxed (122) 62317; Burmans keep a few well-fed animals (125) 62349; (*Gyi, etc.*) (398).
- Milk supply, in large towns unsatisfactory; Government or co-operative societies should undertake (*Pan, etc.*) (197), (201) 63067. (*See under WELFARE OF RURAL POPULATION.*)
- Mineral constituents, no injury to cattle through lack of (*Pan, etc.*) (197).
- Numbers of livestock (*McKerral*) (11), (55) 61534-7.
- Pastures : generally over-stocked (*McKerral*) (11); cattle, sheep and goats kept by parasitic Indians paying no land revenue (11); compulsory registration and castration advocated (28) 61109-13.
- Pathways, lack of, to grazing grounds (*Maung, etc.*) (169).
- Prices of plough cattle, three times what they were 30 years ago; due to enormous slaughtering of cattle by licensees (*Tun, etc.*) (206), and disease; inadequate veterinary staff (217) 63285-7, (220) 63321-8, (222) 63348-52.
- Rinderpest : serious : 100,000 deaths in some years (*McKerral*) (27-8) 61106-8.
- Sheep are pests (*McKerral*) (26-7) 61086-8.
- Shows, exhibitions, and competitions; prizes should be given to improve breeds (*Tun, etc.*) (207).
- Trade, trans-frontier : ponies, mules and cattle used (*Rippon*) (130) 62427-9.
- AUNG, U TUN** (witness) (*see under MAUNG, U BA, etc.*).
- BASKET** (as a measure) (*see under MARKETING*).
- BASKET MAKING** (*see under AGRICULTURAL INDUSTRIES*).
- BEE-KEEPING** (*see under AGRICULTURAL INDUSTRIES*).
- BROKERS** (*see under MARKETING*).
- BUDDHISM** (*see under WELFARE OF RURAL POPULATION*).
- BUFFALO** (*see under ANIMAL HUSBANDRY*).
- BULKELEY, J. P., M.A., I.E.S.**, Officiating Director of Public Instruction, Burma (134-147).

ADMINISTRATION :

District councils, transfer of control of vernacular education to, has been successful in every way except financially (142) 62570-3.

EDUCATION :

Adult education in rural tracts :

Christian Missions Village Education Committee, 1920, work on similar lines advocated (134).

Demand for, has not expressed itself (136) 62504.

BULKELEY, J. P.—*contd.*EDUCATION—*contd.*

- Establishment of national form of Government, must probably wait for, or until district councils have sufficient enlightenment and funds (135), (142) 62575. Comparison with England and Punjab (143) 62580-3.
- Magic lantern lectures, cinema (134).
- Voluntary agencies, lack of (134). Political feeling an obstacle; compared with Madras (142-3) 62576-9.
- Agricultural bias: will not lead to much improvement (135); but more might be done in this direction. Better trained teachers required (139) 62538-40.
- Agricultural Department's short courses for adolescents (144) 62594-5.
- Arithmetic, Burmese have average ability for (138) 62523-4.
- Attendance at schools: money wasted owing to children leaving school prematurely (135); this the chief reason of failure (139) 62536-7. Compulsion necessary to stop this waste (146) 62615-6.
- Books, in the vernacular, not ideal, but quite useful (139) 62536-7; Text Book Committee (141) 62563. (*See under 'Libraries' below.*)
- Compulsory education the only cure, but can only be gradual and should be accompanied by levy of an education rate (135). Compulsion Act contemplated (137) 62513. Education cess (142) 62570-3. Difficulty with regard to monastery schools (143-4) 62584-8, (146) 62615-6.
- District councils, transfer of control to, has been successful in every way except financially (142) 62574.
- English, great demand to learn (136-7) 62504-8. Knowledge of, leads to dislike of manual labour (147) 62321-4.
- Expenditure in 5 years, 1922-27, increased from 116 to 193 lakhs, figures (139-140) 62541-4.
- Government action suspect for political reasons (142) 62575. Comparison with England and the Punjab (143) 62580-3.
- Incentive, Government service (134-5). Government to some extent responsible for this materialist view (141) 62564-6, (145-6) 62606-8.
- Inspection of schools, insufficient staff; standard has been lowered while awaiting Superior Provincial Service (141) 62555-63.
- Libraries, need of (134); Government should start (142) 62575, (145) 62601-5. (*See under 'Books' above.*)
- Manual labour, education may cause a dislike for (147) 62621-4.
- Moga system (141-2) 62567-9.
- Monastery schools: majority of population attain literacy in unrecognised schools. Do not accept girls (136) 62500-1. Possibilities of improvement doubtful (137) 62509-12. Difficulty in connection with compulsory education. A considerable number receive aid from Government. Number of students. Discipline spasmodic (143-4) 62584-92.
- Nature study: not agricultural education but general education; unpopular as not assisting students to pass examinations; propaganda, etc., necessary (134). Punjab system not suitable for Burma; definite vocational training should not be introduced in normal schools. Government has refused financial aid (137-8) 62514-20. Boys and girls equally interested in (138) 62525-6.
- Newspapers: recent considerable increase in circulation of vernacular newspapers (136) 62502.
- Primary: general desire for (135) 62497-8. Majority of schools have more than one teacher. Average number of students (140) 62550-3. Difficulty with regard to monastery schools (143) 62584-8.
- "Project" methods will help (135); Moga (141-2) 62567-9.
- Punjab system of agricultural training schools not suitable to Burma (137) 62514-6; because so few middle schools large enough to have farms attached to them (144) 62593, (146) 62609-14.
- Schools: bad; curriculum not much to blame (135).
- School farms, combine general and vocational education which is seldom successful; would be costly and unpopular (134), (145) 62596-600.
- School plots: *see under NATURE STUDY under EDUCATION.*
- Teachers: pay has been recently greatly improved (135); figures (140) 62544-7. Training doubtful (135). Large number of qualified women teachers (138) 62528. Better trained teachers required (139) 62538-40. Standard of training has not been raised with increased pay (140) 62554. Women paid the same as men (146-7) 62617-20.

BULKELEY, J. P.—concl'd.**EDUCATION—concl'd.**

Vocational training, definite, should not be introduced in ordinary schools (137) 62514-6. Objection not so strong against agricultural as against industrial vocational training (145) 62596-600; (146) 62609-14.

Women: not so well educated as men but more advanced than in Indian Peninsula (136) 62499. Monastery schools will not accept girls. Illiteracy of mothers encourages relapse into illiteracy of children (136) 62500-3. Boys and girls equally interested in gardening. Provision of separate schools for girls after a certain age would keep them longer at school. Large number of qualified women teachers. Financial difficulties. Classification as between boys and girls' schools misleading (138-9) 62525-35. Difficulty of sending women teachers to lonely villages; should be recruited locally (140) 62548-9. Women teachers paid the same as men (146-7) 62617-20.

BULLOCKS (see under DRAUGHT ANIMALS under ANIMAL HUSBANDRY).**BURMA PROVINCIAL CO-OPERATIVE BANK (see under CO-OPERATION under SEIN, U).****BURMA VILLAGE ACT :**

Gives power to District Officers to deal with cattle disease (*McKerral*) (10); forbids villagers to live on their holdings, but is now in this respect a dead letter (46) 61397; enacted to prevent crime (52) 61497; restrictions on villagers living on their holdings should be abolished (*Tun, etc.*) (208), (213) 63223-4; (*Sein*) (353-4), (364) 64667-9; probably desirable to relax Police restrictions compelling people to live in the villages (*Dunn*) (96) 61908.

CAPITAL, ATTRACTING OF, TO AGRICULTURE.

Attracting capital to agriculture is impossible (*Pan, etc.*) (195). Capitalists should not be allowed to take to agriculture; if they do, small cultivators will become landless tenants (*Sein*) (353). Exemption from rates and taxes, and Government loans should be given, to encourage enterprising Burmans to cultivate land by machinery (*Pan, etc.*) (199). Government estates, present policy with regard to formation of, objectionable (*Pan, etc.*) (199). Government should supply capital (*Sein*) (353).

IMPROVEMENT OF LAND BY OWNERS PREVENTED :

By lack of capital (*Sein*) (353); by ignorance (*Pan, etc.*) (195); want of funds; knowledge of power farming machinery and help from district officials (199); by indiscriminate leasing of land (*Shwe, etc.*) (387); lack or excess of water (393); discouraged by want of co-operation among landowners and banking facilities (*Dawson*) (255); factors tending to discourage (*McKerral*) (13). Land a popular form of investment (*McKerral*) (12). Land tenure, restricting alienation, discourages investment of capital (*Dunn*) (96) 61906. Large estates, formation of, leads to absentee landlordism or to capitalist enterprise and formation of large landless class (*McKerral*) (12), (35) 61231-2. Price of rice relatively lower than before the War (*Dunn*) (69); but absolutely higher (96) 61905. Profits of agriculture must be increased (*Dunn*) (69). Thrift, advantages of, not appreciated (*McKerral*) (13), (53) 61504-10. Zamindari system should be recognised by Government in the delta (*Dawson*) (255), (258) 63707-10.

CAPITATION TAX.

Labourers should be exempted from (*Tun, etc.*) (208); under Burma Rural Self-Government Act, 1921, district councils have option to convert into a tax on circumstances and property; but has not been done owing to opposition of Government; should be done (221) 63332-42.

CATTLE BREEDING (see under ANIMAL HUSBANDRY).**CENTRAL AGRICULTURAL RESEARCH COMMITTEE (see under ADMINISTRATION).**

CHARLTON, J., M.Sc., F.I.C., I.A.S., Principal, Agricultural College, Mandalay.
Experience (283) 63929-31; (279-97).

AGRICULTURAL INDUSTRIES :

Sugarcane, improved furnaces, popular, but demonstration staff insufficient and small area under sugarcane (290) 64058-63.

CROPS AND CROP PROTECTION :

Diseases (289) 64038-42.

Sugarcane, improved furnaces, numbers increasing, but shortage of demonstration staff and small area under sugarcane (290) 64058-63.

EDUCATION :

Agricultural : in Burma generally considered to be a subject of secondary importance (297) 64169-70.

Economics, agricultural, taught at Mandalay College as part of the agricultural course (296) 64167.

High School Final examination : increasing number of students offering agriculture (279); (289) 64046-50.

Incentive to study agriculture : Government service (280).

Mandalay Agricultural College and Research Institute :

College Council : Deals with questions as to teaching and programme of studies (290); consists of Principal and heads of all teaching sections; meets when necessary; does not discuss research programme which is settled by the Director (292) 64084-8, Director of Agriculture is the immediate superior of the Principal (290) 64064-7.

Cost of teaching (282-3); 41 students costing Rs. 80,000 per annum (293) 64110-2.

Diploma might be held equivalent to B.A. and B.Sc. of Rangoon University as qualification for teaching in Government high schools (279).

Governing body for, question of (295) 64141-3.

Research : Danger of College becoming partly an Arts College; research work should be concentrated as far as possible in the College (290-1) 64068-74; responsibility for (289) 64043.

Students : Agricultural Committee, 1925, recommended that past students should be employed in branches of public service other than agriculture (291) 64082. Applications for entry comparatively few because other services offer better prospects than Agricultural (280-1), (286) 63985-6; absence of *awza* in Agricultural Service (280), (283) 63941-2. Number of, slightly improved this year; in about 4 years Agricultural cadre will be filled and number of vacancies will be very small; not one student has gone back to his farm; average student on leaving is fit for Subordinate Agricultural Service; possibility of having to find men for Provincial Agricultural Service; obligation to give students posts in Agricultural Department, which they are bound to accept. Leave College at age of 21 to 24; not advisable to raise qualifications for admission to College in the immediate future; no co-ordination with Rangoon University whose Intermediate College is at Mandalay; most students come from Lower Burma; very few sons of cultivators (283-4) 63935-54; very few good at chemistry, weak in English, fairly good in arithmetic (285) 63966-9; comparison with position in Poona and Britain 30 years ago (285) 63970-80; Rangoon University graduates will not come to Mandalay to work as research students at pay of Rs. 150 to Rs. 300 (288) 64029-30; 35 out of 40 students are stipendiary; no scholarships given by local people (289) 64044-5; stipends withdrawn on many occasions (292) 64095-9; records of parentage and after-careers; small number of third-year students recruited in 1925 still remaining; students not knowing Burmese not recruited; Subordinate Civil Service, Land Records and Subordinate Co-operative Branch, filled by competitive examination; it would not help students of the College if agriculture were included; knowledge of English inferior to that of men taking regular degree; agricultural economics taught as part of the agriculture course (296-7) 64155-68; selection: no preference given to those drawn from agricultural classes; Selection Board consists of Development Commissioner (now called Financial Commissioner, Transferred Subjects), Chairman, Director of Agriculture, the Principal of the College, Principal of High School at Rangoon, and a Burmese Barrister-at-Law (297) 64172-6.

University affiliation, difficulties, (281-2), (285-6) 63981-4, (291) 64075-81, (292) 64089-94; Principal not a Member of Senate of Rangoon University (293-4) 64118-32, (295) 64141-3.

CHARLTON, J.—*contd.*EDUCATION—*contd.*

- Pyinmana, American Baptist Mission School: still in an experimental stage (284) 63956-7; well attended by sons of cultivators, between 50 and 60 students, an expensive school (294-5) 64133-40.
- Rangoon University: no co-ordination with Mandalay Agricultural College, which is not affiliated (281-2); Principal not a Member of Senate (293) 64118-20, (284) 63948-51, (289) 64032-7; teaching of sciences relating to agriculture (290) 64068-9; consists of three Colleges: University College and Judson College in Rangoon and Intermediate College, Mandalay (294) 64123-4.
- Research, not assisted by association with elementary teaching (285) 63964-5.
- Students, comparatively few sons of cultivators (280).
- Teachers of agriculture, should preferably be drawn from agricultural class (297) 64172-5.
- Teaching facilities, agricultural, urgent need for extension (279); difficulty of getting competent teachers (295) 64138-40.
- University: questionable whether it should confine itself to purely theoretical work or should interfere in applied work (284) 63955; specialisation should be preceded by a good basis in pure science (286) 63987-96.

FERTILISERS:

- Ammonium sulphate and superphosphate, only useful sources of nitrogen and phosphate for paddy (280).
- Ammo-phos: has proved to be profitable (280); no commercial firm advertising and pushing sale of (284) 63960-2.
- Artificial, prices too high (280).
- Basic slag: tests insufficient (280).
- Bone flour, ground, possibly of some use in sour paddy soil of Lower Burma (280), (288) 64018-26.
- Cyanamide: tests insufficient (280).
- Dhaincha plant as a green manure for paddy (290) 64053-7.
- Green manuring, not practised (290) 64051-2.
- Lime deficiency in nearly all paddy growing districts of Lower Burma (280), (288) 64018-26.
- Nitrates useless on wet lands (280).
- Nitrogen, general shortage of (280).
- Pelun, a leguminous plant, used as a green manure (290) 64053-7.
- Phosphate, shortage of, in many districts (280).
- Potash, rarely necessary for paddy (280).
- Research, insufficient; knowledge of secondary changes exceedingly important (280), (284) 63963, (288) 64016-7.
- Urea being investigated, but not hopeful (280), (284) 63963.

RESEARCH:

- Agricultural Chemist, Burma, responsible for teaching, research and routine work, unable to leave Mandalay and become really conversant with agricultural problems in various parts of the Province; assistant lecturers should be appointed and Rs. 2,000 travelling expenses allowed (279); is also at present Principal of Mandalay Agricultural College and Agricultural Engineer (283) 63929-34, (287) 63997-9, (288) 64027-8; is not Member of Board of Faculties of University of Rangoon (288) 64031.
- Agricultural Engineer: Agricultural Chemist and Principal of Mandalay College at present acting as, (283) 63933; a very important post; holder has resigned and assistant offered his resignation; should be on the superior establishment (295-6) 64144-54.
- Co-ordination of central and provincial research: very little; Pusa might co-ordinate work of Provinces; inspection would not be helpful but conferences might (287-8) 64000-15; equipment equal to any in India (293) 64107-9.
- Insectary, lack of, at Mandalay (279), (284) 63958-9.
- Plant diseases (289) 64038-42.
- Pusa, no contact with; might co-ordinate work of Provinces (287-8) 64000-15, (293) 64107-9.
- Soil analyses: useless without accurate knowledge of the district (292-3) 64101-3.
- Soil survey: by the Agricultural Chemist (292-3) 64101-6.
- Teaching, elementary: association with, does not assist research (285) 63964-5.
- Weeds: (289) 64038-42.

CHARLTON, J.—concl'd.**SOILS :**

Survey by Agricultural Chemist (292-3) 64101-6; very imperfect, but some definite information obtained; samples taken by the auger to depth of 6 or 7 ins. (297) 64177-82.

WATER HYACINTH :

Research necessary as to insect, fungus and bacteriological enemies (279); nobody actively engaged on now (297) 64171.

Sprays, chemical: merely mitigation; only arsenical sprays likely to be effective (279); but cannot be used as they would poison cattle (289) 64038.

COMMUNICATIONS (see under TRANSPORT under ADMINISTRATION).**CO-OPERATION.**

Adult education: an important instrument for (*McKerral*) (29) 61137; an opening for societies (*Maung, etc.*) (181) 62869-70.

Agricultural associations not run by co-operative societies (*Hendry*) (59) 61576. Agricultural Department not directly concerned with (*McKerral*) (46) 61398-410.

Audit: cost should be borne by Government (*Maung, etc.*) (185) 62940-9; (*Sein*) (368) 64723-4; primary, by Co-operative Council, good but broke down owing to lack of funds to pay auditors (*Tin*) (113) 62182-6.

Better farming and better living societies: hopeful if Agricultural Department assist (*Sein*) (357) 64550-1.

Buddhist Priests: many have nothing to do with worldly affairs but some have started societies (*Tin*) (114) 62201-2; unregistered, in some cases successful (*Dunn*) (88) 61836-7, (89) 61853-7.

Burma Co-operative Association, unofficial; activities limited (*Tin*) (110) 62113-8.

BURMA PROVINCIAL CO-OPERATIVE BANK, LTD., MANDALAY: see under SEIN, U.

Canals and embankments, difficulty of organising to maintain, when unanimous consent necessary (*Dunn*) (69), (80) 61770-1.

Capital of societies (*Tin*) (113) 62180-1.

Cattle breeding societies: should be formed as an experiment (*Shwe, etc.*) (386); Registrars should circulate advice (390); obstacles of lack of capital and religious prejudice (*Sein*) (352).

Cattle insurance: not working well (*Tin*) (114) 62203; failure of (*Dunn*) (75-6) 61732-5.

Colonisation Department, now Government Estates Department (*McKerral*) (48) 61432-3.

Colonisation societies: land leased from Government; allotted by committee; Government advanced money, but not enough, leading to resort to moneylenders. A success. Eighty-two such societies at present. Yitkangyi Colony (*Maung, etc.*) (184-5) 62920-39. Pegu Kayan Railway not of much use to Colony (186) 62964-6. No improved methods of cultivation used (186-7) 62974-9. Land belongs to Government (189) 63017-9.

Conferences: district, once a year and provincial once in four years (previously two years) (*Sein*) (361) 64617-20, (369) 64750-6.

Consolidation of holdings societies advocated (*Shwe, etc.*) (386)

Continuity of department broken (*Dunn*) (73) 61719; in a very bad state (73) 61723; (88-9) 61843-52; superior officers not regular departmental officers (102) 61921-9

Cottage industries societies should be introduced among housewives (*Sein*) (352). Credit, Co-operative, is the cheapest (*Gyi, etc.*) (397); (400) 64846.

CREDIT SOCIETIES :

(*Tun, etc.*) 206-7; not generally in competition with joint stock banks, but complementary (*Dawson*) (258) 63718-21; unsuccessful owing to high interest, insufficient finance and lack of long term loans (*Sein*) (352); none really successful (353); (see under BURMA PROVINCIAL CO-OPERATIVE BANK under SEIN, U). Committee of management in each society prepares forecasts, upon which Government officer fixes maximum borrowing limit; Committee sanctions loans to individual members (*Sein*) (363) 64649-51; Committees take sufficient interest but societies are unsuccessful because incomes of members are too small for them to make repayments (363) 64652-4 (see STANDARD OF LIVING under WELFARE OF

CO-OPERATION—*contd.*CREDIT SOCIETIES—*contd.*

RURAL POPULATION. Audit should be done by Government free (*Sein*) (368) 64723-4; weaknesses of (*Maung, etc.*) (177); should be put in order: before starting sale societies (181) 62865-6. Reserves (181-2) 62882-6. Present demoralisation of, calls for strong Government action (*Pan, etc.*) (194). Debt: priority should be given to that owing to societies and imprisonment for debt due to private individuals should be abolished (*Maung, etc.*) (172).

DECLINE IN MOVEMENT :

Mainly due to relaxing of Government supervision (*Tin*) (105-6) 62008-14; which should be done gradually (109) 62079-82. Supervision should take the place of super-audit (109) 62084-7. Failures due to small margin and high cost of management (109) 62088-90; not due to rate of interest being too low, nor to cultivators' fear of offending moneylenders (110-1) 62121-33. Upper Burma (114) 62203-13.

DEPARTMENT :

Comparative size of (*Tin*) (109) 62083; should give more advice and support (*Shwe*) (394) 64811-2; officers (except Registrar) should act merely as propagandists and instructors (*Maung, etc.*) (174). Relations with non-officials good (187) 62989-91. Staff inadequate (177). Deposits: mainly from public. Under Act III of 1923, local bodies can deposit their funds with the Central Banks approved by Local Government, but so far Government have refused sanction (*Maung, etc.*) (188) 63003-10. Could be obtained from public at lower interest if Government made loans to societies (188) 62011-6. Discipline: a Burman quality (*Sein*) (370) 64757-9. Dry zone districts, failure of societies in (*Dunn*) (82) 61791. Educational influence (*Tin*) (110) 62112, (113-4) 62187.

EDUCATION :

Co-operative training schools should be opened at expense of Government (*Maung, etc.*) (177); has not been neglected (178) 62824; (*Dunn*) (72) 61712-4. Principles should be taught in village lay schools (*Sein*) (353); members well educated in principles; should be done mainly by non-officials (359-60) 64590-5.

EINME TOWNSHIP BANK: *see under Co-OPERATION under MAUNG, U Ba, etc.*

Finance: interest 15 per cent on personal security of members, loans extended in bad years; Co-operative finance best method (*Tin*) (105). Reserve fund, share capital, current profits, loans: movement solvent (113) 62167-79. Financial Commissioner for Transferred Subjects to co-ordinate Co-operative and Agricultural Departments (*McKerral*) (46-7) 61398-426. Fragmented holdings, societies for aggregation of, do not exist (*Maung, etc.*) (178); would not be of much use in Burma (*Sein*) (352). Godowns: receipts for produce could be used for credit purposes (*Dunn*) (70) 61683 (*see SALE SOCIETIES below*). Government Estate Department's colonies (*Dunn*) (93-5) 61883-91.

GOVERNMENT :

Should encourage (*Tun, etc.*) (211) 63188, (*Gyi, etc.*) (399); should lend to societies at low interest (*Shwe, etc.*) (388), (393); should exercise closer supervision and give more assistance (390); should take charge of Co-operative Council (393), (394) 64813, 64819-20; should provide funds (*Sein*) (351), (368) 64725; at 5 per cent (355) 64500-7; should have entire control (352), (363) 64658-9 (*see under BURMA PROVINCIAL CO-OPERATIVE BANK under SEIN, U*). Is expected to do everything for the people (362) 64635-6. Should do audit free (368) 64723-4. State bank advocated (368) 64725; loans should be made through co-operative societies (*Maung, etc.*) (172), (177); should not provide money (*Dunn*) (69).

GUARANTEEING UNIONS :

Functioning badly (*Dunn*) (83) 61793-8; system unsatisfactory and should be abolished (*Sein*) (363) 64645-8; recommend loans and guarantee repayment to Central Bank; the last resort in liquidation (*Tin*) (112) 62145-54; in some cases have had to pay (*Shwe, etc.*) (395) 64821-7.

CO-OPERATION—contd.

Health improvement work in rural parts not done by societies who do not consider it their work (*Maung, etc.*) (189-90) 63022-34.

Implements, should be distributed by Government or co-operative societies at cost price and by easy instalments (*Pan, etc.*) (197).

IMPROVEMENTS, SOCIETIES FOR EFFECTING :

Should be tried as to irrigation and drainage (*Sein*) (352); should be tried where there are fisheries and canals (*Maung, etc.*) (177-8); advocated as an experiment (*Shwe, etc.*) (386); should be established after formation of health service under district councils (*Jolly*) (147); distribute quinine; no anti-malaria societies (157) 62674-5; not giving medical assistance, not considered to be part of their work (*Maung, etc.*) (189) 63024-33.

Industrial societies should be financed by Government (*Maung, etc.*) (177).

Initiative, lack of, in societies (*Dunn*) (69).

Interest (*see under FINANCE*).

JOINT FARMING SOCIETIES :

Consisting of families are best (*Ghosh*) (329), (337) 64343-6; do not exist but should be introduced where credit societies are successful (*Maung, etc.*) (178); premature, difficult problem of unity; should be introduced when co-operation generally is successfully established (*Sein*) (352); require advice of Registrar (*Shwe, etc.*) (389).

Labour societies for contract work should be formed (*Maung, etc.*) (178).

Land mortgage banks; should be merged in Central Banks (*Maung, etc.*) (177).

LIABILITY, UNLIMITED :

Is understood by members; has not been enforced yet (*Maung, etc.*) (183) 62898-900; a good thing (*Shwe, etc.*) (394) 64806.

LIQUIDATION :

Act gives liquidator, with approval of Registrar, power to recover contributions as arrears of land revenue. Delays in liquidation due to appointment of honorary liquidators. Paid liquidators then appointed and now Junior Assistant Registrars (*Sein*) (361) 64611-6; official liquidators paid by Government (361) 64622-4. Caused by crop failures owing to flood and drought (*Maung, etc.*) (178-9) 62824-5. 300 societies; outstanding liabilities 10 lakhs; 12 per cent recovered in one year; sale of members' land, unlimited liability of members called upon in one case; guaranteeing unions; eight years to liquidate owing to employment of non-officials (*Tin*) (112) 62145-61. 500 societies (*Dunn*) (73) 61717-8; policy as to winding up (89-90) 61858-60.

Literature issued by department in vernacular (*Tin*) (110) 62105-8.

Litigation, Government servants should give assistance to societies engaged in (*Maung, etc.*) (174-5).

Local bodies have power to deposit funds in Central Banks, but have not done so owing to opposition by Government (*Sein*) (367-8) 64717-22.

Long-term loans: necessity of: Government should provide funds at first (*Maung, etc.*) (176); at 5 per cent per annum (176); careful supervision necessary (179) 62825-32, (181) 62863-4. Land mortgage banks should be merged in Central Banks (177); (*Shwe, etc.*) (388).

Lower Burma wet tract, movement satisfactory in (*Tin*) (106) 62024-7.

Machinery, agricultural, joint use of: should be undertaken by credit societies (*Shwe, etc.*) (386); requires advertisement by Agricultural Department (389).

Societies for use of: cultivators not in a position to utilise (*Pan, etc.*) (194); do not exist, but would be useful (*Maung, etc.*) (178); would be advantageous if working with their own money and not with money borrowed from banks (*Sein*) (352).

Management of primary societies, cost too high; majority of members take an interest in management (*Tin*) (109) 62090-9.

Manure societies (*Sein*) (362) 64634.

Meetings: of most societies properly conducted; 90 per cent attendance of members at annual meetings of primary societies (*Maung, etc.*) (179-80) 62833-45.

Members: average per society 50 in Pegu District (*Maung, etc.*) (179) 62835-7; importance of members understanding principles (*Shwe, etc.*) (394) 64809-10.

Middle dry tract, movement particularly disappointing, owing to bad seasons (*Tin*) (106) 62015-23.

CO-OPERATION—contd.

Milk supply in large towns extremely unsatisfactory; Government or co-operative societies should undertake (*Pan, etc.*) (197).
 Minorities, compulsion on, to come into schemes of joint improvement (*Sein*) (353); (*Dunn*) (69); (*Jevons*) (268) 63828; (*Shwe, etc.*) (386); (*Gyi, etc.*) (399); should not be compelled (*Pan, etc.*) (194); not feasible as to irrigation (*Shwe, etc.*) (393); restrictions in Burma Rural Self-Government Act, 1921, should be removed (*Dunn*) (69).

MONEYLENDERS:

Members of societies borrow from moneylenders at 36 and 60 per cent after crop failures (*Sein*) (357-8) 64552-5. Moneylenders do not regard co-operative movement as a serious competitor (360) 64601-2; live in luxury by exploiting cultivators (367) 64703-6; have not been driven away by credit societies (*Maung, etc.*) (182) 62894-7, (186) 62954-63.

NON-OFFICIALS:

Failure of (*Dunn*) (69), (82) 61791, (95) 61896-8; activities limited (*Tin*) (110) 62113-8.

Honorary organisers, instruction of (*Maung, etc.*) (172), (187) 62984-8; travelling expenses should be borne by Government (177). Inefficiency of control by (183-4) 62918-9. Intimate association necessary between officers of Department and members of societies (172-3), (174). Relations good (187) 62989-91. Non-officials have not sufficient spare time (188) 62996-63002. Honorary organiser of Einme Township Bank appointed by Deputy Commissioner (*Maung, etc.*) (190) 63035-8; help insufficient (*Tun, etc.*) (216) 63271-8; receiving encouragement from Department (218-9) 63302-9; should do propaganda (*Sein*) (352), (363) 64655-7. Objection to exclusion of, from board of control of proposed Land Mortgage Bank. Provincial Bank and Central Banks managed by (*Sein*) (366) 64691-7; should help by propaganda, newspapers, schools, etc. (*Shwe, etc.*) (389).

Objects of societies: achieved to a small extent (*Maung, etc.*) (173); not yet achieved (175); (*Pan, etc.*) (194); (*Shwe, etc.*) (386), (393).

PAYITRON CENTRAL CO-OPERATIVE SOCIETY: see under CO-OPERATION under GYI, U YIN, etc.

A successful purchase society (*Robertson*) (340-1).

Political agitation against Government societies (*Dunn*) (89) 61853-7.

PRIMARY SOCIETIES:

Have not been neglected in favour of central societies (*Dunn*) (82-3) 61792; Membership (*Tin*) (107) 62046-8.

PROGRESS:

None (*Dunn*) (69); owing to excessive dependence on Provincial Banks (69); promising in the earlier stages (72) 61709-11, (73) 61715-6; very bad state of things (73) 61723; (81) 61777-83; not flourishing so well in Upper Burma as in Lower Burma (*Tun, etc.*) (211) 63188; not so active as 5 years ago (216) 63271-3; recent setback (*Dawson*) (258) 63718; lack of, due to non-payment of dividends and not operating as saving societies (*Jevons*) (271) 63865-6. Movement going backwards; enquiry called for (*Sein*) (367) 64712-6; due to higher standard of living though Burmans more advanced than in the Indian Peninsula; lack of capital; not due to bad report issued by Registrar which was justified by the facts; societies in the dry tracts in a very bad way; education and knowledge of co-operative principles good; lack of cheap credit; land mortgage banks will give relief (368-9) 64726-41; enquiry as to cause of decline advocated (*Shwe, etc.*) (388), (394) 64814; slow because loans are not utilised for purposes for which granted (*Gyi, etc.*) (400) 64846-7.

Propaganda: none being done by Department except in Arakan; unofficial propaganda not sufficient (*Tin*) (106) 62029-34.

Provincial Co-operative Council, in a faint condition (*Dunn*) (95) 61897-8.

PURCHASE SOCIETIES:

Advocated (*Shwe, etc.*) (386); Government help necessary at first (389); (*Robertson*) (340-1); failure of, generally, but a successful society among police in Pegu

CO-OPERATION—*contd.*PURCHASE SOCIETIES—*contd.*

- District (*Maung, etc.*) (177); not many; should be started among members of credit societies, after reformation (*Sein*) (352); better than credit societies (*Gyi, etc.*) (401) 64859-60.
- Recognition, greater, of societies, necessary (*Maung, etc.*) (174); no records of work done by department (*Tin*) (108) 62062-3.
- Registrar, Junior Assistant, one should be appointed by Government in every district (*Maung, etc.*) (172).
- Registrars: frequent change (*Dunn*) (73) 61719-22, (82) 61790, (95) 61892, should continue for at least 12 years (*Shwe, etc.*) (388).
- Repayment: Time should be extended (*Shwe, etc.*) (390); period between repayment of loan and granting fresh loan; guaranteeing unions the final resort (*Tin*) (111-2) 62141-54.
- Reputation of movement: Not damaged (*Maung, etc.*) (181) 62872-3; Government loan would improve prestige of co-operative banks (188-9) 63011-6; not very good (*Tin*) (107) 62043-5.
- Reserve fund: 37 lakhs realised in cash (*Tin*) (113) 62167-70.
- Revenue: payment should be postponed to 30th June (*Shwe, etc.*) (388).

SALE SOCIETIES:

- Should be developed (*Dunn*) (73) 61724-5; groundnut societies satisfactory but ceased during War (*Tin*) (107) 62049-57, (108) 62074-6; complete failure of (*Maung, etc.*) (177); present conditions discouraging; Government help needed (*Pan, etc.*) (194); should store produce in godowns and make advances upon it (198). Societies for storage and sale of rice (*Edwards & Nelson*) (236) 63518-22. Advocated (*Robertson*) (340-1); (*Shwe, etc.*) (386). Should be started among members of credit societies, after reformation; should have godowns, built with their own money or intact reserve funds of credit societies (*Sein*) (352); not speculative (357) 64547-9. Unlucky attempt eight years ago leading to demoralisation. To build godowns long term loans repayable in ten years necessary; Provincial Bank cannot make such loans; application made to Government (361-2) 64625-33. Have collapsed, require finance (389); better than credit societies (*Gyi, etc.*) (401) 64859-60; very little co-operative marketing (*McKerral*) (28) 61122-4.
- Seed distribution: help given to Agricultural Department (*McKerral*) (25) 61061-2; (*Maung, etc.*) (181) 62867-8, (185) 62950; (*Tin*) (106) 62035-6; help received from Agricultural Department (110) 62109-11.
- Seed farms, little success (*Hendry*) (59) 61572.

SEED SOCIETIES:

- For joint growing of pure strains and selling direct to millers, successful; premia of 10 to 15 per cent paid by millers for improved paddy (*Pan, etc.*) (191). Distribution should be to societies and not to individuals, to avoid mixing (191), (194).
- Shares: 37 lakhs paid up in cash (*Tin*) (112-3) 62162-6.
- Staff, training and recruitment: annual courses and examinations (*Tin*) (111) 62134-40; book-keeping and accountancy not strictly enforced subjects (114) 62188-91.
- Statistics as to progress of societies (*Dunn*) (81) 61777-83.
- Subsidiary employment on public works, roads, irrigation, supply of timber, etc., to railways, should be arranged by Co-operative officers (*Shwe, etc.*) (389).
- Success, lack of (*McKerral*) (29) 61133-6.

SUPERVISION BY DEPARTMENT:

- (*Tin*) (108) 62064-9; closer, necessary (*Shwe, etc.*) (390); withdrawal of, a cause of trouble in co-operative movement (*Sein*) (357) 64545-6; witness's changed opinion (361) 64621; Government should have entire control (352), (363) 64658-9; premature withdrawal of, cause of present disappointing condition of movement (*Maung, etc.*) (178) 62820-3, (183-4) 62918-9; not caused by political non-co-operation movement (187) 62980-3. Non-officials had not sufficient spare time (188) 62996-63002. Government supervision necessary (189) 63016; removed in 1921; movement desired it should be removed (190) 63039-43.
- Supreme association, with non-officials in majority on controlling board, and subsidised by Government, should be formed (*Maung, etc.*) (174-5).

CO-OPERATION—concl'd.**SUPERVISION BY DEPARTMENT—cont'd.**

Taccavi should be lent through co-operative banks at rates of interest not exceeding rate at which Government borrows (*Tin*) (104); but not for non-members (108) 62070-3, (110) 62119-20.

Taluka development associations compared with Agricultural improvement committees (*McKerral*) (50-1) 61472-9.

Tenants' societies should be formed and given leases of land (*Maung, etc.*) (177).

Thrift: has been promoted (*Tin*) (109) 62100; Burman has no sense of (*Maung, etc.*) (188) 62992.

Training and recruitment of subordinate staff (*Dunn*) (95) 61893-5.

Treasuries: societies should be able to deposit funds with (*Shwe, etc.*) (288).

Upper Burma: 4,000 credit societies, helping cultivators (*Tin*) (107-8) 62058-61, (114) 62203-13. Co-operation should not be abandoned in, (*Dunn*) (82) 61789.

Women: partly control spending of family income, are not excluded from co-operative societies (*Dunn*) (86-7) 61821-6; Registrars should form industrial, handicraft, saving and other societies (*Shwe, etc.*) (390).

COTTON (see under CROPS AND CROP PROTECTION, MARKETING and TARIFFS AND SEA FREIGHTS).**CREDIT (see under AGRICULTURAL INDEBTEDNESS, FINANCE and CO-OPERATION).****CRIME (see under WELFARE OF RURAL POPULATION).****CROPS AND CROP PROTECTION.**

Adulteration of seed should be prevented by extensive pure seed distribution (*Hendry*) (60) 61586-7, (61) 61597-9.

Catch crops after paddy harvest unsuccessful (*Hendry*) (66) 61680.

Cattle trespass: many cases; for instance, a loss of Rs. 40 on 6 acres of juar (*Gyi, etc.*) (404) 64911-5.

Cinchona plantations under Government of India (*McKerral*) (55) 61532. (see under QUININE under WELFARE OF RURAL POPULATION).

Coffee grows well in Burma (*Dan*) (238).

COTTON: see under SEED DISTRIBUTION below, MARKETING and TARIFFS AND SEA FREIGHTS.

Cambodia, area small but increasing (*McKerral*) (8).

Seed, germination percentage low: (*McKerral*) (42) 61325.

Selected, premiums given for (*McKerral*) (8).

Value as a money crop (*McKerral*) (20) 60969-72; not much scope for improvement; conditions in Upper Burma very poor (*Edwards & Nelson*) (229) 63417-20; picked October and November (232) 63452-3.

Climatic difficulty of spreading improved strain in dry tract (*Robertson*) (344) 64376.

Destructive Insects and Pests Act, 1914, probably necessary to revise to protect Burma from pests from Indian Peninsula (*McKerral*) (9); should be done as soon as possible (26) 61073-5; by system of certificates (36) 61246-9.

Diseases (*Charlton*) (289) 64038-42.

Egret, preserved because a great insect feeder (*Tun, etc.*) (205).

Experimental stations in each Agricultural Circle undertake improvement of crops (*Hendry*) (57).

FODDER:

Difficulty of growing in paddy lands of Lower Burma (*Hendry*) (57).

Grasses (Guinea, Merker, foddercane, Kikuyu) introduced but not grown to any extent (*Hendry*) (57).

In Insein District not extensively put down (*Pan, etc.*) (192).

Many new crops tried but failed (*McKerral*) (8).

Paddy stubble, jowar stalks and bean husks only (*Shew, etc.*) (391).

Saccoline in Upper Burma (*Pan, etc.*) (192).

Foreign markets: varieties of paddy suitable for, should be made known to cultivators (*Tun, etc.*) (207).

Frogs: insect feeders (*Tun, etc.*) (205), (209) 63172-5, (222) 63364-5.

Fruit: importation from other countries best method of improving (*Hendry*) (57).

Garden crops, mixed, improvement work undertaken (*Hendry*) (57).

CROPS AND CROP PROTECTION—*contd.***GRAM :**

Distribution of immune varieties by Agricultural Department (*Tun, etc.*) (210) 63181-2.

Improved : increased yield 5 lakhs of rupees per annum (*McKerral*) (8).

Karachi : cultivation of, extending (*Dun*) (376).

—introduction in Upper Burma a great success (*Robertson*) (348) 64471-5 ; partly consumed by cultivator (*Gyi, etc.*) (401) 64868-70.

GROUNDNUTS : see under SEED DISTRIBUTION below MARKETING and TARIFFS AND SEA FREIGHTS.

Improvement of variety, scope for (*Edwards & Nelson*) (230) 63429 ; Agricultural Department working on right lines but staff inadequate (231) 63437-9 ; introduced during the last 20 years and covering 400,000 acres (*McKerral*) (8) ; oil extraction in India, oil and cake exported (40) 61300-3 ; introduction in dry tract has increased prosperity (*Robertson*) (343-4) 64374-5 ; no rotation (347-8) 64455-8 ; in Pakokku District, has brought in a large amount of money (*Setin*) (358) 64570.

Heavier yielding food crops should be grown, (*Shwe, etc.*) (382).

Hmawbi Government Farm distributing many improved varieties (*Dan*) (238), (240) 63575-9.

Improvement : Agricultural Department attempting to improve rice, cotton, beans, gram, chillies, groundnuts, sesamum, tobacco and juar ; all crops capable of improvement (*McKerral*) (8).

—No improvement (*Pan, etc.*) (197).

Juar : best fodder crops in the dry zone ; liable to fungus attack (*McKerral*) (8).

Kyaukse District : canals irrigate about half total irrigated area bearing crops other than rice ; double cropping, e.g., sesamum before rice (*Stuart*) (242).

NEW CROPS :

Demonstration of, necessary (*Shwe, etc.*) (382).

Meteorological data required (*Jevons*) (266).

Not hopeful (*McKerral*) (8).

Rice, no crops can compete with, in Lower Burma (*Hendry*) (57).

Very little headway (*Pan, etc.*) (197).

OUTTURN :

Paddy, generally 8 baskets per acre 15 years ago and now (*Tun, etc.*) (210)

63176-80. 50 per cent greater with seed from Agricultural Department (213)

63225-40 ; 750 baskets of paddy from 100 acres (*Pan, etc.*) (204) 63151 ;

long lived, *Nga-sein-gyi*, successfully introduced by Agricultural Department (*Shwe, etc.*) (391).

Pemyit, leguminous, roots and pods food crop, in irrigated rice areas of Upper Burma (*McKerral*) (8).

Pescinsa, leguminous, root food crop, Lower Burma and alluvial tracts (*McKerral*) (8).

Pests :

Bollworm, pink, all over Burma ; difficulty because cultivators gin part of their own kapas (*Ghosh*) (337) 64347-57.

External : special protection from Indian Peninsula required (*Ghosh*) (329) 64183-5.

Internal : *Chilo simplex* and borers, palm beetle ; legislation required (*Ghosh*) (329)

64184-7 ; cotton (329) 64188-91 ; Pusa not consulted except occasionally to

identify pests (329-30) 64192-7.

Legislation necessary (*Ghosh*) (336) 64319.

Paddy : borer damage avoided by altering time of planting (*Ghosh*) (338) 64369.

—Crabs caught in pots (*Ghosh*) (338) 64369-70.

Propaganda by pamphlets (*Ghosh*) (336) 64316-22.

Protective measures should be taken immediately (*Tun, etc.*) (207).

Pwinbyu (*striga lutea*) damaging jowar fodder ; remedies (*Robertson*) (343).

Research, should be centralised (*Ghosh*) (298), (339) ; (*Tun, etc.*) (205).

Smut on jowar, copper sulphate used (*Robertson*) (340), (348) 64463-6.

Potato cultivation increased in Shan States owing to Scotch seed and extension of railway (*McKerral*) (4), (19) 60967-8, (34) 61210.

Price of paddy : considerable increase (*Tun, etc.*) (210) 63179-80.

Profitable crops : sugarcane, coconut, plantain, Indian corn, tobacco, onions, groundnut, gram and betel (*Dun*) (376).

CROPS AND CROP PROTECTION—*contd.*

- Protection: insufficient (*Shwe, etc.*) (382), (392).
 Rangoon bean, important commercially (*McKerral*) (8).
 Rats: do a great deal of damage (*Tun, etc.*) (209) 63173-4.

RICE:

- Area under, in Lower Burma, 90 per cent of cultivated area (*Hendry*) (57).
 Burma supplies 63 per cent of Western world's requirements; quality not inferior (*McKerral*) (43-4) 61355-8; quantity has increased steadily (*Hendry*) (62) 61613-4.
 Diseases: remedy burning stubble (*McKerral*) (38) 61281-3.
 Flood resisting varieties (*McKerral*) (55) 61529-31.
 Heaviest yielding food crop (*McKerral*) (8).
 Improvement: Considerable scope for (*Edwards & Nelson*) (225); breeding farm, work satisfactory; importation from Bangkok successful (228) 63398-401; demand for better quality (229) 63407-8; importance of uniformity; quality is improving; reputation has not risen in the world market; the cheapest rice (229) 63409-16; importance of weight per basket, yield and appearance; not sold for cooking qualities (231-2) 63436-49, (232-3) 63462-5, (234) 63481-4; compulsory use of tested seed (235) 63503-12; satisfactory progress: increased yield and premium (*Hendry*) (57), (65) 61654-5.
 Japanese and other short period varieties (*Hendry*) (60) 61592-6.
 Ngasein, for export (*Hendry*) (61) 61610.
 90 per cent of the whole irrigated area (*Stuart*) (242).
 Premiums given on improved variety (*McKerral*) (8); (*Hendry*) (60) 61586-9, (61) 61597-9; but difficulty of marketing (64) 61641-2.
 Produced by Agricultural Department, better outturn and prices (*Pan, etc.*) (192); sometimes cultivator does not share in improved price (202) 63092-6.
 Quality of Burma rice (*Hendry*) (61-2) 61609-13.
 Quality and quantity (*McKerral*) (40) 61304-7.
 Red rice, percentage being reduced (*Hendry*) (60) 61590-1.
 Seed of Agricultural Department gives uniform crop for which mills pay increased prices (*Dun*) (376); (*McKerral*) (25-6) 61060-9.
 Steel Brothers, seed distribution by (*Edwards & Nelson*) (228) 63398, (232-3) 63462-5.
 Varieties already in the country should be improved (*Hendry*) (57); hybridisation work (59) 61567, (64) 61643-4.
 Varieties under distribution, 7; under study, several hundreds (*Hendry*) (60) 61585.
 Yield not decreasing (*McKerral*) (45) 61378-81, (52) 61493-4 (*see under* **MARKETING and RESEARCH**).
 Rubber, introduced during the last 20 years: 79,437 acres (*McKerral*) (8); not much assistance from Agricultural Department (22) 61004-9.
 Saccoline millet: has gradually become popular as a fodder crop (*Dun*) (376).

SEED DISTRIBUTION:

- Absentee landlordism retards in Pegu (*Maung, etc.*) (176).
 By Agricultural Department, no private agency (*Hendry*) (57), (61) 61600-5.
 Centre of distribution should be in each village tract (*Tun, etc.*) (207), (209) 63176.
 Central seed farms, experimental and not expected to pay (*Hendry*) (65) 61664.
 Commercial assistance desirable (*Edwards & Nelson*) (232-3) 63462-5.
 Co-operative societies, little success in opening seed farms (*Hendry*) (59) 61572-4.
 Cotton: great importance of. At present no system; cultivators buy from ginning factories (*Edwards & Nelson*) (226); control by gineries (233) 63466-70.
 Cultivators' difficulty in getting seed; high prices charged by local ginners; average price Rs. 5 to Rs. 7 early in the season to Rs. 17 later; some seed extremely bad germination; setting up of Government gineries not advisable; regulations insisting on standard of germination; hand ginning a retrograde step (*Robertson*) (349-50) 64482-96 (*see under* **MARKETING**).
 Depôts advocated (*Shwe, etc.*) (391).
 District farms rented to tenants (*Hendry*) (65) 61665-8.
 Expansion satisfactory (*Hendry*) (57); on a large scale (58-9) 61561-2.
 Facilitated by showing cultivators that higher prices are paid for crops grown from pure seed (*Shwe, etc.*) (382).
 Farms in each district necessary to save transportation cost (*Hendry*) (57); there are 32 in 6 districts (59) 61563-6, (61) 61606-8.

CROPS AND CROP PROTECTION—concl'd.**SEED DISTRIBUTION—concl'd.**

- Farms, 25 to 30 acres, required in each village tract (*Tun, etc.*) (205-7); should be self-supporting (219-20) 63310-20.
 by Government, not private agency (*McKerral*) (8).
 Grain: kinds desired by people should be ascertained (*Maung, etc.*) (169).
 Groundnut: cultivator keeps his own seed (*Edwards & Nelson*) (226).
 of Paddy seed: partly unsuccessful owing to unsuitability (*Maung, etc.*) (170); help of co-operative societies (181) 62867-8; supplied by Agricultural Department, premium of Rs. 10 per 100 baskets paid (*Gyi, etc.*) (401) 64863-5.
 Prices adjusted to equalise transport cost (*Hendry*) (65) 61663.
 Quality of seed, legislation not necessary (*Hendry*) (66) 61670-4.
 Societies for joint growing of pure seed and selling direct to millers, successful; premia paid by millers for improved paddy (*Pan, etc.*) (191); but floods during last 5 years (192); unsatisfactory; should be distributed from township headquarters and advertised (195), (197).
 Sesamum seed, price increased from Rs. 7 to Rs. 17 (*Sein*) (258) 64571-2.
 Snipe, great insect feeders (*Tun, etc.*) (205), (222) 63366.

SUGARCANE:

- Horticulturist at Hmawbi Farm in charge (*Hendry*) (63) 61631-3.
 Improved furnaces, numbers increasing, but shortage of demonstration staff and small area under sugarcane (*Charlton*) (290) 64058-63.
 Prospects good: J-213 and B-3412 (*Hendry*) (63) 61628-30.
 Quantity negligible in Southern Circle (*Hendry*) (63) 61628.
 Tapioca (cassava), increased area (*McKerral*) (8).
 Water: crops could be grown from January to May if water were available (*Hendry*) (65) 61656-62.
 Wild animals: damage caused by, comparatively insignificant (*McKerral*) (8); methods of scaring away (*Shwe, etc.*) (391); Township officers should take measures to prevent damage (*Dun*) (376); no damage (*Pan, etc.*) (192).

CULTIVATION.

- Agricultural improvement committees, five started (*McKerral*) (42) 61325-7; informal (45) 61390-4.
 Breaking of surface before rains not possible (*Shwe, etc.*) (394) 64816-8.
 Cotton, difficulty of introducing row-sowing instead of broadcasting (*McKerral*) (9).
 Culturable waste: 20 million acres; most would be unprofitable to work (*McKerral*) (48) 61427-35. Rate of increase of area cultivated diminishing (54) 61523-7.
 District councils take no interest in agricultural matters (*McKerral*) (45) 61395-6.
 Drill sowing recommended (*Robertson*) (342).
 Dry tract, extreme uncertainty of season (*Robertson*) (343-4) 64374-85; 30 ins. of rainfall in 6 months; implements used; mixed cultivation: groundnut and pigeon pea, sown broadcast; in proper groundnut tracts no rotation (*Robertson*) (347-8) 64448-58.
 Gwin-set plough, a great improvement (*Shwe, etc.*) (390-1).
 Improved methods, introduction of, not very successful (*McKerral*) (9).
 Instruction needed as to rotations, mixtures, periods of planting, destruction of insect pests (*Shwe, etc.*) (382-3), (391).
 Inter-cultivating recommended (*Robertson*) (342).
 Kazins, importance of (*Tun, etc.*) (208), (213) 63217-20, (214) 63238-42.
 Line sowing recommended (*Robertson*) (342).
 Middle tract, shortage of moisture a limiting factor; green manuring (*McKerral*) (20-1) 60973-82.
 Outturn: 750 baskets of paddy from 100 acres (*Pan, etc.*) (204) 63151.
 Paddy, present method most suitable (*Tun, etc.*) (207).
 Plough, hire of, costs 75 baskets of paddy per yoke (*Pan, etc.*) (204) 63150.
 Plough cattle (see DRAUGHT ANIMALS under ANIMAL HUSBANDRY).
 Rice: present method most suitable (*Tun, etc.*) (207); intensive instead of extensive (*Hendry*) (62) 61615; puddling (64) 61649.
 Rotation: none in Insein District, paddy being the only crop (*Pan, etc.*) (192). Propaganda as to, by leaflets, cinema, broadcasting and demonstrations, advocated (197).
 Shifting cultivation (see under SOILS).
 Sugarcane, economies can be effected (*McKerral*) (9).
 Theikpan plough designed by Agricultural Department, improved tillage if used (*Pan, etc.*) (192); recommended (*Robertson*) (342).

CULTIVATION—*contd.*

Tillage : not much done to improve (*Pan, etc.*) (192); very little improvement can be made (197); existing system defective (*Shwe, etc.*) (382), (391).

Tractors : use of, prevented by lack of capital; Government should assist (*Pan, etc.*) (197).

Waste of time through growing unseasonable crops, bad implements, poor seed (*Shwe, etc.*) (378), (383).

Water : crops could be grown from January to May if water were available (*Hendry*) (65) 61656-62.

DAIRYING (see under ANIMAL HUSBANDRY).

DAN, DANIEL PO, Bar.-at-Law, Tharrawaddy : (237-40). Landowner, letting out land to agriculturists on produce rent, 13 to 15 baskets per acre (238) 63542-8.

AGRICULTURAL DEPARTMENT :

Work, considerable; should be strengthened (240) 63575-9.

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : need of expenditure before harvest, facile credit, improvidence, crop failure and loss of cattle (237).

Labourers, field, suffer by having to sell their paddy before harvest at a low price (238); have to sacrifice half the price; are hired during the rains for baskets of paddy to be delivered at harvest; would benefit if they could borrow money at reasonable interest (239) 63554-60.

Repayment prevented by the same causes as borrowing (237).

AGRICULTURAL INDUSTRIES :

Basket-making : most people can only do if paid a daily wage (238).

Bee-keeping : almost unknown (238).

Labourers, field, unemployed for 3 months in the rains and 4 months in hot weather (238).

Leisure period : cultivation work from May to January; in slack season from January to May carting, collecting firewood, bamboo, thatching and manuring land; 80 days when very little work (238); no connection between slack season and crime (240) 63570-4.

Poultry rearing : Buddhist religious objection (238), (239) 63549.

Rope making : most people can do only if paid a daily wage (238).

Sericulture : only in certain localities (238), (239) 63549-50.

Study, intensive, of each rural industry, advocated (238).

AGRICULTURAL LABOUR :

Labourers, field, unemployed period (238).

CROPS AND CROP PROTECTION :

Coffee grows well in Burma (238).

Hmawbi Government Farm distributing many improved varieties (238), (240) 63575-9.

DEMONSTRATION AND PROPAGANDA :

Demonstration of improved implements (238).

EDUCATION :

Agricultural : Institutions, supply insufficient (237).

Students, not drawn mainly from agricultural classes (237); taking up cultivation after education (239) 63561-3.

Teachers, supply insufficient; if possible, should be drawn from agricultural classes (237).

Attendance in 4th class poor owing to parents employing their children in the house and fields (238).

Compulsion advocated (238), primary vernacular (239-40) 63566-7.

Crime, partly due to lack of education (240) 63567.

Nature study advocated (237).

Pyinmans, at least one school similar to, required (237).

School farms advocated (237).

School plots advocated (237).

DAN, DANIEL PO—contd.**FINANCE :**

Government loans, great difficulty in obtaining (239) 63564-5.

IMPLEMENTS :

Demonstration in the field advocated (238).

Paddy reaping machine introduced 40 years ago, but heavy and unsuitable (238).

Threshing machine : works perfectly but too heavy (238).

VETERINARY :

Inoculation, often too late (238).

Legislation dealing with notification, segregation, etc., very necessary (238).

Research, further facilities required (238).

WELFARE OF RURAL POPULATION :

Crime, large proportion in Tharrawaddy (239) 63551-3 ; partly due to lack of education (240) 63567 ; no connection with slack season (240) 63570-4.

DAWSON, L., of Dawson's Bank, Ltd., Rangoon (254-63).**AGRICULTURAL INDEBTEDNESS :**

Causes of borrowing : rinderpest (255), (257) 63703 ; thriftlessness, festivals, sickness, litigation (255), (259) 63731-2 ; want of banking facilities, high standard of living (255) ; as compared with India ; probably gone up in recent years (261) 63781-5.

Measures for lightening agriculture's burden of debt : better repayment would lower interest (255).

Repayment prevented by same factors as cause borrowing (255).

Restriction of credit of cultivators, not advocated (255).

Sources of credit : village moneylender, chetty, co-operative credit societies, banks (255).

CAPITAL, ATTRACTING OF, TO AGRICULTURE :

Improvements by landowners discouraged by want of co-operation among landowners and lack of banking facilities (255).

Zamindari system should be recognised by Government in the delta (255), (258) 63707-10.

CO-OPERATION :

Credit societies : not generally in competition with joint stock banks, but complementary (258) 63718-21.

Progress : recent setback (258) 63718.

FINANCE :

Banking facilities : extension of to rural parts advocated (254) ; cheques, use of, growing ; dacoity encourages banking habits (258) 63711.

Chetties : charge 30 per cent interest, but rates decrease in face of competition of joint stock banks (259) 63733-4 ; useful but offend against canons of sound banking (260) 63757-60, (262) 63788-91.

Co-operative credit societies : can give short term credit ; but difficult to finance produce (255) ; not generally in competition with joint stock banks (258) 63718-21.

Dawson's Bank : Report, 1923 (255) ; 7,000 customers ; managers usually lawyers ; not moneylenders ; know the cultivators (256) 63672-6 ; average interest 14½ per cent (256) 63678-82 ; takes the cream of the security (262) 63788-91 ; has not acquired considerable areas of land by foreclosure ; policy not to hold land (256-7) 63683-93 ; makes short term advances on produce but not on cattle alone ; difficulty that legal right on such produce is very indefinite (257-8) 63701-5, (258-9) 63722-8 ; operating in the lower portion of the delta (259) 63735, (261) 63778-80 ; does not lend money to moneylenders intentionally ; is a joint stock bank, was formerly a private company ; paid-up capital 7½ lakhs, gross assets 90 lakhs, outstanding loans about 57 lakhs ; borrowers mostly substantial landowners (259) 63735-42 ; borrowers usually honest (262) 63786-7 ; land the substantive security ; trouble in investigating title (259-60) 63743-7, (262-3) 63802-4 ; a quarter make default in payment of instalments ;

DAWSON, L—*contd.*FINANCE—*contd.*

bank retains right to demand payment of the whole loan at any time; Burmans being trained to take part in the business (259-60) 63748-56; 9 branches; considerable room for expansion in the delta, an area of 25,000 square miles; branch managers not prohibited from lending on their own account; control exercised over way borrower spends loan; administration expenses heavy; resort to civil court deprecated (260-1) 63761-77; reluctant to advance money in the districts where cannot control the loans (262) 63792; long term loans not exceeding 10 years (262) 63793-7; mainly agricultural business; have combined ordinary operations of joint stock bank with those of a land mortgage bank; free from "encumbrances" of the commercial banking house which has to deal with city business (262) 63798-801; confusion in the mind of the borrower between short and long term loans must be avoided (263) 63805-7.

Insurance increasing (258) 63712-7.

Joint stock banks: can operate in the delta where crops are secure and land easily marketable (254); can give short term credit (255); must specialise in long term deposits (256) 63666, 63677, (259) 63729-30.

Land in the delta easily realisable (255), (257) 63694-5.

Land mortgage banks: can operate where crops less secure and land not easily marketable, because financed not by deposits but by long term debentures (255), (257) 63698-700, (259) 63729-30.

Long term credit: (255); joint stock banks should provide; careful examination of applications necessary (256) 63666-71; not exceeding 10 years (256) 63679, (262) 63793-7; care taken to see that money is appropriated to purpose for which borrowed (257) 63696-7.

Short term credit: can be given by joint stock and co-operative banks, but difficult to finance produce (255); not exceeding 9 months (256) 63679-80, (257-8) 63701-5. Taccavi: should be retained but not extended (255).

Title: investigation takes a great deal of time (258) 63706, (260) 63745-7, (262-3) 63802-4.

WELFARE OF RURAL POPULATION:

Standard of living: high, cause of indebtedness (255); high as compared with Indian Peninsula; probably gone up in recent years (261) 63781-5.

DEBT (*see under* AGRICULTURAL INDEBTEDNESS).

DEMONSTRATION AND PROPAGANDA.

Agricultural education: propaganda necessary to induce lads to study (*Pan, etc.*) (190), (191).

Agricultural improvement committee, none (*Hendry*) (63) 61627.

at Conferences, agricultural and co-operatives (*Hendry*) (56).

Copper sulphate, demand for, as anti-smut treatment of jowar, as the result of free demonstration issue (*Robertson*) (340), (348) 64463-6.

in Cultivators' own fields: near villages and roads (*Hendry*) (56); no specific guarantee (62) 61622; comparative demonstrations of improved and mixed seeds (*Pan, etc.*) (191); of fertilisers (192), (197); and improved implements (192); the best method (*McKerral*) (3), (19) 60962; use of Ammo-phos (7); (*Gyi, etc.*) (395); (*Robertson*) (340).

Demonstrations on Department's land, regardless of expenditure, worse than useless (*Pan, etc.*) (195), (200) 63058-9, (205) 63166; (*Jevons*) (265).

Demonstrators, mostly graduates of Poona Agricultural College and have practical knowledge (*McKerral*) (16) 60910-3.

Direct propaganda by Agricultural Department by posters and leaflets distributed in villages, should precede demonstration (*Jevons*) (265).

Distribution of activities, fair, between demonstration and research (*McKerral*) (16) 60914-5.

Distribution of pure seed: to individual cultivators fails owing to mixing; to societies will be successful (*Pan, etc.*) (191), (195).

EXPERT ADVICE:

Cultivators may be induced to adopt (*Pan, etc.*) (195); by best-holding competitions with prizes (*Robertson*) (340); which has been done in Myingyan Circle (344) 64379-81; cultivator willing (345) 64393-5, (348-9) 64474-8; cultivators do not require advice as to existing crops which they grow better than on Government farms (*Ghosh*) (299).

DEMONSTRATION AND PROPAGANDA—*contd.*

FARMS:

- Experimental farms in each district (*Ghosh*) (299); 25 to 30 acres, for demonstration required in each village tract (*Tun, etc.*) (205-6); should be self-supporting (219-20) 63310-20.
- Government experimental, have little effect (*Robertson*) (340).
- for Instructing agriculturists should be opened by the Agricultural Department (*Gyi, etc.*) (396).
- Special demonstration, subject to criticism (*McKerral*) (3); but necessary in special circumstances (31) 61161.
- Fertilisers, use of: staff insufficient for demonstration (*Hendry*) (58) 61557-60; (*Shwe, etc.*) (382).
- Field demonstrations on paddy land (*Maung, etc.*) (170-1); more necessary (176).
- Foreign markets: varieties of paddy suitable for, should be made known to agriculturists (*Tun, etc.*) (207).
- Gram, substitution of immune variety (*McKerral*) (4).
- Groundnut cultivation increased from nothing to over 400,000 acres in 20 years; cotton ginning factories could deal with groundnut (*McKerral*) (4).
- Gwin-set revolving harrow should be demonstrated (*Shwe, etc.*) (390).
- Hmawbi Farm: excellent for research work but for demonstration serves only 5 miles radius (*Tun, etc.*) (205).
- Higginbottom work at Allahabad (*Jevons*) (267) 63818.
- Improved implements, necessary (*Maung, etc.*) (176-7); (*Dan*) (238).
- Improvements of holdings might be financed by Government (*Robertson*) (340); under existing Acts (344) 64382-5.
- Indirect propaganda: of great importance; Universities and Education Department should create an atmosphere of interest in agriculture; patriotism should be aroused; permanent agricultural exhibition required in Rangoon (*Jevons*) (265), (267) 63816-20; Hmawbi Farm inaccessible (274) 63898.
- Leaflets, lecture, lantern slides, should follow demonstration on cultivators' fields (*Robertson*) (340).
- Lectures should follow demonstration (*Gyi, etc.*) (395); in cultivators' own village (*Hendry*) (56).
- Literature, agricultural, non-official, paucity of (*Jevons*) (265); land-owning class largely literate (270) 63851-2.
- Manures, natural, demonstration of storing and bedding necessary (*Robertson*) (342)
- New crops, demonstration of, necessary (*Shwe, etc.*) (382).
- New varieties introduced by Agricultural Department; cultivators have quickly adopted, e.g., hard sugarcane and Karachi gram (*Ghosh*) (299).
- Paddy seed, distribution of, partly unsuccessful owing to unsuitability (*Maung, etc.*) (170); great benefit resulting from demonstration of pure seed (176).
- Peripatetic lecturing (*McKerral*) (3).
- Pests: posters and pamphlets issued (*Ghosh*) (336) 64316-22.
- Plots in representative soils for experiment (*Ghosh*) (299).
- Potato cultivation increased in Shan States owing to Scotch seed and extension of railway (*McKerral*) (4), (19) 60967-8, (34) 61210.
- Ram, Sir Ganga: farming operations in the Punjab (*Jevons*) (267) 63818.
- Rice, spread of improved varieties (*McKerral*) (4).
- Short courses for cultivators at central farms (*McKerral*) (3).
- Shows, cattle or produce (*McKerral*) (3); held every year (17) 60916-7.
- Shows, exhibitions, etc. (*Hendry*) (62-3) 61622-7.
- STAFF: More junior officers required for village work (*Tun, etc.*) (210-1) 63184-7; trained labourer cultivators should be permanently appointed for demonstration (*Robertson*) (340); in Myingyan Circle (348) 64459-62.
- Successes, due to filling market need and giving immediate profit (*McKerral*) (4); (*Dun*) (373).
- Successful demonstration: harrow called *arlein*, iron harrow with 5 teeth, seed supplied by Agricultural Department, soaking seeds in diluted vitriol to prevent disease (*Gyi, etc.*) (395); Karachi gram and other seed (396).
- Theikpan ploughshares, great demand for, as the result of practical demonstration (*Robertson*) (340).
- Touring of agricultural officers (*Hendry*) (59) 61570-1.

DEVELOPMENT COMMISSIONER: now called Financial Commissioner for Transferred Subjects (*McKerral*) (47) 61413-4; to co-ordinate Agricultural, Veterinary

DEVELOPMENT COMMISSIONER—*contd.*

and Co-operative Departments, an awkward arrangement (6); had no control over Education, Public Health or Irrigation (47) 61413-22. Board should be substituted (47) 61423-6.

DIET (see under WELFARE OF RURAL POPULATION).**DUMONT, J.L., B.Sc. (Edin.) (witness, see under TUN, U. PAW, etc.**

DUN, U AUNG, A.T.M., Rice Miller, Daingtaw, Mandalay: (371-8); mills 1,000 baskets of paddy per day, buys through brokers (377) 64777-81; has been farm superintendent in Agricultural Service (377) 64791-2.

ADMINISTRATION :

Burmans should be employed for expert work (374).
 Department for sale and purchase of paddy should be established under Agricultural Department (374).
 Transport: roads, inadequate (374).

AGRICULTURAL DEPARTMENT :

Agriculturists Loans Act, should administer (374).
 Staff: inadequate (372).

AGRICULTURAL INDEBTEDNESS :

Interest: heavy on subsistence and cultivating loans (373-5).
 Legislation to protect cultivators from usury should be enforced after provision has been made for Government loans (375).

AGRICULTURAL INDUSTRIES :

Leisure period: 100 days in the year (376), (378) 64804.

CROPS AND CROP PROTECTION :

Gram, Karachi: cultivation of, extending (376).
 Profitable crops: sugarcane, cocoonut, plantain, Indian corn, tobacco, onions, groundnut, gram and betel (376).
 Rice: Seed of Agricultural Department gives uniform crop for which mills pay increased prices (376).
 Saccoline millet: has gradually become popular as a fodder crop (376).
 Wild animals, damage by: Township officers should take measures to prevent (376).

DEMONSTRATION AND PROPAGANDA :

Successes obtained (373).

EDUCATION :

Adult: should be encouraged by small experimental farms and exhibitions (372).
 Agricultural: demand for, general (371).
 Burmese, agricultural education should be in (372).
 Careers of students: majority become salary earners (372).
 Cinema films advocated (372).
 Curricula: Modifications necessary (372).
 Nature study (372).
 Night schools for children advocated (372).
 Progress: Gradual (372).
 School farms: need encouragement (372).
 School plots: should be extended (372).
 Stipends should be given to children of cultivators (372).
 Students: from Agricultural classes, not available (372).
 ————Land should be given to students' societies (371-2).
 ————Number insufficient (371).
 Teachers: Agricultural classes, teachers from, not available (371).
 ————sufficient number (371).

FERTILISERS :

Artificial: Good, but do not sufficiently increase yield to cover expenses (376).
 Ashes of paddy husks, good (376).
 Cowdung, shortage of, (376); not used as a fuel except by Indians (376).
 Demonstration, comparative, on cultivators' own land, advocated (376).
 Mixtures of bonemeal and cowdung, advantageous (376).

DUN, U AUNG—contd.**FINANCE :**

- Agriculturists Loans Act : should be administered by Agricultural Department (374).
- Government loans to cultivators at moderate interest advocated (374).
- Land mortgage banks advocated (373).

HOLDINGS :

- Consolidation : difficulty of Government action ; no action should be taken (375).
- Legislation necessary to deal with minors, widows and persons legally incapable, and to keep disputes out of the courts (375).

IRRIGATION :

- Paddy : continuous water supply essential (374-5).

MARKETING :

- Basket for measuring paddy is gradually becoming standardised (377) 64782-7 ; varying size does not lead to cultivator getting less than he ought to (377) 64795.
- Brokers : Receive Ra. 2 on 100 baskets of paddy (377) 64788 ; favour sellers from whom they receive brokerage in preference to buyers (378) 64800-3.
- Middlemen : store paddy from various cultivators and mix it (377) 64796-7.
- Open market : under present circumstances impossible (377-8) 64798-9.
- Premium price for quality rice : importance of cultivator receiving, to encourage him to grow better qualities (377) 64793-4.

DUNN, C. W., C.L.E., I.C.S., Officiating Financial Commissioner (Transferred Subjects), Burma ; (66-104). Co-operative experience (72) 61706-9.

ADMINISTRATION :

- Circle Boards, elect members of district council ; no other function unless delegated by the district council (97) 61911-2.
- Co-ordination of work of departments not completely successful (77-8) 61745-50 ; alternatives of single control or control by a board (95) 61899-901.
- Development Commissioner : succeeded by Financial Commissioner (Transferred Subjects) (70) 61681-2.
- Co-ordination of departments not a complete success (77) 61745-6.
- District councils, areas too large for representation (76) 61742-4.
- Ferry tolls, an oppressive tax (88) 61842.
- Fisheries inland, appointment of special officer (74) 61727-31, (104) 62004.
- Local self-government in rural parts should be developed (70) ; hardly any yet (76) 61742, (87) 61835.
- Lorries, great number in-rural areas (88) 61841.
- Rice control, profits spent on railways and expenditure on road expansion contemplated (99-100) 61954-7.
- Roads : Expenditure on (99) 61943-53.
- Profits of rice control being spent on road expansion (99-100) 61954-7.
- Superior Provincial Agricultural Service : rules being framed (78) 61751-7.
- Veterinary Department should be under Director of Agriculture (67), (70-1) 61695-8.
- Village committee : proportion of literates, powers as assessors in criminal courts (97) 61914-9.

AGRICULTURAL DEPARTMENT :

- Superior Provincial Agricultural Service, rules being framed (78) 61751-7.

AGRICULTURAL INDEBTEDNESS :

- Ancestral indebtedness not serious (81) 61784.
- Bhamado : interest, charged by middlemen (93) 61877.
- Causes of borrowing (67) ; productive and unproductive borrowing, difficulty of defining (70-1) 61685-6.

DUNN, C. W.—contd.**AGRICULTURAL INDEBTEDNESS—contd.**

- Civil Procedure Code, provisions for protection of cultivators from harassment by cultivators, a dead letter (67); ignored by Courts (81) 61785-8.
 Competition among chetties prevents enslavement of borrowers (91) 61864, (93) 61875.
 Greatest in richest parts (90-1) 61863-6.
 Imprisonment for debt should be abolished (87) 61827-31.
 Interest rates of chetties decreasing (73-4) 61726; but middlemen increase the rates of interest (93) 61877.
 Legislation to restrict or control credit of cultivators inadvisable (67).
 Limitation of accumulated interest to an amount equal to principal (93) 61878-80.
 Moneylenders not wicked (93) 61876.
 Repayment prevented by inefficiency of lender and borrower (67); chetties do not want to foreclose (71) 61689-92.
 Sources of credit (67).

AGRICULTURAL INDUSTRIES :

- Buddhist religion, an obstacle (68).
 Carting by agricultural labourers in industrialised areas of agriculture not affected by competition of railways and motor cars (88) 61838-41.
 Cottage industries dependent upon local supply of material (68).
 Cotton ginneries employ rural labour (68).
 Factories, establishment of, in rural areas, promising; Government should encourage (68).
 Fisheries, inland, appointment of special officer (74) 61727-31; clash of interests of fishermen and agriculturists (104) 62004.
 Government can do little (68).
 Health conditions of villages: district health officers under district council, etc. (68).
 Leisure period varies; many fully occupied all the year (68), (79) 61766-9.
 Preparation of agricultural produce for consumption: remarkable progress without Government aid (68).
 Rice mills employ rural labour (68).
 Standard of life apparently not improved by cottage industries (68).

AGRICULTURAL LABOUR :

- Colonisation Department, now Government Estate Department:
 _____, should consider recruiting colonists from congested areas (68).
 _____, Recruitment attempted (68).
 _____, Successful colonies at Minbu and Sittang (93-5) 61883-91.
 Efficiency of Burman labour as compared with Indian and British labour (97-8) 61926-40.
 Labouring population with little land being created while average size of holdings is increasing; legislation to prevent this would be ineffective without co-operative organisation of the smallholder (91-2) 61867-70.
 Migration: seasonal, well developed (68).
 _____ Government and co-operative societies probably cannot control (68).

BURMA VILLAGE ACT :

- Probably desirable to relax Police restrictions compelling people to live in the villages (96) 61908.

CAPITAL, ATTRACTING OF, TO AGRICULTURE :

- Land tenure, restricting alienation, discourages investment of capital (96) 61906.
 Price of rice relatively lower than before the War (69); but absolutely higher (96) 61905.
 Profits of agriculture must be increased (69).

CO-OPERATION :

- Buddhist monks started societies, unregistered, in some cases successful (88) 61836-7, (89) 61853-7.
 Canals and embankments, difficulty of organising to maintain, when unanimous consent necessary (69), (80) 61770-1.

DUNN, C. W.—*contd.*CO-OPERATION—*contd.*

- Cattle insurance, failure of (75-6) 61732-5.
 Continuity of department broken (73) 61719; very bad (73) 61723, (88-9) 61843-52;
 superior officers not regular departmental officers (102) 61981-9.
 Dry zone districts, failure of societies (82) 61791.
 Education in principles of (72) 61712-4.
 Godowns: receipts for produce could be used for credit purposes (70) 61683.
 Government Estate Department's colonies (93-5) 61883-91.
 Government should not provide money (69).
 Guaranteeing unions functioning badly (83) 61793-8.
 Initiative, lack of, in societies (69).
 Interest rates of chetties decreasing (73-4) 61726.
 Liquidation: 500 societies (73) 61717-8; policy as to winding up (89-90) 61858-60.
 Minority should be compelled to come into schemes for joint improvement; restrictions in Burma Rural Self-Government Act, 1921, should be removed (69).
 Non-official agencies, failure of (69), (82) 61791, (95) 61896-8.
 Political agitation against Government societies (89) 61853-7.
 Primary societies have not been neglected in favour of central societies (82-3) 61792.
 Progress, none (69); owing to excessive dependence on Provincial Banks (69); promising in the earlier stages (72) 61709-11, (73) 61715-6; very bad state of things (73) 61723.
 Provincial Co-operative Council, in a faint condition (95) 61897-8.
 Registrars, frequent change (73) 61719-22, (82) 61790, (95) 61892.
 Selling societies should be developed (73) 61724-5.
 Statistics as to progress of societies (81) 61777-83.
 Training and recruitment of subordinate staff (95) 61893-5.
 in Upper Burma, should not be abandoned (82) 61789.
 Women, partly control spending of family income, are not excluded from co-operative societies (86-7) 61821-6.

EDUCATION:

- Buildings and equipment should be improved (69).
 Pay of teachers should be improved (69).
 Specialist agricultural instruction inadvisable (69).

FERTILISERS:

- Compensation should be given to evicted tenants for unexhausted improvements (87) 61832-4.

FINANCE:

- Account keeping, knowledge of, required (66).
 Agriculturists Loans Act: loans for the year 1925-6, 12 lakhs; has a moderating influence on interest rates of private moneylenders (103) 62000-3.
 Banking knowledge necessary (66), (70) 61683, (71) 61687-8.
 Burma Central Bank (93) 61881.
 Co-operative godowns, receipts for produce being used for credit (70) 61683.
 Egyptian experience of confusion of short and long term loans (76) 61737-9.
 General improvement required (66).
 Government cannot do much (66).
 Land Mortgage Bank: draft Bill (76) 61736; elaborate, cultivator might not understand extent of his liability (85-6) 61804-12; independence of management (86) 61813-20; co-operative element should be introduced, with a nominated board (100-1) 61958-71; a demand for (102) 61990-2.
 Long term, danger of confusion with short term (76) 61737-41.
 Machinery for issuing loans required (102) 61990-2.
 Registration of title of immoveable property (66).
 Short term credit: use of agricultural produce as security for, needs improvement (66), (70) 61683-4.
 Period of crop, 8 months, or for cattle 3 years (80) 61772-6.
 Taccavi loans in colonies of Government Estates Department (94) 61883.
 Torrens system, doubtful (66); suitable to Australian conditions which are different from Indian (96) 61909-10.

DUNN, C. W.—concl'd.**HOLDINGS :**

- “Agriculturists”, definition of (95-6) 61902-4.
- Economic holding: 9 acres in North Prome, 22 acres in South Tharrawaddy (78-9) 61758-9.
- Fragmentation not excessive (67), (78-9) 61758-65.
- Price of land follows price of paddy (96) 61905.
- Size of holding varies; average figure over a wide area useless (84) 61802-3.
- Transfer by sale, 497,000 acres in 1925-6 in Lower Burma (96) 61905.

IRRIGATION :

- Canals and embankments, construction and maintenance of by district councils under Burma Self-Government Act, 1921, requires unanimous consent (69), (80) 61770-1.

LAND REVENUE :

- Pitch of assessment (101) 61971-80.

LAND TENURE :

- Government Estates Department, a model landlord, land leased to tenants (94) 61883-8.
- Yearly tenancy system, discourages use of manure (87) 61332-4, (96) 61906-7, (103) 61997-9.

STATISTICS :

- Progress of co-operative societies (81) 61777-83.

TARIFFS AND SEA FREIGHTS :

- Export duties on rice and hides injurious to cultivators (69).
- Hides, export has decreased owing to export tax (69), (72) 61701-5.
- Import duties injurious to cultivators (69), (72) 61699-700.

VETERINARY :

- Department: should be under Director of Agriculture (67), (70-1) 61695-8.
- Very strong in numbers (103) 61996.
- Dispensaries: no demand for increased number (67).
- Only four; district councils contribute to but do not control (67).
- Prome district council has objected to paying for (67).
- Provincial authority, control should not be transferred to (67).
- no Popular demand for expansion of service (103) 61993-5.
- Superior Veterinary Officer with the Government of India, appointment of, not recommended (67).

WELFARE OF RURAL POPULATION :

- Crime, great increase (97) 61924-5.
- Diet, rise in standard of (99) 61941-2.
- Economic surveys in typical villages generally not advisable (70), (83) 61799-801.
- Efficiency of Burman labour compared with that of Indian and British (97) 61926-33.
- Government Estates Department colonies (94) 61883-91.
- Housing: vast increase in masonry buildings; use of corrugated iron (97) 61922.
- Malaria and other diseases handicapping Burman cultivator (98) 61934-40.
- Self-government, rural local, should be developed (70).
- Standard of living has risen (97) 61920-3.

EDUCATION.

- Administration: should rest with school committees and teachers under control of Government which should give grants-in-aid (*Shwe, etc.*) (390).

EDUCATION—*contd.*

ADULT, IN RURAL TRACTS :

- Christian Missions Village Education Committee, 1920, work on similar lines advocated (*Bulkeley*) (134).
 Cost (*McKerral*) (31) 61157-60, (33) 61203-7.
 Cultivators at Agricultural Department central farms (*McKerral*) (2), (18) 60946-53, (19) 60959-61.
 Demand for, has not expressed itself (*Bulkeley*) (136) 62504.
 ——— should be encouraged by Government giving preference to educated persons (*Shwe, etc.*) (379), (390); by small experimental farms and exhibitions (*Dun*) (372).
 Establishment of national form of Government, must probably wait for, or until district councils have sufficient enlightenment and funds (*Bulkeley*) (135), (142) 62575; comparison with England and Punjab (143) 62580-3.
 Farm schools and continuation schools: teaching 9 months, touring and demonstrating 3 months, suggestion (*McKerral*) (3), (12).
 Libraries necessary (*Maung, etc.*) (170); co-operative societies should help (181) 62869-70.
 Magic lantern lectures, cinema (*Bulkeley*) (134).
 Night classes necessary (*Ghosh*), (299), (332) 64235-40.
 should be Popularised by demonstration that profits are increased by improved methods (*Pan, etc.*) (191).
 Stipends of Rs. 20 per month (*McKerral*) (36) 61238-40.
 Students: go back to the land; some the scum of the village (*McKerral*) (40) 61308-12.
 Voluntary agencies, lack of (*Bulkeley*) (134); political feeling an obstacle compared with Madras (142-3) 62576-9.

AGRICULTURAL :

- Agricultural classes, teachers should be drawn from (*Shwe, etc.*) (378), (390).
 in Burma generally considered to be a subject of secondary importance (*Charlton*) (297) 64169-70.
 should be a Compulsory subject in schools (*Shwe, etc.*) (386-7).
 Demand for, general (*Dun*) (371).
 Economica, agricultural, taught at Mandalay College as part of the agricultural course (*Charlton*) (296) 64167.
 small scope for Employment of educated persons (*Tun, etc.*) (217) 63288-91.
 Extension, urgent need for (*Shwe, etc.*) (378), (390).
 High School Final examination: increasing number of students offering agriculture (*Charlton*) (279), (289) 64046-50.
 Importance of (*McKerral*) (29) 61131-2.
 Incentive to study agriculture: Government service (*Charlton*) (280).
 Institutions: supply insufficient (*Dun*) (237); (*Pan, etc.*) (190).
 Local control necessary (*Tun, etc.*) (214-6) 63248-70.
 Primary, a crying need (*Tun, etc.*) (214) 63248-54.
 Scientific, should be a subject in village lay schools (*Sein*) (353); should be taught in all educational institutions (*Maung, etc.*) (170); schools should be established in every important agricultural district (175).
 Students, not drawn mainly from agricultural classes (*Dun*) (237); taking up cultivation after education (239) 63561-3; are mainly drawn from agricultural classes (*Shwe, etc.*) (379).
 Teachers, supply insufficient; if possible should be drawn from agricultural classes (*Dun*) (237); (*Shwe, etc.*) (378), (390).
 Teaching should be in Burmese (*Dun*) (372).
 Text books, elementary, cause laughter (*Ghosh*) (298); agriculture should not be taught in elementary schools (331) 64215-23.
 Value educational rather than vocational (*McKerral*) (54) 61516-8.
 No institutions for, in the districts (*Pan, etc.*) (190); boys of agricultural classes only have time to learn to read and write (191); should form part of rural education (191); should be left to Agricultural Department and financed by Government (191); schools, urgent need for (195); boys should attend at about 15 years of age (200) 63052-7; existing system bad (199), (201) 63068-70.

AGRICULTURAL BIAS :

- Agricultural bias: in rural areas, advocated (*Pan, etc.*) (194).
 ——— will not lead to much improvement (*Bulkeley*) (135); but more might be done in this direction; better trained teachers required (*Bulkeley*) (139) 62538-40.

EDUCATION—*contd.*AGRICULTURAL BIAS—*contd.*

Agricultural Department's short courses for adolescent (*Bulkeley*) (144) 62594-5. Agricultural research and demonstration station required in immediate vicinity of Rangoon (*Jevons*) (265); Hmawbi Farm inaccessible (274) 63898. Arithmetic, Burmese have average ability for (*Bulkeley*) (138) 62523-4.

ATTENDANCE AT SCHOOLS :

Money wasted owing to children leaving school prematurely (*Bulkeley*) (135); this the chief reason of failure (139) 62536-7; compulsion necessary to stop this waste (146) 62615-6; suffers from lack of employment for educated persons (*Maung, etc.*) (170); in 4th class poor owing to parents employing their children in the house and fields (*Dan*) (238); (*Sein*) (353); adversely affected by lack of practical agricultural value of teaching (*Pan, etc.*) (194); due to parents' lack of desire for education and requiring their children to work (*Shwe, etc.*) (387), (393).
Books, in the vernacular, not ideal, but quite useful (*Bulkeley*) (139) 62536-7; Text Book committee (141) 62563.
Buddhist monastery schools, teaching meagre (*McKerral*) (3).
Buildings and equipment should be improved (*Dunn*) (69).
Careers of agricultural students: majority become paid servants (*Shwe, etc.*) (379); (*Dun*) (372); students, higher or collegiate, should be compelled to serve in Agricultural Department and be trained in Agriculture before going to other departments (*Shwe, etc.*) (386).
Cinema films advocated (*Dun*) (372).

COMPULSORY EDUCATION :

The only cure, but can only be gradual and should be accompanied by levy of an education rate (*Bulkeley*) (135); compulsion Act contemplated (137) 62513; Education cess (142) 62570-3; difficulty with regard to monastery schools (143-4) 62584-8, (146) 62615-6; advocated (*Dan*) (238); primary vernacular (239-40) 63566-7; advocated in suitable places (*Shwe, etc.*) (393); advocated, conditionally (*Pan, etc.*) (203) 63121-5; preferred in rural areas (*Sein*) (353); would not involve extra expenditure (*Sein*) (362) 64637-8, (364) 64670-6.

CO-OPERATION :

Training schools should be opened at the expense of Government (*Maung, etc.*) (177); should be a subject in village lay schools (*Sein*) (353).
Crime, partly due to lack of education (*Dan*) (240) 63567.
Curricula: Modifications necessary (*Dun*) (372).
Demand for agricultural education should be stimulated by use of Burmese language and proving economic advantage (*Pan, etc.*) (195).
District councils, transfer of control to, has been successful in every way except financially (*Bulkeley*) (142) 62574.
Economics: Professors should lay stress on importance of agriculture (*Jevons*) (265); agricultural economics a compulsory subject in Rangoon University (273-4) 63887-95.
Elementary: standard too low to benefit cultivators appreciably (*Pan, etc.*) (194).
Elementary school: Parents unable to keep children at school continuously owing to needing their labour (*Gyi, etc.*) (399).

ENGLISH :

Great demand to learn (*Bulkeley*) (136-7) 62504-8; knowledge of, leads to dislike of manual labour (147) 62621-4; education in, wanted if not expensive (*Pan, etc.*) (203) 63125-30.
Estate managers, no demand for (*McKerral*) (23) 61015-6.
Expenditure in 5 years, 1922-7, increased from 116 to 193 lakhs, figures (*Bulkeley*) (139-140) 62541-4.
Facilities, insufficient (*Shwe, etc.*) (393).
Fees, none should be charged for children at school (*Maung, etc.*) (170).
Garden cultivation should be taught in schools (*Shwe, etc.*) (379).
Government action suspect for political reasons (*Bulkeley*) (142) 62575; comparison with England and the Punjab (143) 62580-3.
Handicrafts: should be taught in schools (*Shwe, etc.*) (379); schools should be opened (*Gyi, etc.*) (399).

EDUCATION—contd.

- Higher : not needed by agriculturists (*Pan, etc.*) (194).
 Hygiene, importance of (*Jolly*) (165-6) 62787-94.
 Incentive, Government service (*Bulkeley*) (134-5); (*McKerral*) (3), (19) 60954-5.
 Government to some extent responsible for this materialist view (*Bulkeley*) (141) 62564-6, (145-6) 62606-8.
 Insein Veterinary College : (*see under VETERINARY*).
 Inspection of schools, insufficient staff ; standard has been lowered while awaiting Superior Provincial Service (*Bulkeley*) (141) 62555-63.
 Institutions, insufficient (*Maung, etc.*) (169).
 Libraries, need of (*Bulkeley*) (134) ; Government should start (142) 62575, (145) 62601-5.
 Literacy : desirable that it should accompany but need not necessarily precede improvement in standard of life (*Jevons*) (268) 63829 ; considerable among land-owning class (270) 63851-2.
 Literature, agricultural, non-official ; paucity of (*Jevons*) (265), (270) 63851-2.

MANDALAY AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE :

- Sufficient for Agricultural education (*Pan, etc.*) (190) ; insufficient, a white elephant (195) ; schools more necessary (200) 63048-54.
 College Council : deals with questions as to teaching and programme of studies (*Charlton*) (290) ; consists of Principal and heads of all teaching sections ; meets when necessary ; relation to research, etc. (*McKerral*) (43) 61349-53 ; (*Charlton*) (292) 64084-8 ; Director of Agriculture is the immediate superior of the Principal (290) 64067.
 Cost of teaching (*Charlton*) (282-3) ; 41 students costing Rs. 80,000 per annum (293) 64110-2.
 Diploma might be held equivalent to B. A. and B. Sc. of Rangoon University as qualification for teaching in Government high schools (*Charlton*) (279).
 Economics, agricultural, taught (*McKerral*) (44) 61361.
 Personnel (*McKerral*) (16) 60905, (17) 60918-9.
 Research : Danger of College becoming partly an arts college ; research work should be concentrated as far as possible in the College (*Charlton*) (290-1) 64068-74.

STUDENTS : (*see under CHARLTON, J., M.Sc., F.L.C., I.A.S.*)

- Mainly training for Agricultural Department (*McKerral*) (2).
 No Post-graduate training (*McKerral*) (23) 61019-21, (44) 61371.
 Very few sons of cultivators (*Gyi, etc.*) (400) 64840-1.
 University affiliation difficulties (*McKerral*) (53) 61511-4 ; (*Charlton*) (281-2), (285-6) 63981-4, (291) 64075-81, (292) 64089-94 ; Principal not a Member of Senate of Rangoon University (293-4) 64118-32, (295) 64141-3.
 Manual labour, education may cause a dislike for (*Bulkeley*) (147) 62621-4.
 Marketing : education the method of improving conditions (*Hendry*) (58) 61555 ; (*McKerral*) (28) 61119-20.
 Mechanics, no demand for tuition (*McKerral*) (19) 60963.

MIDDLE CLASS YOUTHS :

- Demonstrations in the field necessary to show advantages of studying agriculture (*Pan, etc.*) (191) ; should be enabled to develop waste land, with financial aid if necessary (195) ; should be attracted to agriculture by education (*Shwe, etc.*) (379) ; by lease of waste jungle land free of revenue (390) ; training and then practical work ; education of, will not solve problem of mass of cultivators (*Ghosh*) (298-9), (337) 64336-42, (338) 64363-4.
 Moga system (*Bulkeley*) (141-2) 62567-9.
 Monastery schools : majority of population attain literacy in unrecognised schools ; do not accept girls (*Bulkeley*) (136) 62500-1 ; possibilities of improvement doubtful (137) 62509-12 ; difficulty in connection with compulsory education ; a considerable number receive aid from Government ; numbers of students ; discipline spasmodic (143-4) 62584-92.

NATURE STUDY :

- Useful in developing intelligence, but not of direct vocational value (*McKerral*) (3) ; work not well done (19) 60956-8 ; urgent necessity, especially of insect life ; training teachers the first necessity (*Ghosh*) (298), (332) 64227-34 ; should be practical (*Pan, etc.*) (191) ; advocated in all schools (195) ; advocated (*Shwe, etc.*) (379) ; (*Dan*) (237) ; (*Dun*) (372) ; not agricultural education but general

EDUCATION—*contd.*NATURE STUDY—*contd.*

- education; unpopular as not assisting students to pass examinations; propaganda; etc.; necessary (*Bulkeley*) (134); Punjab system not suitable for Burma; definite vocational training should not be introduced in normal schools; Government has refused financial aid (137-8) 62514-20; boys and girls equally interested in (138) 62525-6.
- Newspapers: recent considerable increase in circulation of vernacular (*Bulkeley*) (136) 62502.
- Night schools: necessary for adults and boys (*Ghosh*) (299); Maymyo adult school (332) 64235-40; advocated for children (*Dun*) (372).
- Pay of teachers should be improved (*Dunn*) (69).
- Physical exercises should be taught (*Shwe, etc.*) (384).
- Poor children should be educated as boarders at school, their expenses being paid (*Shwe, etc.*) (379).
- Practical work, as much as possible should be introduced in connection with nature study, school plots and farms (*Pan, etc.*) (191); (*Shwe, etc.*) (390).
- Primary: general desire for (*Bulkeley*) (135) 62497-8; suggestions welcomed; majority of schools have more than one teacher; average number of students (140) 62550-3; difficulty with regard to monastery schools (143) 62584-8.
- Progress: gradual (*Dun*) (372).
- "Project" methods will help (*Bulkeley*) (135); Moga (141-2) 62567-9.
- Propaganda necessary to induce youths to study agriculture (*Pan, etc.*) (190).
- Punjab system of agricultural training schools not suitable to Burma (*Bulkeley*) (137) 62514-6; because so few middle schools large enough to have farms attached to them (144) 62593, (146) 62609-14.
- Pupils: drawn mainly from agricultural classes those who have studied agriculture are employed in the Agricultural Department; none carry on agriculture on their own account (*Maug, etc.*) (170).
- Pusa Research Institute should give post-graduate training (*McKerral*) (44) 61371-3.

PYNMANA MIDDLE SCHOOL :

- of American Baptist Mission, subsidised by Government: at present an experiment (*McKerral*) (2), (51) 61480-4; no other agricultural school (54) 61515; still in an experimental stage (*Charlton*) (284) 63956-7; well attended by sons of cultivators, between 50 and 60 students, an expensive School (294-5) 64133-40; at least one school similar to, required (*Dan*) (237).

RANGOON UNIVERSITY :

- no Co-ordination with Mandalay Agricultural College, which is not affiliated (*Charlton*) (281-2); of which Principal not a Member of Senate (293) 64118-20, (284) 63948-51, (289) 64032-7; teaching of sciences relating to agriculture (290) 64068-9; consists of three Colleges: University College and Judson College in Rangoon and Intermediate College, Mandalay (294) 64123-4; teaches rural and agricultural economics (*Jevons*) (265), (273-4) 63887-95; willing to co-operate with proposed Board of Economic Enquiry (274) 63896-7.
- Recreations for lads should be arranged (*Shwe, etc.*) (390).
- Research, not assisted by association with elementary teaching (*Charlton*) (285) 63964-5.
- Rural, should consist mainly of the three R's (*Pan, etc.*) (199).
- Secondary: facilities for, should exist in rural areas (*Pan, etc.*) (194).
- Schools: bad; curriculum not much to blame (*Bulkeley*) (135). (See CHILDREN under WELFARE OF RURAL POPULATION).

SCHOOL FARMS :

- Advocated (*Shwe, etc.*) (379); (*Dan*) (237); need encouragement (*Dun*) (372); should be practical (*Pan, etc.*) (191); advocated in all schools (195); combine general and vocational education which is seldom successful; would be costly and unpopular (*Bulkeley*) (134), (145) 62596-600; expensive and useless (*McKerral*) (3).

SCHOOL PLOTS :

- Advocated (*Dan*) (237); (*Shwe, etc.*) (379); useful in developing intelligence but not of direct vocational value (*McKerral*) (3); should be practical (*Pan, etc.*)

EDUCATION—*contd.*SCHOOL PLOTS—*contd.*

(191); advocated in all schools (195); should be extended (*Dun*) (372); (*Maung, etc.*) (170); not necessary in rural areas (*Ghosh*) (298), (331) 64224-6. Specialist agricultural instruction inadvisable (*Dunn*) (69). Stipends should be given to children of cultivators (*Dun*) (372).

STUDENTS:

Comparatively few sons of cultivators (*Charlton*) (280). Land should be given to students' societies (*Dun*) (371-2). Majority who have studied agriculture are serving in Agricultural Department (*Pan, etc.*) (191). Not critical of teaching (*Jevons*) (271) 63860-2; do not desire to study agriculture (274) 63902. Number insufficient (*Dun*) (371). Subsidy of schools by Government (*McKerral*) (51) 61480-4. Tax, educational, should be levied locally and paid to teacher, not as regular salary but by way of rewards (*Maung, etc.*) (170). Technical: scholarships abroad, with the object of furthering industrial development (*Jevons*) (275-6) 63912-6.

TEACHERS:

of Agriculture, should preferably be drawn from agricultural class (*Charlton*) (297) 64172-5. Agricultural classes, need of (*Ghosh*) (298); for teaching nature study (332) 64227-34; teachers from, not available (*Dun*) (371). Pay has been recently greatly improved (135); figures (*Bulkeley*) (140) 62544-7. Training doubtful (135). Large number of qualified women teachers (138) 62528. Better trained teachers required (139) 62538-40; Standard of training has not been raised with increased pay (140) 62554; Women paid the same as men (146-7) 62617-20. in Rural areas, should be drawn from agricultural classes (*Pan, etc.*) (190). Sufficient number (*Dun*) (371). Supply, insufficient; should have knowledge of co-operative account-keeping and science of agriculture (*Maung, etc.*) (169); should not receive a regular salary but should receive rewards (170). Teaching facilities, agricultural, urgent need for extension (*Charlton*) (279); (*Pan, etc.*) (190); difficulty of getting competent teachers (*Charlton*) (295) 64138-40. University: questionable whether it should confine itself to purely theoretical work or should interfere in applied work (*Charlton*) (284) 63955; specialisation should be preceded by a good basis in pure science (286) 63987-96. Vocational training, definite, should not be introduced in ordinary schools (*Bulkeley*) (137) 62514-6. Objection not so strong against agricultural as against industrial vocational training (145) 62596-600, (146) 62609-14.

WOMEN:

Not so well educated as men but more advanced than in India (*Bulkeley*) (136) 62499. Monastery schools will not accept girls. Illiteracy of mothers encourages relapse into illiteracy of children (136) 62500-3. Boys and girls equally interested in gardening. Provision of separate schools for girls after a certain age would keep them longer at school. Large number of qualified women teachers. Financial difficulties. Classification as between boys and girls schools misleading (138-9) 62525-35. Difficulty of sending women teachers to lonely villages; should be recruited locally (140) 62548-9. Women teachers paid the same as men (146-7) 62617-20.

EDWARDS, E. L. and NELSON, J. J., of Messrs. Steel Brothers & Co., Ltd., Rangoon (224-37).

AGRICULTURAL INDEBTEDNESS:

Cotton: loans on growing crops (225-6).

CO-OPERATION:

Societies for storage and sale of rice (236) 63518-22.

EDWARDS, E. L. and NELSON, J. J.—*contd.***CROPS AND CROP PROTECTION :**

- Cotton : not much scope for improvement ; conditions in Upper Burma very poor (229) 63417-20 ; picked October and November (232) 63452-3.
- Groundnuts : improvement of variety, scope for (230) 63429 ; Agricultural Department working on right lines but staff inadequate (231) 63437-9.
- Rice : Considerable scope for improvement (225) ; breeding farm, work satisfactory ; importation of seed from Bangkok successful (228) 63398-401 ; demand for better quality (229) 63407-8 ; importance of uniformity ; quality is improving ; reputation has not risen in the world market ; the cheapest rice (229) 63409-16 ; importance of weight per basket, yield and appearance ; not sold for cooking qualities (231-2) 63436-49, (232-3) 63462-5, (234) 63481-4 ; compulsory use of tested seed (235) 63503-12.
- Seed, pure, distribution : Commercial assistance desirable (232-3) 63462-5.
- Cotton, great importance of ; at present no system ; cultivators buy from ginning factories (226) ; control by gineries (233) 63466-70.
- Groundnut : cultivator keeps his own seed (226).
- Rice : Steel Brothers, distribution by (228) 63398, (232-3) 63462-5.

IRRIGATION :

- Cotton : scope for doubtful (230) 63421-2.

MARKETING :

- Cotton : Adulteration : leaf, particularly if showers during harvest ; not much dust (232) 63454-5.
- Credit given on growing crop (225).
- Export : mainly to Japan, but some to Liverpool and Calcutta (232) 63450.
- Improvement of variety : not much scope for (229) 63417-20 ; quality between Bengals and Oomras (232) 63451, (233) 63474-6.
- Ginning factories buy through brokers from jungle traders (225).
- Jungle traders usually agents for ginning factories ; if independent, often resort to malpractices (225-6).
- Mixing (233) 63471-3.
- Open markets, unsuccessful attempt to establish in Upper Burma (230) 63423-5.
- Season : October-November picking (232) 63452-3.
- Seed, pure, distribution : no organised system ; cultivators buy from ginning factories : unsatisfactory (226) ; commercial assistance should be given to Government department (232-3) 63462-4 ; control by gineries (233) 63466-70.
- Weights and Measures : in villages stone weights which vary slightly (226).
- Groundnut : Basket : standard of measure (230) 63430.
- Central marketing more than with kapas ; very small portion purchased in the jungle by brokers (226).
- Committee should be set up representing dealers and millers, Agricultural Department, distributors, to teach cultivators need of market and regulate practice (228) 63395-7, (231) 63436.
- Crop reports, inaccuracy of (227), (228-9) 63402-4, (236-7) 63531-41.
- Growing crop sold at low price (226).
- Improvement of variety ; scope for (230) 63429.
- Magwe market, description by Government officials of unfair treatment of cultivators, inaccurate (230-1) 63430.
- Oil used for ghi (230) 63428.
- Open markets advocated (231) 63431.
- Seed : cultivator keeps his own (226).
- Supply and demand : competition among buyers for local consumption very keen ; demand greater than supply (226), (230) 63426-7.
- Unhusked when marketed (226) ; recent development, small crop not exported (230) 63426-7.
- Weights and Measures : sale should be by weight (231) 63430-2 ; weightment by neutral tallymen not practical (231) 63433.
- Rice : Adulteration, common (225).
- Basket : in the jungle much larger than at the mills (224-5), (227) 63378, (228) 63387-94.
- Bran : exported to England and Germany (235) 63500-1 ; export cess would not affect price in Burma (235) 63502.
- Brokers at Rangoon are also traders (224).

EDWARDS, E. L. and NELSON, J. J.—*concl'd.*

MARKETING—*cont'd.*

RISE—*cont'd.*

- Cess, export, not adversely affecting competition with other producing countries (235) 63498-9.
- Committee should be set up representing dealers and millers, Agricultural Department, distributors and cultivators, to teach cultivator needs of the market and regulate practice (228) 63395-7.
- Direct sale by cultivators to mills encouraged (236) 63518-9.
- Elevators: cannot be used for rice but can for paddy (229) 63405-6.
- Export: principally to Germany and Holland (234) 63492-3; for starch for industrial purposes (236) 63523-8.
- Facilities satisfactory (224).
- Improvement of strain (*see under CROPS AND CROP PROTECTION*).
- Jungle brokers paid a commission of Re. 1 to Rs. 2 per hundred baskets of paddy (224).
- Mixing of different grades (227-8) 63386; importance of uniformity (229) 63409, (231) 63440-1; gets mixed on the way from field to mill (235) 63513-7.
- Over-production, possibility of (234) 63492-7.
- Premium paid for selected white grain, especially from seed supplied by Agricultural Department (225); do not always reach cultivators (227) 63379-86; Rs. 20 the highest premium (234) 63486-91.
- Storage for higher price (236) 63520-2.
- Transport: by cart in bulk, by rail in gunnies, by boat in bulk (225); higher rates for rice than for paddy (236) 63529-30.
- Waive system: cultivator takes seed on credit and repays with share of crop at a very low price (234) 63479-80.

RESEARCH:

- Commercial representation advocated (232) 63457-61; financial contribution from merchants (234) 63485-91.

STATISTICS:

- Experiments as to yields advocated (229) 63404.
- Groundnut: all channels of consumption should be traced (227), (231) 63434-5.
- Land Records Department: crop reports of very little commercial importance as to cotton and groundnut (227); on an acreage basis; accurate as to rice (228-9) 63402-4; earlier information required; inaccuracy as to groundnut (236-7) 63531-41.

TARIFFS AND SEA FREIGHTS:

- Cotton and groundnut products: customs duty and sea freight do not adversely affect prosperity of cultivator (226), (233) 63477-8.
- Export cess on rice of Rs. 5-4-0 does not affect competition with other producing countries (235) 63498-9; on bran, would not affect price in Burma (235) 63502.

EXPORT DUTIES (*see under TARIFFS and SEA FREIGHTS*).

FERTILISERS.

ADULTERATION:

- Legislation to prevent (*Hendry*) (56); not the cause of cultivators not using fertilisers (58) 61556; difficult to prevent (*Pan, etc.*) (196); analysis should be made by experts (*Shwe, etc.*) (382); is unknown (391).
- Agricultural Department should stock and supply (*Hendry*) (56).
- Ammonium sulphate: good effect on paddy nurseries demonstrated by Agricultural Department (*Pan, etc.*) (192); and superphosphate, only useful sources of nitrogen and phosphate for paddy (*Charlton*) (280).

AMMO-PHOS:

- Analysis and price (*Hendry*) (56); controlled demonstrations carried out on cultivators' own fields (*McKerral*) (7); profitable (8); imported from America, for paddy, cultivators not using it (39) 61293-5; experiments show profitable return with paddy (*Hendry*) (56); has proved to be profitable (*Charlton*) (280); no commercial firm advertising and pushing sale of (284) 63960-2.

FERTILISERS—*contd.*

ARTIFICIAL MANURE:

- Cheaper and will be profitable (*Hendry*) (56); a question of cost (58) 61550, (63) 61634-9; profit not sufficient hitherto (56); prices too high (*Charlton*) (280); not suitable for paddy cultivation, washed away by heavy rains (*Tun, etc.*) (207); not so profitable as natural manures (*Pan, etc.*) (196); and expensive (203) 63117-20; good, but not sufficiently increasing yield to cover expenses (*Dun*) (376); not used (*Shwe, etc.*) (391).
- Artificial farmyard manure made at Hmawbi, but not profitable (*McKerral*) (7), (33) 61187-8.
- Ashes of paddy husks, good (*Dun*) (376).
- Basic slag: tests insufficient (*Charlton*) (280).
- Bats' guano (*see* GUANO below).
- Bone flour, ground, possibly of some use in sour paddy soil of Lower Burma (*Charlton*) (280), (288) 64018-26.
- Calcium cyanamide, on swamp rice, inferior to sulphate of ammonia (*McKerral*) (7).

CATTLE MANURE:

- Fuel, use of as, not practised (*McKerral*) (7); except by Indians (*Dun*) (376); (*Pan, etc.*) (192), (197); should be prohibited by law (*Gyi, etc.*) (398).
- Inexpensive (*Maung, etc.*) (176).
- Lost on waste grazing land (*McKerral*) (7), (40) 61297-9.
- Nurseries, only enough for (*McKerral*) (7), (39) 61296-7.
- Pit storage to increase quality and value (*Hendry*) (56).
- Shortage of (*Dun*) (376).
- Tenancy-at-will system discourages use of (*McKerral*) (7), (34) 61213-5.
- Compensation should be given to evicted tenants for unexhausted improvements (*Dunn*) (87) 61832-4; no compensation to evicted tenants for unexhausted manure (*Hendry*) (57), (64) 61645-6.
- Cost, a deterring factor (*Maung, etc.*) (176).
- Cyanamide: tests insufficient (*Charlton*) (280).
- Dhaincha plant as a green manure for paddy (*Charlton*) (290) 64053-7.
- Demonstration necessary (*Shwe, etc.*) (382); (*Maung, etc.*) (172), (176); on cultivators' own plots (*Pan, etc.*) (192), (197); comparative (*Dun*) (376); (*Hendry*) (56); staff insufficient (58) 61557-60.
- Farmyard manure, the only inexpensive fertiliser (*Maung, etc.*) (176).
- Firewood: not of great importance except in dry zone and mainly a question of transport (*Hopwood*) (115).
- Fish manure, used for garden cultivation but too expensive for paddy (*Hendry*) (56); not used (*McKerral*) (29) 61138-9.
- Floods will not wash away manures once incorporated (*Hendry*) (64-5) 61640.
- Green manuring: profitable with mechanical power (*Pan, etc.*) (196); not practised (*Charlton*) (290) 64051-2.
- GUANO, BAT'S: Along Shan Hills; small quantities available (*McKerral*) (7); in forests of Tenasserim, right to collect sold by auction on 3 years lease (*Hopwood*) (120) 62273-5; used for garden cultivation, but too expensive for paddy (*Hendry*) (56).
- Increased use of manures on high paddy land (*Maung, etc.*) (172).
- Legislation to deal with fraudulent adulteration (*McKerral*) (7).
- Lime: of good quality found in abundance (7); deficiency in nearly all paddy growing districts of Lower Burma (*Charlton*) (280), (288) 64018-26.
- Mixtures of bonemeal and cowdung, advantageous (*Dun*) (375).
- Natural manures, greater use of, the only thing that can be done at present (*Robertson*) (341); demonstration of storing, necessary (342).
- Night soil, not used (*McKerral*) (30) 61140-2.
- Nitrates: poisonous to swamp rice (*McKerral*) (7); useless on wet lands (*Charlton*) (280); injurious on paddy land in Lower Burma (*Hendry*) (57), (64) 61647-8.
- Nitrogen, general shortage of (*Charlton*) (280).
- Nitrogen and phosphate: considerably increase yield in paddy land of Lower Burma, but not sufficiently profitable hitherto (*Hendry*) (57); the limiting factors in Lower Burma rice soils (*McKerral*) (25) 61057-9.
- Peun, a leguminous plant, used as a green manure (*Charlton*) (290) 64053-7.
- Phosphate, shortage of, in many districts (280).

FERTILISERS—concl'd.

- Potash : rarely necessary for paddy (280) ; has no appreciable effect on swamp rice (*McKerral*) (7) ; beneficial but need for not so great as for phosphate and nitrogen (*Hendry*) (57).
- Prawn dust, small quantities exported from Lower Burma to the Straits (*McKerral*) (7).
- Prices of artificial fertilisers coming down and of rice going up (*McKerral*) (8) ; finance required (24) 61035.
- Reclamation of land by use of fertilisers (*Pan, etc.*) (192).
- Research : Crops other than rice in Lower Burma, not yet undertaken (*Hendry*) (57).
- Experiments carried out fairly thoroughly (*Hendry*) (58) 61549-50, (62) 61616.
- Insufficient ; knowledge of secondary changes exceedingly important (*Charlton*) (280), (284) 63963, (288) 64016-7.
- Rice (*Hendry*) 56-7.
- Silting : profitable with mechanical power (196) ; in delta lands by sluices (*Pan, etc.*) (200-1) 63062-6 (see under IRRIGATION).
- Sulphate of ammonia combined with phosphates increased rice yield up to 40 per cent but not profitable (*McKerral*) (7), (26) 61070-2.
- Superphosphate : analysis and price (*Hendry*) (56).
- Urea being investigated, but not hopeful (*Charlton*) (280), (284) 63963.
- Value of fertilisers not appreciated by cultivators (*Hendry*) (58) 61556-60.

FINANCE.

- Account keeping, knowledge of, required (*Dunn*) (66).
- Agriculturists Loans Act : loans for the year 1925-26, 12 lakhs ; has a moderating influence on interest rates of private moneylenders (*Dunn*) (103) 62000-3 ; should be administered by Agricultural Department (*Dun*) (374).
- Amount for agriculture : Rs. 20 or Rs. 30 to Rs. 55 per acre (*Tun, etc.*) (211) 63192-4, (222) 63353-63.
- Banking facilities : extension of, to rural parts advocated (*Dawson*) (254) ; cheques, use of, growing ; dacoity encourages banking habits (258) 63711.
- Banking knowledge necessary (*Dunn*) (66), (70) 61683, (71) 61687-8.
- Burma Central Bank (*Dunn*) (93) 61881.

CHETTIES :

- Charge 30 per cent interest, but rates decrease in face of competition of joint stock banks (*Dawson*) (259) 63733-4 ; useful but offend against canons of sound banking (260) 63757-60, (262) 63788-91 ; charge 24 per cent per annum for seasonal loans (*Maung, etc.*) (181) 62874-81 ; interest 18 to 36 per cent insists upon valuable security, not elastic (*Tim*) (104).
- Co-operation : credit societies can give short term credit ; but difficult to finance produce (*Dawson*) (255) ; not generally in competition with joint stock banks (258) 63718-21.
- Godowns, receipts for produce being used for credit (*Dunn*) (70) 61683.
- Movement should be encouraged and interest should be lowered (*Tim*) (104) ; (*Tun, etc.*) (206-7).
- (see CO-OPERATION).
- DAWSON'S BANK : (see under DAWSON, L.).
- Egyptian experience of confusion of short and long term loans (*Dunn*) (76) 61737-9.
- General improvement required (*Dunn*) (66).

GOVERNMENT LOANS :

- Cannot do much (*Dunn*) (66).
- Formality, delay, inadequacy, repayment instalments too large ; Township officers should have authority (*Tun, etc.*) (206-7) ; Government should finance agriculture (211) 63189-94 ; French system at Pondicherry should be adopted (221-2) 63343-7, (222) 63353-63 ; four years should be allowed for repayment, interest should be lower, loans should be made in kind (*Gyi, etc.*) (397) ; at present must be repaid in 2 years (402) 64882 ; great difficulty in obtaining (*Dun*) (239) 63564-5 ; to cultivators at moderate interest advocated (*Dun*) (374) ; under Agricultural Loans Act and Land Improvement Loans Act unpopular (*McKerral*) (35-6) 61233-4.
- Government should lend to cultivators on mortgage (*Maung, etc.*) (171).

FINANCE—*contd.*

Implements: Government should make loans for purchase of "Case" power farming machinery (*Pan, etc.*) (199).
 Improvement, land, loans, careful extension of, advocated (*Robertson*) (341).
 Insurance increasing (*Dawson*) (258) 63712-7.

INTEREST

Banks charge societies 10 per cent; societies charge members 15 per cent; excessive; has ruined societies and will strangle cultivators (*Sein*) (351) (*see* CAUSES OF BORROWING under AGRICULTURAL INDEBTEDNESS).
 Co-operative credit societies Rs. 1-4-0 per cent per mensem, moneylenders Rs. 2-8-0 per cent per mensem with security, Rs. 3 to Rs. 5 per cent per mensem without security; advance payments for crops to be repaid in kind at harvest, e.g., Rs. 80 advanced to be repaid at harvest by 100 baskets of groundnut, price of which will probably be Rs. 125 (*Gyi, etc.*) (397).
 Excessive (*Shwe*) (388), (393).
 Rates of chetties decreasing (*Dunn*) (73-4) 61726.
 Rates paid by and to co-operative societies should be controlled by Government (*Maug, etc.*) (172-3). Rural credit societies charge 15 per cent to members and pay the Bank 10 per cent while moneylenders charge from 24 to 60 per cent. Rate charged to cultivators should not be increased (180-1) 62846-62, (181-2) 62874-86, (186) 62954-63; should be lowered (*Tin*) (104); joint stock banks 6 to 7 per cent Central Banks 10 per cent, primary societies 15 per cent (105), (106-7) 62037-42; rates have been decreased as the result of co-operation (109-10) 62100-4. Failures not due to interest being too low (110-1) 62121-8.
 Joint stock banks: can operate in the delta where crops are secure and land easily marketable (*Dawson*) (254); can give short term credit (255); must specialise in long term deposits (256) 63666, 63677, (259) 63729-30.
 Kazins, loans should be granted for building (*Tun, etc.*) (208), (213) 63217-20, (214) 63238-42.
 Land in the delta easily realisable (*Dawson*) (255), (257) 63694-5.

LAND MORTGAGE BANKS: *see under FINANCE under SEIN, U.*

Advocated (*Pan, etc.*) (196); (*Tun, etc.*) (207); (*Dun*) (373); (*Gyi, etc.*) (397); (400) 64848-9, (404) 64920; can operate where crops less secure and land not easily marketable, because financed not by deposits but by long term debentures (*Dawson*) (255), (257) 63698-700, (259) 63729-30; draft Bill (*Dunn*) (76) 61736; elaborate, cultivator might not understand extent of his liability (85-6) 61804-12; independence of management (86) 61813-20; co-operative element should be introduced, with a nominated board (100-1) 61958-71; a demand for (102) 61990-2.

LONG TERM CREDIT:

(*Dawson*) (255); joint stock banks should provide; careful examination of applications necessary (256) 63666-71; not exceeding 10 years (256) 63679, (262) 63793-7; care taken to see that money is appropriated to purpose for which borrowed (257) 63696-7; danger of confusion with short term (*Dunn*) (76) 61737-41; essential (*Pan, etc.*) (191); for improved implements, e.g., tractors (197); necessary for improvements (*McKerral*) (24) 61033-8.
 Machinery for issuing loans required (*Dunn*) (102) 61990-2.
 Marketing: Government should make loans to cultivators on easy terms (*Pan, etc.*) (198).
 Moneylenders: (*see under* AGRICULTURAL INDEBTEDNESS and CO-OPERATION).
 Registration of title of immoveable property (*Dunn*) (66).

SHORT TERM CREDIT:

Use of agricultural produce as security for, needs improvement (*Dunn*) (66), (70) 61683-4; period of crop 8 months, or for cattle 3 years (80) 61772-6; can be given by joint stock and Co-operative banks, but difficult to finance produce (*Dawson*) (255); not exceeding 9 months (256) 63679-80, (257-8) 63701-5; loans should be issued by Government at 10 per cent per mensem (*Shwe, etc.*) (380).
 State bank advocated (*Sein*) (368) 64725.

FINANCE—concl'd.

TAOCANI :

- Does not reach poorest; growing crops might be accepted as security; difficulty and trouble is applying for; advances in kind after a bad season; danger of too facile credit (*Robertson*) (341); should be lent through Co-operative banks at rates of interest not exceeding rate at which Government borrows (*Tin*) (104); but not for non-members (108) 62070-3, (110) 62119-20; should be given only where no Co-operative society can be formed; necessity of publicity (*Maung, etc.*) (173); should be retained but not extended (*Dawson*) (255); in colonies of Government Estates Department (*Dunn*) (94) 61883
- Title: investigation takes a great deal of time (*Dawson*) (258) 63706, (260) 63745-7, (262-3) 63802-4.
- Torrens system, doubtful (*Dunn*) (66); suitable to Australian conditions which are different from Indian (96) 61909-10.

FISH (see under WELFARE OF RURAL POPULATION).

FODDER (see under ANIMAL HUSBANDRY).

FORESTS.

AFFORESTATION :

- Advocated near villages (*Shwe, etc.*) (385); no opening for (393); schemes in neighbourhood of villages would be detrimental to villagers in regard to their grazing (*Pan, etc.*) (194); no opening for in neighbourhood of villages, reservation necessary but reserves formed near villages very unpopular (*Hopwood*) (115-6), (118) 62231-8; a hopeless failure (119) 62250-2, (123) 62328-34.
- Agricultural Department does not come into touch with Forestry Department (*McKerral*) (28) 61114-5.

AGRICULTURAL PURPOSES :

- Full use not being made for (*Shwe, etc.*) (385); fullest use being made for (*Hopwood*) (116); strips of forest left unreserved for village use (120-1) 62277-82; distant forest of no use to villages (121) 62283-9; reservation of forest areas for villagers if villagers desire (121) 62290-2; forest land cultivated where profitable; in unclassified forests extraction by villagers free (122) 62312-6.
- Area of reserved, should be ascertained (*Shwe, etc.*) (387).
- Bamboo used for houses, mats, but for paper only experimentally (*Hopwood*) (124) 62339-41.
- Bats' guano in forests in Tenasserim; right to collect sold by auction on 3 years lease (*Hopwood*) (120) 62273-5. (See under FERTILISERS).
- Chaulmoogra oil for leprosy (*Hopwood*) (123) 62326-7.
- Chestnut, not used much as timber (*Hopwood*) (119) 62245.
- Classification of forests, vague (*Hopwood*) (121) 62293-5.
- Conifers: mostly in Shan States; of very little value; *Pinus Khasya* (*Hopwood*) (119) 62246-9.
- Cultivation in, should be extended (*Shwe, etc.*) (385), (393).
- Cutch made in large quantities (*Hopwood*) (124) 62341.
- Dehra Dun Research Institute has proved of value, will find a market for forest products and will increase employment (*Hopwood*) (120) 62270, (123) 62325; does not train Burma forest officers (123) 62324.
- Dry zone: afforestation during last 25 years; attempted plantation of dry stony hills unsuccessful (*Hopwood*) (115-6), (118) 62235.

EROSION OF SOIL :

- Does not arise in Burma except in small areas in Kachin Hills where there is shifting cultivation (*Hopwood*) (116), (120) 62265 (see under Shifting Cultivation below). Due to deforestation: difficulty of preventing (*Pan, etc.*) (194); none in consequence of deterioration of forests and floods (*Shwe, etc.*) (385).

EXTRACTION :

- Of timber and bamboo for implements, building and firewood, licenses should be extended (*Shwe, etc.*) (385), (393); of wood for fuel and implements by cultivators should be permitted without license (*Pan, etc.*) (194); privilege should be extended (*Gyi, etc.*) (404) 64919.

FORESTS—*contd.*

FIREWOOD :

- Not of great importance except in dry zone and mainly a question of transport (*Hopwood*) (115); plenty, if forest reservation ceased (*Gyi, etc.*) (399).
 Floods: river training (*Hopwood*) (146).
 Fodder: supply not part of duty of Forest Department (*Hopwood*) (116); no baling of grass (124) 62347-9. (*See under ANIMAL HUSBANDRY.*)

GRAZING :

- Charges, usually practically nothing (*Hopwood*) (117) 62218-20.
 Deterioration of forests not being caused by excessive grazing (*Hopwood*) (116); (*Shwe, etc.*) (385), (393).
 Disease introduced by unregulated grazing (*Hopwood*) (115); control necessary (116).
 Facilities in forests, figures (*Hopwood*) (115), (117) 62215-6, (119) 62253-61; should be extended (*Shwe, etc.*) (385), (393); (*Gyi, etc.*) (404) 64919.
 Grass varies in character (*Hopwood*) (118) 62239; no grass cutting (117) 62217; or baling (124) 62347-9.
 Revenue for grazing 33,000 cattle in reserved forests in 1926-27: Rs. 11,000 (*Hopwood*) (117) 62216.

Guano (*see under FERTILISERS.*)

- Irrigation: supply of water increased by forests at headwaters (*Hopwood*) (116); log drifting does not prevent streams being used for irrigation (125) 62350-61.
 Labour employed in forests is agriculturist (*Hopwood*) (120) 62266-9; mainly local but some immigrant; 12 annas a day, no women employed; 150 forest villages (121-2) 62300-8.
 Lac made in large quantities (*Hopwood*) (124) 62341.
 Marketing of forest produce depends upon transport, but prices of timber too low to make railways and roads profitable (*Hopwood*) (122) 62309-11.
 Oak, not much used as timber (*Hopwood*) (119) 62245.
 Policy of department: not to make village reserves but to make plantations of valuable timber (*Hopwood*) (118) 62231-8.
 Pyinmana Forest School, training during service (*Hopwood*) (123) 62319-24.
 Rainfall, whether increased by forests, doubtful (*Hopwood*) (116).
 Rangoon University, training for Forest Service (*Hopwood*) (123) 62319-24.
 Rent for cultivated forest land, the same as for similar land outside (*Hopwood*) (122) 62307-8.
 Research (*see under Dehra Dun under AGRICULTURAL PURPOSES above*) Locally, small problems, e.g., chaulmoogra oil in leprosy (*Hopwood*) (123) 62326-7.
 Reservation, control impossible without (*Hopwood*) (117) 62228-30; difficulty of (120) 62277-82.
 Revenue of department over 2 crores, expenditure about 83 lakhs (*Hopwood*) (121) 62296-8.
 Sawmills (*Hopwood*) (124) 62339-40.
 Scattered all over Burma (*Hopwood*) (119) 62254, (120) 62266, (121) 62283-4.
 Shifting cultivation in Cachin Hills causes soil erosion and landslides (*Hopwood*) (116).
 _____ Causes serious damage (*Hopwood*) (117) 62221-7.
 _____ Control impossible without reservation (*Hopwood*) (117) 62228-30.
 Species being developed by department: teak, pyinkado, padauk, ingyin (*Hopwood*) (121) 62299.
 Staff: training at Forest School at Pyinmana and at Rangoon University; none trained at Dehra Dun (*Hopwood*) (123) 62319-24; some trained at Oxford (124) 62345-6.
 Teak: more profitable than village plantations (*Hopwood*) (118) 62236-8; does not grow well over 2,800 feet (119) 62240-4. Planted by paid agriculturists (120) 62276, (121) 62299, (122) 62307-8; (*McKerral*) (25) 61056.
 Tenasserim: dense evergreen forest, will be explored and proposed as reserved forest; not suitable for teak (*Hopwood*) (118-9) 62239-43. Bats' guano found in forests (120) 62273-5.
 Timber cutting, uncontrolled, does great harm (*Hopwood*) (117) 62221-7.

TRANSPORT :

- Facilities improving (*Hopwood*) (124) 62335-7.
 Firewood supply mainly a question of transport (*Hopwood*) (115).

FORESTS—concl'd.**TRANSPORT—cont'd.**

- Prices of timber too low to make railways and roads profitable (*Hopwood*) (122) 62309-11.
 Rivers, use of for drifting logs, does not prevent use for irrigation (*Hopwood*) (125) 62350-61.
 Variety of timbers, great (*McKerral*) (18) 60941.
 Wilful damage : none (*Hopwood*) (124) 62338.

FRUIT GROWING (see under AGRICULTURAL INDUSTRIES).

GALE, U MAUNG (witness) (*see under PAN, etc.*).

GALE, U YIN (witness) (*see under SHWE, etc.*).

GHOSH, C. C., B.A., F.E.S., Entomologist, Mandalay, (298-339).

Experience : of sericulture (302); of crop pests at Pusa (329) 64192-7.

AGRICULTURAL DEPARTMENT :

Agricultural chemistry, botany and probably engineering should be administered provincially; entomology, mycology and bacteriology centrally (299).

AGRICULTURAL INDUSTRIES :

Bee-keeping : Research necessary (298); should be central as a separate department with a specialist; local bee not suitable; Italian bee should be introduced (299); no religious objection (330-1) 64208-11, (336) 64331-3; easy and profitable (332) 64241-9.

Buddhist religious objection to taking life : in many places not strict (300); no objection to bee-keeping and should be none to lac-culture (330-1) 64208-13, (336) 64331-5; sericulture : tradition and economic pressure overcome religious objection (333) 64254-9; people sympathetic to efforts to destroy pests (336) 64316-22.

Lac-culture : limited to particular areas (328), (331) 64212-4; no religious objection (330-1) 64208-13, (336) 64335.

Leisure period : varies (299).

Sericulture :

Ansorge : (322-4).

Artificial silk, i.e., rayon : imports (314); legislation to prevent fraud (325); does not compete in India with natural silk which is largely used for ceremonial purposes (330) 64201-7; bought as natural silk; import duty (333) 64260-4, (335-6) 64303-15.

Assam : (319).

Bengal : cause of decline in (309-10), (317-9), (323), (326).

Breeding silkworms : by mongrelisation (301), (304-6). Burma silkworm multivoltine; yield same as Chinese; Burma climatic conditions unsuitable for univoltine (333) 64271-6.

Bounty and State help : given by France, Ottoman Empire, Brazil, Austria and Japan (310); in India (324).

China : supplies 15 per cent of the world's raw silk (316).

Cloth, silk, large use of (299), (330) 64201-7.

Co-ordination : necessary; lack of, cause of decline in Bengal (309-10), (323), (326-7).

Cottage industry : demonstration of rearing (301); economics (307-8); subsidiary to agriculture (334) 64286-92.

Criminals, habitual, taught sericulture (301); started at Pankkoug in October, 1927 (333) 64252-3.

Department in Burma : programme (301-2), (319), (338) 64370.

Development : lines of (320-2), (325); capable of very great expansion (333) 64250-1; especially where standard of life is low (336) 64323-6; can compete against imported silk if methods are improved (336) 64327-30.

Districts suitable (300-1), (320).

Dyeing : No departmental programme for (302); done by weavers; best done in factories (309), (328).

Enquiries, recent, into the industry (316-7).

Eri silk : Confined to Assam, completely domesticated, feed on castor and kesern; cocoons not reelable; rearing and spinning a cottage industry. European demand for cocoons, (302-3), (326); no scope for extension of (338) 64365-6.

GHOSH, C. C.—*contd.*AGRICULTURAL INDUSTRIES—*contd.*Sericulture—*contd.*

- Factories, filatures, necessary (301), (325).
 Imperial Institute, Silk Committee: recommendations (325-6).
 Imperial Sericulturist, proposed appointment of (327-8), (334) 64281-5.
 Industry: in Burma, figures (300); in India (316).
 Institute, Central Sericultural, proposed (326-7), (334) 64281-5.
 Kashmir, Jammu and the Punjab (320), (326).
 Khamru: home-reeled silk; coarse (308-09).
 Lefroy, Imperial Entomologist: (302), (316-22); estimate of importance of silk industry in India (316); opinion as to cause of Bengal decline (317).
 Ling Nan Agricultural College Bulletin on South China silk industry (316).
 Madras: Kollegal tract (319).
 Muga silk: Confined to Assam; semi-domesticated; fed on trees; cocoons reelable; highly prized golden silk; great improvement not expected (303), (326).
 Mukherji's opinion as to decline of Bengal sericulture (317).
 Mulberry: improvement trials at Leiktho (301); tree and bush (307); demonstration (328); large areas where it can be grown (338) 64367.
 Mulberry silk: The principal commercial silk; improvement possible; univoltine and multivoltine sources of supply (303-4).
 Mysore: The largest multivoltine rearing tract in India; suggestions (319), (323).
 Pebrine disease: eliminated by Pasteur's microscopical examination (306-7); legislation not practical (325), (334) 64277-80.
 Rawley: on tariffs (311-3).
 Rearing: Nurseries at Maymyo and Mandalay (302); conditions: climate, race, disease, food, tree and bush mulberry, nursing, economics of cottage industry (307-8); very great expansion possible (333) 64250-4.
 Reeling: in factories, filatures: at Leiktho; at first by Department and later by private capitalists (301-2). Process; results of home reeling coarse (308-9); filatures should be located among rearers from whom cocoons should be bought direct (309); research as to cheap machinery necessary (328); in India reeling very bad (334) 64283.
 Research: should be central, a separate department with a specialist (299); four assistants employed; object to increase silk yield (333) 64265-70.
 Seed supply, should be a specialised industry (328).
 Tariffs:
 Manufacturing: Theory of the tariff and history in France, Germany, Switzerland, Austria, Russia, America and Japan (311-3); effect in India (324-5).
 Throwing: history of industry in England, protected in America, Switzerland, France and Austria (310-1).
 Tasar silk: completely wild worm; fed on trees; cocoons reelable; great improvement not expected; manufacturing industry important (303).
 Throwing: Small factory to be at Mandalay (302). Thrown yarn imported machinery necessary (309); several filatures may combine to have a throwing mill (328).
 Trade: in Burma figures (299-300); India, tables (313-6), (323).
 Weaving: handlooms suitable (309); must be organised and in close touch with market (310).

CO-OPERATION:

Joint farming: societies consisting of families are best (329), (337) 64343-6.

CROPS AND CROP PROTECTION:

- Pests, External: Special protection from Indian Peninsula required (329) 64183-5.
 ———, Bollworm, pink, all over Burma; difficulty because cultivators gin part of their own kapas (337) 64347-57.
 ———, Internal: *Chilo simplex* and borers, palm beetle, legislation required (329) 64184-7; cotton (329) 64188-91; Pusa not consulted except occasionally to identify pests (329-30) 64192-7.
 ———, Legislation necessary (336) 64319.
 ———, Paddy: borer damage avoided by altering time of planting (338) 64369.
 ———, Crabs caught in pots (338) 64369-70.
 ———, Propaganda by pamphlets (336) 64316-22. Research, should be centralised (298), (329).

GHOSH, C. C.—concl'd.**DEMONSTRATION AND PROPAGANDA :**

- Expert advice : cultivators do not require advice as to existing crops which they grow better than on Government farms (299).
 Experimental farms in each district (299).
 New varieties introduced by Agricultural Department : cultivators have quickly adopted, e.g., hard sugarcane and Karachi gram (299).
 Pests : posters and pamphlets issued (336) 64316-22.
 Plots in representative soils for experiment (299).

EDUCATION :

- Agricultural : Text books, elementary, cause laughter (298). Agriculture should not be taught in elementary schools (331) 64215-23.
 Adult : night classes necessary (299) ; Maymyo adult school (332) 64235-40.
 Middle class youths, attracting to agriculture : training and then practical work ; will not solve problem of mass of cultivators (298-9), (337) 64336-42, (338) 64363-4.
 Nature study : urgent necessity, especially of insect life ; training teachers the first necessity (298), (332) 64227-34.
 Night schools : necessary for adults and boys (299) ; Maymyo adult school (332) 64235-40.
 School plots : not necessary in rural areas (298), (331) 64224-6.
 Teachers : need of (298) ; for teaching nature study (332) 64227-34.

RESEARCH :

- Entomology : agricultural, dealing with crop pests should be centralised, with sufficient staff to cover Provinces in co-operation with Indian Museum (298), (334-5) 64293-302, (338) 64359-62 ; (339). Systematic, should be confined to the Indian Museum (298) ; (330) 64198-200 ; (334-5) 64293-302. At present museums at Pusa, Dehra Dun and Coimbatore (337-8) 64358, (339).
 Bee-keeping : No work being done ; staff should be appointed (298).
 Pusa : criticism of (329-30) 64192-200, (334-5) 64293-302, (339).

GRAM (*see under CROPS AND CROP PROTECTION*).

GRAZING (*see under ANIMAL HUSBANDRY and FORESTS*).

GROUNDNUT (*see under CROPS AND CROP PROTECTION, MARKETING and TARIFFS and SEA FREIGHTS*).

GYI, U YIN, Ohnbin Village, Mahlaing Township ; **HMAW, U LU**, Chairman, The Payitkon Central Co-operative Society, Ltd., and **TIN, THUGYI U BA** (395-404).

ADMINISTRATION :

- Posts and Telegraphs : Lack of facilities in outlying small villages causes loss and delay of mails and telegrams (396).
 Transport :
 Railways and steamers : unjust demands made by subordinate officials, excessive delay and heavy freight charges ; Government should manage (396), (402) 64873-7.
 Roads : lack of good village roads compels cultivators to sell their produce cheaply locally (396).

AGRICULTURAL DEPARTMENT :

- Advice of, has always been followed (396).
 Seed, paddy, supplied by Agricultural Department, premium of Ra. 10 per 100 baskets paid (401) 64863-5.
 Services, have brought immense benefits to agriculturists (395-6), (400) 64838-9, (401) 64861-2.

AGRICULTURAL INDEBTEDNESS :

- Agricultural Department should administer Government loans (396).
 Attachment of cultivators' cattle for debt (403) 64904.
 Causes of borrowing : Poor results of cultivation owing to irregular rains (395) ; high cost of living, irregularity of rainfall, lack of economy (397).
 Land Mortgage Banks charging low interest should be started by Government (396).

GYI, U YIN, HMAW, U LU and TIN, THUGYI U BA—*contd.*AGRICULTURAL INDEBTEDNESS—*contd.*

- Mortgages, non-terminable, should be prohibited after Government has established land mortgage banks (397), (400-1) 64848-9.
 Repayment prevented by poor yield and low prices (396); by unprofitable use of loans and exorbitant interest (397).
 Restrictions on credit of cultivators inadvisable (396); Usurious Loans Act should be enforced and non-terminable mortgages should be prohibited after Government has established land mortgage banks (397), (400) 64848-9.
 Sources of credit: jungle traders, brokers, *Chettyars* and Government (395); Co-operative credit societies, *Chettyars* (397).
 Usurious Loans Act should be enforced (397).

AGRICULTURAL INDUSTRIES :

- Cattle-breeding, a subsidiary industry (398).
 Fruit-growing: may be profitable in suitable localities (398).
 Handicraft or industrial institutions advocated (399).
 Leisure period: Cultivation 160 days intermittently; during slack season carting or selling crops (398).
 Mills, transfer to rural areas, not favoured (398).
 Poultry rearing, may be profitable in suitable localities (398).

ANIMAL HUSBANDRY :

- Fodder: shortage: due to Peninsular Indians, non-agriculturists, keeping cattle; scarcity very much felt from March to June (398).
 Grazing: No grazing grounds in Chindwin district (398).
 Indians, Peninsular, Non-agriculturists, keep cattle, sheep and goats, which eat the grass and raise price of stalks of millet and other fodder (398).
 Plough cattle: 2 pairs for 40 acres (399-400) 64832-3, (401) 64850; usually bought; price very much increased; 10 years ago price of a pair of bullocks Rs. 200, present price Rs. 300 to Rs. 350 (401) 64850-5, (402) 64883.

CO-OPERATION :

- Credit, Co-operative, is the cheapest (397), (400) 64846.
 Government should encourage (399).
 Minorities should be compelled to come into schemes for joint improvement (399).
 Payitkon Central Co-operative Society, for the collection, sale and purchase of seed grain, Monywa Township, Lower Chindwin, has achieved its objects (399); has bought Rs. 13,000 worth of seed for distribution; buys ploughs from Agricultural Department and distributes them (400) 64834-7; among borrowers only a few defaulters (401) 64856-7; purchase and sale societies better than credit societies (401) 64858-60; 400 members; some owners, some tenants; drawn from an area of 2 square miles; unlimited liability; holder of Rs. 5 share liable up to Rs. 25; under new law society may be of unlimited liability which will be harmful to the society; seed given to members on credit; seed obtained for cash from Agricultural Department or from local selected cultivators; funds of society obtained from share capital or borrowed from Provincial Bank; this year a loss on one seed transaction; members apply to society for seed; society adds up indents and purchases; deals in gram, juari, red beans, wheat and *mungoo* beans; members who are sharing tenants, if land is good, pay owner half; in other cases owner takes two-fifths (402-3) 64884-903.
 Progress: slow because loans are not utilised for purposes for which granted (400) 64846-7.
 Sale and purchase societies better than credit societies (401) 64859-60.

CROPS AND CROP PROTECTION:

- Cattle trespass: many cases; for instance, a loss of Rs. 40 on 6 acres of juar (404) 64911-5.
 Karachi gram: Partly consumed by cultivator and partly sold (401) 64868-70.
 Seed, paddy, supplied by Agricultural Department, premium of Rs. 10 per 100 baskets paid (401) 64863-5.

CULTIVATION :

- Plough cattle: two pairs for 40 acres (399-400) 64832-3, (401) 64850; usually bought; price very much increased; 10 years ago price of a pair of bullocks Rs. 200; present price Rs. 300 to Rs. 350 (401) 64850-5, (402) 64883.

GYI, U YIN, HMAW, U LU and TIN, THUGYI U BA—*contd.*

DEMONSTRATION AND PROPAGANDA :

- Farms for instructing agriculturists should be opened by the Agricultural Department (396).
- Lectures should follow demonstration (395).
- On cultivators own land, advocated (395).
- Successful demonstration : harrow called *arlein*, iron harrow with five teeth, seed supplied by Agricultural Department, soaking seeds in diluted vitriol to prevent disease (395); Karachi gram and other seed (396).

EDUCATION :

- Elementary school : Parents unable to keep children at school continuously owing to needing their labour (399).
- Handicraft schools should be opened (399).
- Mandalay Agricultural College : attended by very few cultivators ; value of agricultural education not appreciated (400) 64840-1.

FERTILISERS :

- Cowdung, use of as fuel should be prohibited by law (398).

FINANCE :

- Government loans : four years should be allowed for repayment, interest should be lower, loans should be made in kind (397); at present must be repaid in two years (402) 64882.
- Interest : Co-operative Credit Societies Rs. 1-4-0 per cent per mensem, moneylenders Rs. 2-8-0 per cent per mensem with security, Rs. 3 to Rs. 5 per cent per mensem without security; advance payments for crops to be repaid in kind at harvest, e.g., Rs. 80 advanced to be repaid at harvest by 100 baskets of groundnut, price of which will probably be Rs. 125 (397).
- Land Mortgage Banks should be established (397), (400) 64848-9, (404) 64920.

FORESTS :

- Firewood : plenty, if forest reservation ceased (399).
- Grazing, cattle, should be extended (404) 64919.
- Timber for implements, extraction by cultivators, privilege should be extended (404) 64919.

HOLDINGS :

- Consolidation should be effected by Government resuming occupation of lands and re-allotting, restricting mortgage, sale and partition (397-8).
- Fragmentation : adversely affects agricultural efficiency due to division on inheritance or by gift to children, or mortgage or sale (397).

IMPLEMENTS :

- Theikpan ploughs : obtained from Agricultural Department do in two days what Burmese ploughs do in three days (402) 64871-2.

IRRIGATION :

- Dam, washed away by heavy rains (404) 64916.
- Tanks should be constructed by Government in Lower Chindwin District, water tax being levied on lands irrigated (398).

LAND TENURE :

- Sharing tenants : on good land, owner takes half, in other cases two-fifths (403) 64901-7.

MARKETING :

- Basket, paddy, should be uniform (401) 64866-7.
- Information as to market conditions, etc., should be supplied to cultivators by Government (399).
- Middlemen's profits are excessive; illustration : Rs. 175 paid by mills for 100 baskets of paddy for which cultivator received Rs. 100 (399).
- Roads, village, lack of compels cultivators to sell produce cheaply locally (396).

GYI, U YIN, HMAW, U LU and TIN, THUGYI U BA—*concl'd.*

SOILS :

Chindwin, Lower, inundation owing to ruined state of old tanks (398), (402) 64877-8. Jungle, culturable, should be sold to cultivators, payment being by easy instalments (398); could be worked at a profit (402) 64879-81.

VETERINARY :

Assistant: keeps medicines in his own residence (400) 64843-5; does not make unauthorised charges (404) 64910.

Contagious diseases: Legislation as to inoculation, movement and sale of cattle and carcasses advocated (398).

Department has brought immense benefits to agriculturists (396), (400) 64842.

Dispensaries: Freely used by agriculturists (398); none in Monywa Township (400) 64843.

Inoculation: No fee charged (398).

Serum, supply of, sometimes insufficient (398).

WELFARE OF RURAL POPULATION :

Charity (403) 64905-7.

Cinema: would be appreciated as a novelty (403) 64909.

Opium smoking encouraged by Chinese (404) 64917-9.

Standard of living: impossible to make a living out of agriculture (401) 64858.

Surveys economic, advocated (399).

Wireless, not known (403) 64908.

HAN, U PO (witness) (*see under PAN, SAYA, etc.*).

HEALTH (*see under WELFARE OF RURAL POPULATION*).

HENDRY, D., M.C., I.A.S., Deputy Director of Agriculture, Southern Circle, Rangoon (56-66).

ANIMAL HUSBANDRY :

Cattle breeding: in Lower Burma, none, owing to swamp conditions (59-60) 61577-84.

CO-OPERATION :

Agricultural associations not run by co-operative societies (59) 61576.

Seed farms, little success (59) 61572.

CROPS AND CROP PROTECTION :

Adulteration should be prevented by extensive pure seed distribution (60) 61586-7, (61) 61597-9.

Catch crops after paddy harvest unsuccessful (66) 61680.

Crops could be grown from January to May if water were available (65) 61656-62.

Experimental stations in each agricultural circle undertake improvement of crops (57).

Fodder: Difficulty of growing in paddy lands of Lower Burma (57).

———Grasses (*Guinea, Merker, foddercane, Kikuyu*) introduced but not grown to any extent (57).

Fruit: importation from other countries best method of improving (57).

Garden crops, mixed, improvement work undertaken (57).

New crops, none can compete with rice in Lower Burma (57).

Rice: Exports from Burma over half the rice which goes into international trade; quantity has increased steadily (62) 61613-4.

———Improvement, satisfactory progress: increased yield and premium (57), (65) 61654-5.

———Japanese and other short period varieties (60) 61592-6.

———in Lower Burma, occupies 90 per cent of cultivated area (57).

———Ngasein for export (61) 61610.

———Premiums on pure paddy (60) 61586-9, (61) 61597-9; but difficulty of marketing (64) 61641-2.

———Quality of Burma rice (61-2) 61609-13.

———Red rice, percentage being reduced (60) 61590-1.

———Varieties already in the country should be improved (57); hybridisation work (59) 61567, (64) 61643-4.

———Varieties under distribution (7); under study, several hundreds (60) 61585.

HENDRY, D.—contd.

CROPS AND CROP PROTECTION—contd.

- Seed distribution : by Agricultural Department, no private agency (57), (61) 61600-5.
- Central seed farms, experimental and not expected to pay (65) 61664.
- Co-operative societies, little success in opening seed farms (59) 61572-4.
- District farms rented to tenants (65) 61665-8.
- Expansion satisfactory (57); on a large scale (58-9) 61561-2.
- Farms in each district necessary to save transportation cost (57); there are 32 in 6 districts (59) 61563-8, (61) 61606-8.
- Prices adjusted to equalise transport cost (65) 61663.
- Quality of seed, legislation not necessary (66) 61670-4.
- Sugarcane : Horticulturist at Hmawbi Farm in charge (63) 61631-3.
- Prospects good : J-213 and B-3412 (63) 61628-30.
- Quality negligible in Southern Circle (63) 61628.

CULTIVATION :

- Crops could be grown from January to May if water were available (65) 61656-62.
- Rice : Intensive instead of extensive (62) 61615.
- Puddling (64) 61649.

DEMONSTRATION AND PROPAGANDA :

- Agricultural improvement committees, none (63) 61627.
- at Conferences, agricultural and co-operative (56).
- in Cultivators' own fields near villages and roads (56); no specific guarantee (62) 61622.
- Fertilisers, use of : staff insufficient for demonstration (58) 61557-60.
- Lectures in cultivators' own villages (56).
- Shows, exhibitions, etc. (62-3) 61622-7.
- Touring of agricultural officers (59) 61570-1.

FERTILISERS :

- Adulteration, legislation to prevent (56); not the cause of cultivators not using fertilisers (58) 61556.
- Agricultural Department should stock and supply (56).
- Ammono-Phos : analysis and price (56).
- Experiments show profitable return with paddy (56).
- Artificial manure : Cheaper and will be profitable (56); a question of cost (58) 61550, (63) 61634-9.
- Profit not sufficient hitherto (56).
- Cattle manure : pit storage to increase quality and value (56).
- no Compensation to evicted tenants for unexhausted manure (57), (64) 61645-6.
- Demonstrations should be on cultivators' own land (56); staff insufficient (58) 61557-60.
- Fish manure, used for garden cultivation but too expensive for paddy (56).
- Floods will not wash away manures once incorporated (64-5) 61640.
- Guano, bats', used for garden cultivation, but too expensive for paddy (56).
- Nitrates, injurious on paddy land in Lower Burma (57), (64) 61647-8.
- Nitrogen and phosphate considerably increase yield in paddy land of Lower Burma, but not sufficiently profitable hitherto (57).
- Potash beneficial but need for not so great as for phosphate and nitrogen (57).
- Research : Crops other than rice in Lower Burma, not yet undertaken (57).
- Experiments carried out fairly thoroughly (58) 61549-50, (62) 61616.
- Rice (56-7).
- Superphosphate : analysis and price (56).
- Value of fertilisers not appreciated by cultivators (58) 61556-60.

MARKETING :

- Cultivators suffer from unevenness and irregularity of methods (58) 61552-3.
 - no Demand for better methods (58) 61554.
 - Education, the method of improving conditions (58) 61555.
 - Rice, through middlemen : a difficulty in the way of improving quality (64) 61641-2.
- MO Y 336—4a

HENDRY, D.—concl'd.**RESEARCH :**

- Fertilisers (56-7); experiments carried out fairly thoroughly (58) 61549-50, (62) 61616.
- Millers: do not contribute financially (66) 61675-6.
- Organisation of committee advisable (66) 61677-9.
- Staff (62) 61619-21.
- Sugarcane at Hmawbi Farm (63) 61631-3.
- Rice: Hybridisation (59) 61567, (62) 61617-8, (64) 61643-4.
- Improvement (65) 61654-5.

SOILS :

- Analyses, occasional requests for (59) 61569.
- Survey in Pegu District not quite completed owing to lack of staff (59) 61568.

WELFARE OF RURAL POPULATION :

- Tharrawaddy District has become quieter (64) 61650-3.

HMAW, U LU (witness) (see under GYI, U YIN, etc.).**HOLDINGS.**

- "Agriculturist", definition of (*Dunn*) (95-6) 61902-4.
- Arbitration by village committees advocated (*Shwe, etc.*) (391).

CONSOLIDATION :

- Difficulty of Government action (375); no action should be taken (*Dun*) (375).
- Minority should be compelled to come into schemes (*Jevons*) (268) 63828.
- Owners of adjacent holdings should have right of pre-emption (*Shwe, etc.*) (381).
- Prevented by customs of inheritance and lack of spirit of co-operation (*Pan, etc.*) (192).
- Punjab work, very good (*Jevons*) (267) 63826-7.
- Should be effected by Government resuming occupation of lands and reallotting, restricting mortgage, sale and partition (*Gyi, etc.*) (397-8).
- Economic holding: 9 acres in North Promé, 22 acres in South Tharrawaddy (*Dunn*) (78-9) 61758-9.

FRAGMENTATION :

- A Custom; to interfere with would be against wishes of cultivators (*Pan, etc.*) (192).
- Adversely affects agricultural efficiency, due to division on inheritance or by gift to children, or mortgage or sale (*Gyi, etc.*) (397).
- Not Excessive (*Dunn*) (67), (78-9) 61758-65.
- Very little except in Arakan (*McKerral*) (24) 61039-40.
- Indians not displacing Burmese (*McKerral*) (48) 61441-3.
- Legislation necessary for consolidation (*Shwe, etc.*) (391).
- Legislation necessary to deal with minors, widows and persons legally incapable, and to keep disputes out of the courts (*Dun*) (375), (*Shwe, etc.*) (381).
- Plots: should be about 2 acres; loans should be granted for building high and straight kazins (*Tun, etc.*) (208), (213) 63217-20, (214) 63238-42.
- Price of land follows price of paddy (*Dunn*) (96) 61905.

SIZE OF :

- Varies; average figure over a wide area useless (*Dunn*) (84) 61802-3; average: paddyland, 25 to 30 acres: the suitable size (*Tun, etc.*) (207).
- Transfer by sale, 497,000 acres in 1925-6 in Lower Burma (*Dunn*) (96) 61905.

HOPWOOD, S. F., M.C., I.F.S., Officiating Chief Conservator of Forests, Burma (115-125).**ADMINISTRATION :**

- Transport, in forests:
 - Facilities improving (124) 62335-7.
 - Firewood supply mainly a question of transport (115).
 - Prices of timber too low to make railways and roads profitable (122) 62309-11.
 - Rivers, use of for drifting logs, does not prevent use for irrigation (125) 62350-61.

HOPWOOD, S. F.—*contd.*

AGRICULTURAL INDUSTRIES :

- Cutch made in very large quantities (124) 62341.
 Forests: labour employed is agriculturist (120) 62266-9; mainly local but some immigrant, 12 annas a day, no women employed, 150 forest villages (121-2) 62300-8.
 ————Large number of industries (124) 62339-41.
 Lac made in very large quantities (124) 62341.
 Mats made from bamboo (124) 62342-3.
 Paper: no pulp manufacture (124) 62344.
 Sawmills in forests (124) 62340.

ANIMAL HUSBANDRY :

- Grazing (*see under FORESTS*).
 Indians, non-agriculturists, keep half-starved cattle in Burma (119-20) 62261-4; should be heavily taxed (122) 62317; Burmans keep a few well-fed animals (125) 62349.

FERTILISERS :

- Bats' guano in forests in Tenasserim, right to collect sold by auction on 3 years' lease (120) 62273-5.
 Firewood: not of great importance except in dry zone and mainly a question of transport (115).

FORESTS :

- Afforestation schemes, no opening for in neighbourhood of villages, reservation necessary but reserves formed near villages very unpopular (115-6), (118) 62231-8; a hopeless failure (119) 62250-2, (123) 62328-34.
 Agricultural purposes, fullest use being made for (115); strips of forest left unreserved for village use (120-1) 62277-82; distant forest of no use to villages (121) 62283-9; reservation of forest areas for villagers if villagers desire (121) 62290-2; cultivated where profitable; in unclassified forests extraction by villagers free (122) 62312-6.
 Bamboo used for houses, mats, but for paper only experimentally (124) 62339-41.
 Bats' guano in forests in Tenasserim; right to collect sold by auction on 3 years' lease (120) 62273-5.
 (Chaulmoogra oil for leprosy (123) 62326-7.
 Chestnut, not used much as timber (119) 62245.
 Classification of forests, vague (121) 62293-5.
 Conifers: mostly in Shan States; of very little value; Pinus Khasya (119) 62246-9.
 Cutch made in large quantities (124) 62341.
 Dchra Dun Research Institute has proved of value, will find a market for forest products and will increase employment (120) 62270, (123) 62325; does not train Burma forest officers (123) 62324.
 Dry zone: afforestation during last 25 years; attempted plantation of dry stony hills unsuccessful (115-6), (118) 62235.
 Erosion of soil does not arise in Burma except in small areas in Kachin Hills where there is shifting cultivation (116), (120) 62265 (*see under Shifting cultivation below*).
 Firewood: not of great importance except in dry zone and mainly a question of transport (115).
 Floods: river training (146).
 Fodder: supply not part of duty of Forest Department (116); no baling of grass (124) 62347-9.
 Grazing: Charges, usually practically nothing (117) 62218-20.
 ————Deterioration of forests not being caused by excessive grazing (116).
 ————Disease introduced by unregulated grazing (115); control necessary (116).
 ————Facilities in forests, figures (115), (117) 62215-6, (119) 62253-61.
 ————Indians keep half-starved cattle which are a curse (119-20) 62261-4; should be heavily taxed (122) 62317-8.
 ————Grass varies in character (118) 62239; no grass-cutting (117) 62217; or baling (124) 62347-9.
 ————Revenue for grazing 33,000 cattle in reserved forests in 1926-7: Rs. 11,000 (117) 62216.
 Irrigation: supply of water increased by forests at headwaters (116); log drifting does not prevent streams being used for irrigation (125) 62350-61.

HOPWOOD, S. F.—concl'd.**FORESTS—cont'd.**

- Labour employed in forests is agriculturist (120) 62266-9; mainly local but some immigrant; 12 annas a day, no women employed; 150 forest villages (121-2) 62300-8.
- Lao made in large quantities (124) 62341.
- Marketing of forest produce depends upon transport, but prices of timber too low to make railways and roads profitable (122) 62309-11.
- Oak, not much used as timber (119) 62245.
- Policy of department: not to make village reserves but to make plantations of valuable timber (118) 62231-8.
- Pyinmana Forest School, training during service (123) 62319-24.
- Rainfall, whether increased by forests, doubtful (116).
- Rangoon University, training for Forest Service (123) 62319-24.
- Rent for cultivated forest land, the same as for similar land outside (122) 62307-8.
- Research (*see under* Dehra Dun *above*). Locally, small problems, *e.g.*, chaulmoogra oil for leprosy (123) 62326-7.
- Reservation, control impossible without (117) 62228-30; difficulty of (120) 62277-82.
- Revenue of department over 2 crores, expenditure about 83 lakhs (121) 62296-8.
- Sawmills (124) 62339-40.
- Scattered all over Burma (119) 62254, (120) 62266, (121) 62283-4.
- Shifting cultivation: in Cachin Hills causes soil erosion and landslides (116).
 _____, Causes serious damage (117) 62221-7.
 _____, Control impossible without reservation (117) 62228-30.
- Species being developed by department: teak, pyinkado, padauk, ingyin (121) 62299.
- Staff: training at Forest School at Pyinmana and at Rangoon University; none trained at Dehra Dun (123) 62319-24; some trained at Oxford (124) 62345-6.
- Teak: more profitable than village plantations (118) 62236-8. Tenasserim not suitable for; does not grow well at over 2,800 ft. (119) 62240-4. Planted by paid agriculturists (120) 62276, (121) 62299, (122) 62307-8.
- Tenasserim: dense evergreen forest, will be explored and proposed as reserved forest; not suitable for teak (118-9) 62239-43; bats' guano found in forests (120) 62273-5.
- Timber cutting, uncontrolled, does great harm (117) 62221-7.
- Transport: Facilities improving (124) 62335-7.
- Firewood supply mainly a question of transport (115).
- Prices of timber too low to make railways and roads profitable (122) 62309-11.
- Rivers, use of, for drifting logs, does not prevent use for irrigation (125) 62350-61.
- Wilful damage: none (124) 62338.

IRRIGATION:

- Forests at headwaters increase supply of water (116).
- Log drifting does not prevent streams being used for irrigation (125) 62350-61.

MARKETING:

- Timber, depends upon transport; but prices too low to make railways and roads profitable (122) 62309-11.

RESEARCH:

- Chaulmoogra oil in leprosy (123) 62326-7.
- Dehra Dun Research Institute, has proved of value, with a view to finding market for agricultural products and increasing employment (120) 62270-2.

SOILS:

- Shifting cultivation: in Cachin Hills causes soil erosion and landslides (116).
 _____, Causes serious damage (117) 62221-7.
 _____, Control impossible without reservation (117) 62228-30.

HOUSING (*see under* WELFARE OF RURAL POPULATION).**HYGIENE (*see under* WELFARE OF RURAL POPULATION).**

IMPERIAL AGRICULTURAL ASSOCIATION, proposals for: (see under JEVONS, PROF. STANLEY H., M.A., B.Sc., F.S.S., F.G.S.)

IMPLEMENTS—

Agents for sale of, necessary (*Maung, etc.*) (177).
 Agricultural Department has designed: ploughshare for Burmese plough body, screw water lift with windmill, seed drill, improved furnace for jaggery (*McKerral*) (9-10), (30) 61143-50, (51) 61485-7.
 "Case" power farming machinery, the best (*Pan, etc.*) (199); for dry land; cannot be used on wet, muddy land (202) 63099-106, (204-5) 63155-9; seven tractors sold (205) 63160-3.
 Chaff-cutting machines used in dry zones (*Robertson*) (347) 64445.
 Cochin China, French: tractors used for paddy cultivation (*Jevons*) (274) 63900.
 Competitions should be held (*Pan, etc.*) (197).
 Cultivators: not unduly conservative in use of improved implements (*Robertson*) (347) 64445-7.

DEMONSTRATIONS:

Necessary (*Maung, etc.*) (176); in the field advocated (*Dan*) (238); on cultivators' fields, have been successful (*Pan, etc.*) (192); (197); "Case" dealers are prepared to give demonstrations (199).

DISTRIBUTION:

Should be by local traders after popularisation by Agricultural Department (*Robertson*) (342); local traders would require 25 per cent profit (346-7) 64430-40; not widespread; should be at cost price on easy instalments by Government or co-operative societies (*Pan, etc.*) (197); loans should be made by Government to cultivators for the purchase of complete sets of "Case" power farming machinery, costing Rs. 4,810, to be repaid in 2 years (199).
 Engineering, agricultural, need for development (*Jevons*) (266), (274) 63899-901.
 Existing implements are best adapted to needs of the country (*Tun, etc.*) (207).
 Expert, whole-time, required (*McKerral*) (10).
 Government, local, should supply agriculturists with funds to buy implements (*Shwe, etc.*) (383).
 Gwin-set revolving harrow should be demonstrated (*Shwe, etc.*) (390-1).
 Improved implements: requirements: seed-drill, harrows, inter-cultivator, implements for collecting cotton and jowar roots, and for harvesting groundnuts (*Robertson*) (342), (347) 64441-4; in dry tract (347) 64449, (348) 64467-8, (349) 64481.
 Long-term loans advocated (*Pan, etc.*) (197).
 Loss of time and outturn owing to inefficient implements (*Shwe, etc.*) (383).
 Machinery: introduction of, would oust manual labourer from his occupation (*Tun, etc.*) (207).
 Manufacture locally of ploughshares (*McKerral*) (51-2) 61488-92.
 Manufacturers' lack of knowledge of local conditions, an obstacle (*Pan, etc.*) (197).
 Middlemen's profits raise price above means of cultivator (*Pan, etc.*) (197).
 Paddy reaping machine introduced 40 years ago, but heavy and unsuitable (*Dan*) (238).
 Plough: for paddy apparently succeeding (*McKerral*) (9); in the dry zone for cotton and groundnut (36) 61235. (See under **ТРИКПАН PLOUGH** below).
 Price of imported implements, the main difficulty; payment by instalment advocated (*Robertson*) (342).
 Requirements: light enough for bullocks, cheap, to be adjusted and repaired locally (*McKerral*) (9).
 Seed-drill: improvement of, requires investigation (*Robertson*) (342); leaves a furrow which heavy rain fills with soil and seed does not come up; cross-harrowing suggested (346) 64414-6.
 Small implements, considerable scope for (*McKerral*) (36) 61235-7.

ТРИКПАН PLOUGH:

Advocated (*Robertson*) (340 and 342); combines some advantages of western plough with cheap frame, a little heavier than indigenous plough, and goes a little deeper; depth of ploughing by (345-6) 64405-13; obtained from Agricultural Department; does in 2 days what Burmese plough does in 3 days (*Gyt, etc.*) (402) 64871-2; an improvement of the indigenous plough, introduced by Agricultural Department, is inexpensive and saves time and labour (*Maung, etc.*) (176-7); has become very popular (192); one ploughshare can be used instead of two, saves time, surface and composition of soil are made even (*Pan, etc.*) (204) 63145-7.

IMPLEMENTS—*contd.*

- Threshing machine : works perfectly but too heavy (*Dan*) (238).
 Tractors, threshers and other heavy machinery too expensive and difficult to transport (*McKerral*) (9).
 Tractors : many Fordsons sold for paddy cultivation, ploughing being done before the rains (*Jevons*) (266), (267) 63824-5, (274) 63899-901.
 Weed cutter, mechanical, advocated (*Shwe, etc.*) (392).

INFANTILE MORTALITY (*see under WELFARE OF RURAL POPULATION*).INSEIN VETERINARY COLLEGE (*see under VETERINARY*).

IRRIGATION.

- Ava Canal, reservoir on Samon being investigated (*Stuart*) (245).
 Average annual irrigation decreased in 1901-5; explanation (*Stuart*) (241-2).
 Bawle Island in Insein District, attempt to prevent floods (*Stuart*) (249).
 Bribery of officers of Canal Department (*Shwe, etc.*) (381).
 Bunds (*see under Embankments below*).

CANALS :

- Four major : figures of irrigation done by ; 99 per cent under rice (*Stuart*) (242) ; constructed from funds supplied by Government of India, but purchased by Government of Burma in 1921-2 (243). Surplus of water : *mayin* instead of *kaukgyi* crops (*Robertson*) (349) 64479-80.
 Canals and embankments, construction and maintenance of by district councils under Burma Self-Government Act, 1921, requires unanimous consent (*Dunn*) (69), (80) 61770-1.
 Consolidated rate charged on all irrigated areas (*Stuart*) (243) ; does not lead to less economy in use of water (253) 63647-54.
 Cost of irrigation low, lack of expansion due to lack of opportunity (*Stuart*) (253) 63645-6.
 Cotton : scope for, doubtful (*Edwards & Nelson*) (230) 63421-2.
 Dam, washed away by heavy rains (*Gyi, etc.*) (404) 64916.
 Department : responsible for maintenance of navigable channels declared main waterways by Local Government (*Stuart*) (249) 63585 ; can manage both subjects (251) 63619.
 Distribution of water : application of more scientific methods has increased area irrigated (*Stuart*) (244) ; satisfactory (*Maung, etc.*) (172) ; unsatisfactory (*Shwe, etc.*) (381), (391).
 Drainage and reclamation : (*Stuart*) (248-9).
 _____ Contour surveys (*Stuart*) (248).
 _____ Without embankments, very successful (*Stuart*) (248).
 Embankments : receive a credit of 50 per cent of gross land revenue demand on areas protected by them ; particulars ; committee to examine the question (*Stuart*) (247-8) ; benefit protected areas but detrimental to areas outside protection, because they force up flood levels (250) 63603 ; not insanitary (250) 63604-5 ; should be removed (*Stuart*) (251) 63620-5, (252) 63628-9, (254) 63662.
 Excess of water in Irrawaddy Division (*Maung, etc.*) (171).
 Financial results : table (*Stuart*) (243).

FLOODS :

- Practically every year, doing an enormous amount of damage ; two committees appointed ; department dealing with (252) 63636-40 ; (*Pan, etc.*) (191-2) ; measures to prevent, necessary (*Shwe, etc.*) (391).
 Forests at headwaters increase supply of water (*Hopwood*) (116).
 Irrawaddy : problems of conservancy, not irrigation (*Stuart*) (249) 63581-4 ; a building-up river ; deposit of silt (250-1) 63597-612 ; proposal to bund at neck of Delta to save silt (*McKerral*) (24-5) 61045-8, (34) 61216.
 Kalabyagi Canal in Yamethin District, under consideration (*Stuart*) (245).
 Kyaukse District : canals irrigate about half total irrigated area bearing crops other than rice ; double cropping, e.g., sesamum before rice (*Stuart*) (242) ; area irrigated 1901-25 (244) ; Panlaung River scheme (244) ; Pyaungbya and Paleik Canals being re-modelled (245).

IRRIGATION—*contd.*

- Land Records, Superintendent of, works in consultation with Executive Engineer (*Stuart*) (243), (253) 63647-50.
- Levels of older works followed, with one unfortunate exception (*Stuart*) (254) 63664.
- Log drifting does not prevent streams being used for irrigation (*Hopwood*) (125) 62350-61.
- Magwe District : survey being prepared (*Stuart*) (245).
- Man Canal in Minbu District re-modelled (*Stuart*) (245).
- Meiktila District : tank projects being considered, for protective purposes (*Stuart*) (245-6).
- Mileage of Government irrigation channels increased 45 miles per annum for 25 years (*Stuart*) (242).
- Minor irrigation works : in Sagaing District, handed over to cultivators ; Government maintenance unnecessary (*Stuart*) (251-2) 63626-7, (252) 63630-5 ; advice necessary (*Shwe, etc.*) (394) 64815.
- Mon, North, Canal, a new distributary sanctioned (*Stuart*) (244).
- Mu Canal in Shwebo District : surveys in progress (245).
- Myanaung embankment area : drainage problem to be considered (*Stuart*) (248).
- Nankwe scheme, in abeyance (*Tun, etc.*) (212) 63213-6.
- Navigation channels (*Stuart*) (246).
- Paddy : continuous water-supply essential (*Dun*) (374-5) ; water should be given earlier (*Shwe, etc.*) (394) 64814.
- Paleik Canal being re-modelled at cost of 3½ lakhs (*Stuart*) (245).
- Panlaung River : scheme for construction of flood-modulating reservoir sanctioned for 43 lakhs (*Stuart*) (244).
- Plots : should be about 2 acres in size ; loans should be granted for building high and straight kazins (*Tun, etc.*) (208), (213) 63217-20.
- Progress since 1901 ; lists of canals and cost (*Stuart*) (240-2).
- Pyangbya Canal : being re-modelled : cost 7 lakhs (*Stuart*) (245).
- Pyuntaza Plain streams : annual flooding (*Stuart*) (248).
- Research : River Irrawaddy : sufficient known as to silting and scouring action (*Stuart*) (251) 63611.
- Revenue : Collected by Civil Officers (*Stuart*) (244).
- Canal Revenue Staff amalgamated with Land Revenue Staff on Shwebo Canal ; arrangement being introduced in other districts (*Stuart*) (243-4) ; a satisfactory system (253-4) 63655-61.
- Salin Canals, scheme for re-modelling sanctioned : cost 27 lakhs (*Stuart*) (244).
- Scope for irrigation of 100,000 acres in Sagaing and Kyauksee Districts, but cost prohibitive (*Stuart*) (254) 63663.
- Schemes necessary (*Shwe, etc.*) (381), (391).
- Shwebo Canal : to be re-modelled : cost 10 lakhs (*Stuart*) (244).
- Silting : by River Irrawaddy ; scouring and silting actions ; difficult to increase deposit by sluice gates in the embankments. Research : sufficient already known (*Stuart*) (250-1) 63597-612 ; (*McKerral*) (24) 61041-8, (32) 61184-6 ; (*Shwe, etc.*) 391 ; (*Pan, etc.*) (200-1) 63062-6.
- Sittang River : most unstable, danger of cutting bunds (*Stuart*) (252-3) 63641-4.
- Staff : inadequate (*Stuart*) (249).
- Statistics, hydrographical, being collected and collated (*Stuart*) (249).
- TANKS :**
- Should be constructed by Government in Lower Chindwin District, water-tax being levied on lands irrigated (*Gyi, etc.*) (398) (*Maung, etc.*) (171).
- Supervision of construction of small tanks advocated (*Robertson*) (341) ; not control but giving advice ; an officer should be responsible (344) 64386-91.
- Taunggan tank in Mandalay District being re-modelled : cost Rs. 62,000 (*Stuart*) (246).
- Thitson and Samon Rivers, contour survey carried out with a view to co-ordination (*Stuart*) (245).
- Toungoo District, attempt to reclaim by drainage (249).
- Tube well, not satisfactory (*Stuart*) (251) 63613-8.
- Upper Burma : Area irrigated trebled since 1901 (240).
- Dry zone, irrigation has been practised from time immemorial (*Stuart*) (240).
- Urgent need in Yamethin, Meiktila, Myingyan, etc. (*Tun, etc.*) (207).

IRRIGATION—concl'd.

Wastage by evaporation and absorption in the soil should be prevented by reservoirs and gardens and trees (*Shwe, etc.*) (381).
 Water hyacinth: problem under Irrigation Department; (*Stuart*) (249-50) 63589-96
 (see under that title).

WELLS:

In dry zone: possibilities should be investigated (*Robertson*) (341); no tube-wells (344) 64377-8; should be undertaken by Agricultural Engineer (344) 64392; country not suitable for (*McKerral*) (24) 61036-8, (52) 61495-6; should be provided (*Maung, etc.*) (171).
 Windwin chaung in Meiktila District: storage reservoir for 3 lakhs (*Stuart*) (245).
 Yenatha Canal in Mandalay District: estimate under preparation for construction of (*Stuart*) (245).

JEVONS, PROF. STANLEY H., M.A., B.Sc., F.S.S., F.G.S., Professor of Economics, University of Rangoon. (264-78).

Experience: nine years in Allahabad, four years in Rangoon (271) 63863-4.

ADMINISTRATION:

Development: agricultural, importance of; Government should raise loans, if necessary (270) 63853-8.
 ————— industrial, desirable (275-6) 63912-6.
 Meteorological: data required for: Commercial air traffic and ships (266).
 ————— New plants and crops (266).
 ————— Vital statistics and forecasting epidemics (266).
 Service: Bengal, example of (266), (267) 63821-4.
 ————— Experimental farms should take observations (266).
 ————— Inadequate (265); whole-time officer required (266).
 ————— Supervision required (269-70) 63843-50.
 Transport: Roads: feeders to railways more important than trunk roads; network of village roads required (271-2) 63867-8.

AGRICULTURAL DEPARTMENT:

Branches required (266).
 Engineering, agricultural, need for development (266), (274) 63899-901.
 Services of: remarkably good work in the circumstances (266).
 Staff: inadequate; should be 5 times as large; European and trained Burman officers required (266), (274) 63902.

CO-OPERATION:

Minority should be compelled to come into schemes for joint improvement (268) 63828.
 Progress: lack of, due to non-payment of dividends and not operating as saving societies (271) 63865-6.

CROPS AND CROP PROTECTION:

New crops, introduction of: meteorological data required (266).

DEMONSTRATION AND PROPAGANDA:

on Cultivators' own fields, advocated (265).
 Direct propaganda by Agricultural Department by posters and leaflets distributed in villages, should precede demonstration (265).
 Higginbottom's work at Allahabad (267) 63818.
 Indirect propaganda: of great importance; Universities and Education Department should create an atmosphere of interest in agriculture; patriotism should be aroused; permanent agricultural exhibition required in Rangoon (265), (267) 63816-20; Hmawbi Farm inaccessible (274) 63898. (see Imperial Agricultural Association below).
 Literature, agricultural, non-official, paucity of (265); land-owning class largely, literate (270) 63851-2.
 Ram, Sir Ganga: farming operations in the Punjab (267) 63818.

JEVONS, PROF. STANLEY H.—contd.**EDUCATION :**

Adult (275) 63907.

Agricultural research and demonstration station required in immediate vicinity of Rangoon (265); Hmawbi Farm inaccessible (274) 63898.

Economics : Professors should lay stress on importance of agriculture (265); agricultural economics a compulsory subject in Rangoon University (273-4) 63887-95.

Literacy : desirable that it should accompany but need not necessarily precede improvement in standard of life (268) 63829; considerable among land-owning class (270) 63851-2.

Literature, agricultural, non-official; paucity of (265), (270) 63851-2.

Rangoon University : teaches rural and agricultural economics (265), (273-4) 63887-95; would be willing to co-operate with proposed Board of Economic Enquiry (274) 63896-7.

Students : not critical of teaching (271) 63860-2; do not desire to study agriculture (274) 63902.

Technical : scholarships abroad, with the object of furthering industrial development (275-6) 63912-6.

HOLDINGS :

Consolidation : Minority should be compelled to come into schemes (268) 63828.
 ————— Punjab work, very good (267) 63826-7.

IMPERIAL AGRICULTURAL ASSOCIATION : Proposals for :

Co-ordination with Agricultural Department (278); relation to Board of Agriculture (275) 63905-6.

should be Imperial rather than provincial (275) 63903-6.

Initiation : dependent upon support (278).

Methods : publishing journals, etc., in English and vernacular, lectures, exhibitions, coloured posters (278).

Object : to arouse interest in improvement of agriculture among all classes, including towns (277-8).

Red Cross Society : analogy of administration (275) 63903-4.

Subscriptions (278).

IMPLEMENTS :

Cochin China, French : tractors used for paddy cultivation (274) 63900.

Engineering, agricultural, need for development (266), (274) 63899-901.

Tractors : many Fordsons sold for paddy cultivation, ploughing being done before the rains (266), (267) 63824-5, (274) 63899-901.

MARKETING :

Roads : network of village roads required (271-2) 63867-8.

STATISTICS :

Agricultural : importance of (273) 63884-6.

TARIFFS AND SEA FREIGHTS :

Export cesses : Rice : incidence largely on producers (275) 63908-11.

————— Rice and oils, has been appropriated to Central Revenues; special taxes for particular purposes are very useful in early stages of development (276-7) 62923-8.

WELFARE OF RURAL POPULATION :

Board of Economic Development, advocated (269) 63842.

Buddhist point of view compared with Western materialism (272) 63869-80.

Character of the people : take an uneconomic view of life, but character not fixed (270-1) 63856-9, (272) 63869-80.

Cholera : an occupational disease, characteristic of harvest workers, due to drinking filthy water when thirsty (264).

Communications, importance of, in creating desire for better living (268) 63835-6, (276) 63917-22.

JEVONS, PROF. STANLEY H.—concl'd.**WELFARE OF RURAL POPULATION—cont'd.**

- Diseases, preventible, cause immense economic waste by deaths of workers at prime of life; loss estimated at over 10 crores of rupees per annum (264), (266) 63810.
 District health officer in each district with trained staff, advocated (265).
 Drinking water, very little done towards safeguarding (265); pure supply, importance of economically (266-7) 63811-5.
 Industrial development desirable to maintain standard of life; but sanitary conditions must be secured in towns (275-6) 63912-6.
 Plague, an occupational disease, affecting workers in and about rice-mills, grain godowns and shops (264).
 Population, pressure on soil (268) 63830-7; compared with Western history (272-3) 63881-4.
 Public Health Department: has not been able to safeguard health of rural population except by vaccination and staying progress of epidemics (265).
 Punjab canal colonies: standard of living being raised (269) 63839.
 Sanitary precautions: very little instruction of the people (265).
 Standard of Living: Literacy desirable but not necessary preliminary to raising standard of life; agriculture must be made more productive, but danger of increased production being eaten up by increased population; communications create desire for better living (268) 63829-36, (276) 63917-22; importance of correlation and concentration of different measures for improvement; the Punjab example; Board of Economic Development advocated (268-9) 63837-42; Government should raise loans if necessary (270) 63853-8; industrial development desirable (275-6) 63912-6.

JOLLY, MAJOR G. G., C.I.E., M.B., Ch.B., D.P.H., D.T.M. & H., I.M.S., Officiating Director of Public Health, Burma (147-168). Experience at Delhi and in Africa (163) 62759.

ADMINISTRATION:

Public Health District Organisation (161-3) 62729-60.

CO-OPERATION:

Improvements, societies for effecting, should be established after formation of health service under district councils (147).

EDUCATION:

Hygiene, importance of (165-6) 62787-94.

SOILS:

Reclamation schemes in Delta by pumping silt will improve public health (163-4) 62761-2.

WELFARE OF RURAL POPULATION:

- Beri-beri: a few outbreaks, mainly in isolated districts, forests, etc.; not alone due to consumption of polished rice; very little polished rice eaten (158) 62683-9.
 Buddhist religion: prejudice against taking life leads to spread of plague through rats (147), (165) 62780.
 Central Public Health Department under-staffed and must be developed (149), (153).
 Children: medical inspection in Anglo-vernacular schools, a rudimentary system. Child welfare work valuable as educational propaganda (151); practically no rural child welfare; shows held in the towns (163) 62750-2. Proposed Assistant Director of Public Health for schools (164) 62772. (*See under* Infantile mortality *below*.)
 Cholera: causes panic but not so serious as malaria, hookworm, dysentery including diarrhoea (154) 62627-30; outbreaks begin in dry weather when wells are low; a problem of water supply (161) 62721-3.
 Communications: improvement of, destroying isolation of, village which is its only defence against infectious disease, (148); (161), 62728.

JOLLY, MAJOR G. G.—*contd.*WELFARE OF RURAL POPULATION—*contd.*

- Co-operative societies: for improvements should be established after formation of health service under district councils (147). Distribute quinine; no anti-malaria societies (157) 62674-5.
- Department of Public Health: in relation to the Medical Department (160) 62711-2; likely to develop (163) 62760.
- Diet: Adequate and well balanced (147); (167) 62804. Beri-beri, not alone due to eating rice; very little polished rice eaten; has not heard of any lathyrisms; nutrition problems of great importance; central institution should be set up with outlying laboratory in Burma (158) 62681-94. Compared with Punjab diet (160) 62715-20. Research at Public Health Institution (163) 62753-5; "Pe-bin-pank" eaten in Burma and China (160) 62719, (168) 62815-6; (*See under Eggs, Fish, Milk and Rice below.*)
- Disease easily communicated through water supply, methods of disposal of refuse, etc., housing leading to malaria (147). Malaria, hookworm, dysentery and diarrhoea the most serious; cholera not so serious (154) 62626-30.
- Dispensaries: for distributing medicine and treatment of disease; do not help in public health; Sub-Assistant Surgeons in charge. Has not come across any lady doctors in dispensaries (161-2) 62732-8. Municipalities run their own dispensaries with financial aid from district boards and provincial revenues, under technical supervision of Inspector General of Civil Hospitals (162-3) 62744-9.
- District Health Service: Practically none: part-time services of one Medical Officer per 300,000 persons and 26 Sanitary Inspectors in a rural population of 12 millions (148). Should precede treatment of special diseases (151-2). Scheme approved by Finance Committee (157) 62670-1, 62676. Financial difficulties (164) 62772-6. Organisation into districts and circles (161) 62729-31, (164-5) 62775-7. For many years its work will be mainly educative; legislation necessary (165-7) 62787-98.
- Health Officers:
At present only nominal; should be full-time, Burmans, one for each circle, half-pay grant system (148-9). Should be well paid (152). District Health Officer is the Civil Surgeon; carries on private practice and is over-worked (162) 62743.
- Drinking water: river supply dangerous (cholera); properly constructed shallow wells should be provided (149-150). Very little done to improve; practically all rivers contaminated (157-8) 62677-80. Cholera, a problem of water supply (161) 62721-3.
- Eggs: very little eaten (159) 62701-6.
- Engineering Section of Public Health Department should be strengthened (150), (152).
- Environmental conditions: not much can be done to improve, in the absence of district health service. Villagers must be aroused to possibilities of improvement (149). Change of attitude towards, in the towns, but not in rural areas (165) 62778-80. Village not more subject to disease than town (167) 62799-800.
- Expectation of life, though higher than that of other Indian Provinces, pitifully low compared with European standards (147).
- Finance: Municipalities receive financial aid from district boards and provincial revenues for dispensaries (162-3) 62744-9. Finance Committee sympathetic to public health service (163) 62757-8. Grants from Indian Research Fund Association for beri-beri research and Pasteur Institute. No assistance from Rockefeller Institute (164) 62764-8. Small proportion of public health budget spent in rural areas (164) 62771. Financial difficulties (164) 62776.
- Fish: fresh or dried (ngapi) eaten with rice (159) 62700-3, as a relish 62708. Research (163) 62753-5.
- Hookworm: Latrines (150). No general policy except propaganda. Use of latrines decreases incidence. Infection mostly through the feet; shoes or sandals a principal preventive. Experiments in Assam very significant but conditions different (156) 62853-7, (167) 62805-6. Excessive heat and rain destroy hookworm (165) 62786. Less prevalent among the Shans who eat raw meat (167) 62807-9.
- Housing: mat and thatch raised on piles, possibly protects against Kala-e-azar, but affords cover for malaria mosquitoes. Offers facilities for rats; a few minor alterations in design would make a great difference (150), (167) 62799. Economic difficulty (165-6) 62789-90.
- Individual health: measures to improve, should follow environmental hygiene; vaccination for small-pox an exception (151).

JOLLY, MAJOR G. G.—*contd.*WELFARE OF RURAL POPULATION—*contd.*

- Infantile mortality terribly high (147); malaria one of the principal causes (155) 62648-9. (*See under Milk below.*)
- Inspector General of Civil Hospitals: in charge of medical training (159) 62696; of subsidised practitioners (157) 62672-3, and of maternity (162) 62740-2. Supervises hospitals under municipalities (162) 62744-5, (163) 62748.
- Isolation of villages prevents spread of disease (147); but no other defence and improved communications are destroying this isolation (148), (161) 62728.
- Kala-azar: mat and thatch houses raised on pile possibly protect against (150); not endemic; can be mistaken for malaria; Arakan threatened with (154-5) 62637-40.
- Lathyrism: has heard of none (158) 62690.
- Latrines: in dry zone deep pit; in flooded areas septic tank. Officer on special duty should be appointed (150). Wearing of shoes when visiting (151).
- "Makkalam": used as the name of many diseases (167) 62801-3.
- Malaria: Co-operative societies distribute quinine; no anti-malaria society (157) 62674-5.
- , Cultivation as a factor in getting rid of (161) 62724-7.
- , Housing, mats and thatch shelter mosquito (147), (150).
- , Imported infection worse (155) 62642-3.
- , Kala-azar can be mistaken for (154) 62631-40.
- , Kyaukpyu: drainage and stopping wet cultivation (154) 62631-6.
- , Mosquito netting should be woven locally (150).
- , Quinine necessary (150). Distribution insufficient; should be given free to everybody but financial difficulties too great (155) 62644-6. Cinchona febrifuge distributed: as good as pure quinine (155) 62650-2. Co-operative societies distribute (157) 62674.
- , Season varies; worst at beginning and end of rains (155) 62641.
- , Village site, improvement of (150-1).
- Milk: very little consumed except for a recent tendency to take to condensed milk. Burmans get on very well without. Very difficult to keep babies alive when not breast fed (159-160) 62706-10.
- Municipalities run their own hospitals with financial grants from district boards and provincial revenues, under technical supervision of Inspector General of Civil Hospitals (162-3) 62744-9.
- Provincial Public Health Board: distributes grants; has a non-official majority (160) 62713-4.
- Public Health Act: does not exist but is necessary (164) 62769-70. Should leave wide powers of discretion to district councils (165-7) 62787-98.
- Public Health Institution opened last year (163) 62753-5; Finance Committee approved full-time officer (164) 62772.
- Publicity: Hygiene publicity officer produces pamphlets, cinema films, etc. (157) 62668-9. Posters issued do not frighten people (164) 62763. Non-official assistance (165) 62785. Importance of education (165-6) 62787-94.
- Public opinion: great awakening as to public health in recent years (163) 62756-8; has been stimulated by grant of local self-government (164) 62775. Importance of education on public health matters (165-6) 62787-94.
- Punjabi compared with Burman as to physique; not much difference, both good; considerable immigration of Punjabis into Burma. Comparison of diets (160) 62715-20.
- Quinine. (*See under that title under WELFARE OF RURAL POPULATION.*)
- Rats: Large number in houses; religious prejudice against killing (147); compared with China and Japan (165) 62780-4. Burman hut offers facilities to rats; slight alternation in design would make a great difference (150); methods of storing rice (151); (167) 62799.
- Reclamation schemes in the Delta by pumping silt will improve public health (163-4), 62761-2.
- Research: necessary (152); on diet at Public Health Institution (163) 62753-5.
- Rice: Beri-beri not alone due to eating polished rice; very little polished rice eaten (158) 62684-9. Fish nearly always eaten with rice (159) 62700-3, 62708. Disagrees with Col. McCarrison as to nutritive value of rice (160) 62719. Unpolished better than polished (167) 62810-4.
- Rubbish disposal should be dealt with by circle boards and village committees (150).
- Sanitary Inspectors: one required for each circle, total 287 (148-9).
- Schools (*see under Children above.*)

JOLLY, MAJOR G. G.—concl'd.**WELFARE OF RURAL POPULATION—concl'd.**

Specific diseases, e.g., leprosy and venereal diseases, measures directed against should follow provision of adequate health service (151-2).

Sub-Assistant Surgeons: 20 employed at present; 4 years training in the Government Medical School in Rangoon; pay starts at Rs. 100 and Rs. 150 (158-9) 62695-9. In charge of dispensaries; have not much time to do health work (162) 62734-7.

Subsidised practitioners not used for public health work; under Inspector General of Civil Hospitals (157) 62672-3.

Surveys, economic and health, in villages, of great value (152).

Vaccination, no prejudice against (165) 62781; an exception to the general principle of dealing with public health before individual treatment (151).

Villages, lay-out, badly planned (150).

Wells and tanks should be protected against contamination. Engineering Branch of Public Health Department must be strengthened (150).

Women: Lady doctors in larger hospitals, not in dispensaries. Except in bigger centres, no special provision for women's diseases. Not sufficient trained midwives (162) 62738-42.

JUAR (*see under FODDER under ANIMAL HUSBANDRY and CROPS AND CROP PROTECTION*).

KALA-AZAR (*see under WELFARE OF RURAL POPULATION*).

LAC (*see under AGRICULTURAL INDUSTRIES*).

LAND MORTGAGE BANKS (*see under CO-OPERATION and FINANCE*).

LAND REVENUE.

Pitch of assessment (*Dunn*) (101) 61971-80.

LAND TENURE.

Absentee landlordism retards seed distribution in Pegu (*Maung, etc.*) (176).

Colonisation co-operative societies (*see under CO-OPERATION*).

Government estates (*McKerral*) (54) 61528.

Government Estates Department, a model landlord, land leased to tenants (*Dunn*) (94) 61883-8.

Indians not displacing Burmese (*McKerral*) (48) 61441-3.

Leases, yearly, rent in produce; system detrimental (*McKerral*) (79) 61284-92.

Manure, use of, discouraged by tenancy at will system (*McKerral*) (34) 61213-5; (*Dunn*) (87) 61832-4, (96) 61906-7, (103) 61997-9.

Rent: of rice land in Insein District, 15 baskets of paddy per acre, owner paying Revenue (*Pan, etc.*) (204) 63148-9.

Sharing tenants: on good land, owner takes half, in other cases two-fifths (*Gyi, etc.*) (403) 64901-7.

Yearly tenancy system, discourages use of manure (*Dunn*) (87) 61832-4, (96) 61906-7, (103) 61997-9; (*McKerral*) (34) 61213-5.

LATHYRISM (*see under WELFARE OF RURAL POPULATION*).

LATRINES (*see under WELFARE OF RURAL POPULATION*).

MALARIA (*see under WELFARE OF RURAL POPULATION*).

MANDALAY AGRICULTURAL COLLEGE AND RESEARCH INSTITUTE (*see under EDUCATION*).

MANURES (*see under FERTILISERS*).

MARKETING.

BASKET FOR MEASURING PADDY :

- Is gradually becoming standardised (*Dun*) (377) 64782-7; varying size does not lead to cultivator getting less than he ought to (*Dun*) (377) 64795; uniformity should be legally enforced (*McKerral*) (36) 61241-2; standardisation would be great benefit (*Pan, etc.*) (202-3) 63107-16; should be uniform (*Gyi, etc.*) (401) 64866-7; in the jungle much larger than at the mills (224-5), (227) 63378, (228) 63387-94.
- Basket for measuring groundnut (*Edwards and Nelson*) (230) 63430.
- Brokers: Receive Rs. 2 on 100 baskets of paddy (*Dun*) (377) 64788; favour sellers from whom they receive brokerage in preference to buyers (*Dun*) (378) 64800-3; at Rangoon are also traders (*Edwards and Nelson*) (224).
- Bullinger system: by which big millers manipulate paddy market in a way highly detrimental to cultivators; should be prohibited by law (*Pan, etc.*) (198). A pooling system by which competition among buyers is eliminated (200) 63060. European merchants buy 75 per cent of rice for export (204) 63135-40.
- Centralised exchange not possible (*McKerral*) (28) 61121-2.
- Chettyars press for repayment of loans when paddy prices low, which adversely affects paddy market (*Pan, etc.*) (198).
- Co-operation (*see* Sale Societies under **CO-OPERATION**).

COTTON :

- Adulteration: leaf, particularly if showers during harvest; not much dust (*Edwards and Nelson*) (232) 63454-5.
- Credit given on growing crop (*Edwards and Nelson*) (225).
- Export: mainly to Japan, but some to Liverpool and Calcutta (*Edwards and Nelson*) (232) 63450.
- Improvement of variety: not much scope for (*Edwards and Nelson*) (229) 63417-20; quality between Bengals and Oomras (232) 63451; (233) 63474-6.
- Ginning factories buy through brokers from jungle traders (*Edwards and Nelson*) (225).
- Jungle traders usually agents for ginning factories; if independent, often resort to malpractices (*Edwards and Nelson*) (225-6).
- Mixing (*Edwards and Nelson*) (233) 63471-3.
- Open markets, unsuccessful attempt to establish in Upper Burma (*Edwards and Nelson*) (230) 63423-5.
- Regulation required (*McKerral*) (29) 61125-8.
- Season: October-November picking (*Edwards and Nelson*) (232) 63452-3.
- Seed, pure, distribution: no organised system; cultivators buy from ginning factories: unsatisfactory (*Edwards and Nelson*) (226); commercial assistance should be given to Government Department (232-3) 63462-4; control by gineries (233) 63466-70.
- Weights and Measures: in villages stone weights which vary slightly (*Edwards and Nelson*) (226).
- Cultivator suffering from complicated system (*McKerral*) (28) 61116-8; from unevenness and irregularity of methods (*Hendry*) (58) 61552-3; no Demand for better methods (*Hendry*) (58) 61554.
- Education the method of improving conditions (*Hendry*) (58) 61555; (*McKerral*) (28) 61119-20.
- Facilities: unsatisfactory (*Shwe, etc.*) (385); (*Pan, etc.*) (198).
- Foreign merchants, Burmans should be put in direct touch with; cultivators only get one-third of price paid by foreign merchants (*Shwe, etc.*) (385).
- Foreign trade, development of, would raise price of agricultural produce to indigenous consumers (*Pan, etc.*) (194).
- Forward sales of crops before harvest is detrimental to producers; remedy is to supply cultivators with funds (*Shwe, etc.*) (385).
- Government banks should make loans to cultivators (*Pan, etc.*) (198).

GROUNDNUT :

- Basket: standard of measure (*Edwards and Nelson*) (230) 63430.
- Central marketing more than with kapas; very small portion purchased in the jungle by brokers (*Edwards and Nelson*) (226).
- Committee should be set up representing dealers and millers, Agricultural Department, distributors, to teach cultivators need of market and regulate practice (*Edwards and Nelson*) (228) 63395-7, (231) 63436.

MARKETING—*contd.*GROUNDNUT—*contd.*

- Crop reports, inaccuracy of (*Edwards and Nelson*) (227), (228-9) 63402-4, (236 7) 63531-41.
- Growing crop sold at low price (*Edwards and Nelson*) (226).
- Improvement of variety; scope for (*Edwards and Nelson*) (230) 63429.
- Magwe market, description by Government officials of unfair treatment of cultivators, inaccurate (*Edwards and Nelson*) (230-1) 63430.
- Oil used for ghi (*Edwards and Nelson*) (230) 63428.
- Open markets advocated (*Edwards and Nelson*) (231) 63431.
- Seed: cultivator keeps his own (*Edwards and Nelson*) (226).
- Supply and demand: competition among buyers for local consumption very keen; demand greater than supply (*Edwards and Nelson*) (226), (230) 63426-7.
- Unhusked when marketed (*Edwards and Nelson*) (226); recent development, small crop, not exported (230) 63426-7.
- Weights and Measures: sale should be by weight (*Edwards and Nelson*) (231) 63430-2; weighing by neutral tallymen not practical (231) 63433.
(*See under CROPS AND CROP PROTECTION.*)
- Information as to market conditions, etc., should be placed at disposal of cultivators (*Pan*, etc.) (194), by Burmese newspapers and broadcasting in English and Burmese (199); (*Shwe*, etc.) (385); (*Gyi*, etc.) (399).

MIDDLEMEN :

- Make excessive profits (*Shwe*, etc.) (385); cultivators only get one-third of price paid by foreign merchants (*Shwe*, etc.) (385); illustration: Rs. 175 paid by mills for 100 baskets of paddy for which cultivator received Rs. 100 (*Gyi*, etc.) (399); store paddy from various cultivators and mix it (*Dun*) (377) 64796-7; a difficulty in the way of improving quality (*Hendry*) (64) 61641-2.
- Open market: under present circumstances impossible (*Dun*) (377-8) 64798-9.
- Premium price for quality rice: importance of cultivator receiving to encourage him to grow better qualities (*Dun*) (377) 64793-4. (*See under RICE below.*)
- Prices of agricultural produce, high (*Pan*, etc.) (194).

RICE :

- Adulteration, common (*Edwards and Nelson*) (225).
- Basket for measuring paddy: (*see under that title above.*)
- Bran: exported to England and Germany (235) 63500-1; export cess would not affect price in Burma (235) 63502.
- Brokers (*see under that title above.*)
- in Clutches of big millers who manipulate market (*Pan*, etc.) (198).
- Committee should be set up representing dealers and millers, Agricultural Department, distributors and cultivators, to teach cultivator needs of the market and regulate practice (*Edwards and Nelson*) (228) 63395-7.
- Direct sale by cultivators to mills encouraged (*Edwards and Nelson*) (236) 63518-9.
- Elevators: cannot be used for rice but can for paddy (*Edwards and Nelson*) (229) 63405-6.
- Export: principally to Germany and Holland (*Edwards and Nelson*) (234) 63492-3; for starch for industrial purposes (236) 63523-8.
- Export duties (*see under TARIFFS AND SEA FREIGHTS.*)
- Facilities satisfactory (*Edwards and Nelson*) (224).
- Middlemen: a difficulty in the way of improving quality (*Hendry*) (64) 61641-2.
(*See under MIDDLEMEN above.*)
- Mixing of different grades (*Edwards and Nelson*) (227-8) 63386; importance of uniformity (229) 63409, (231) 63440-1; gets mixed on the way from field to mill (235) 63513-7.
- Over-production, possibility of (*Edwards and Nelson*) (234) 63492-7.
- Premia paid for selected white grain, especially from seed supplied by Agricultural Department (*Edwards and Nelson*) (225); do not always reach cultivators (227) 63379-86; Rs. 20 the highest premium (234) 63486-91; (*Tun*, etc.) (213-4) 63225-40; (*Dun*) (377) 64793-4.
- Storage for higher price (*Edwards and Nelson*) (236) 63520-2.
- Transport: by cart in bulk, by rail in gunnies, by boat in bulk (*Edwards and Nelson*) (225); higher rates for rice than for paddy (236) 63529-30.

MARKETING—concl'd.**RICE—concl'd.**

- Wape system: cultivator takes seed on credit and repays with share of crop at a very low price (*Edwards and Nelson*) (234) 63479-80.
- Roads, village: lack of, compels cultivators to sell produce cheaply locally (*Gyi, etc.*) (396) network required (*Jevons*) (271-2) 63867-8.
(See under TRANSPORT under ADMINISTRATION).
- Surveys very important (*McKerral*) (29) 61129-30.
- Tax collectors, try to complete Revenue collection before end of March, and exact payment regardless of hardship to cultivators; collection should be postponed till end of June (*Pan, etc.*) (198).
- Timber, depends upon transport; but prices too low to make railways and roads profitable (*Hopwood*) (122) 62309-11. (See under FORESTS.)

MAUNG, U BA, Honorary Organiser, Einme; **AUNG, U TUN**, Chairman, Mudon Co-operative Society; **MAUNG, U BA**, Manager, the Pegu Central Co-operative Bank, Ltd.; and **ROMEZ, Mr.**, Manager of a Tenant Co-partnership Society. (169-190).

ADMINISTRATION :

- Railway, Pegu Kayan, not much use to co-operative colony (186) 62964-6.
- Services (Agricultural, Veterinary, Transport, Meteorological, Posts and Telegraphs) satisfactory (171).
- Staff, scientific, of Government of India should be increased (171).

AGRICULTURAL IMPLEMENTS :

- Agents for sale of, necessary (177).
- Demonstrations necessary (176).
- Theikpan plough, an improvement of the indigenous plough, introduced by Agricultural Department, is inexpensive and saves time and labour (176-7).

AGRICULTURAL INDEBTEDNESS :

- Causes of borrowing: crop failure, high prices, high wages and absconding labourers (171), payment of rent in advance (173).
- Control of credit of cultivators advocated (171).
- Debt: Ancestral, considerable (182) 62887-9. Increasing with value of land. Cultivators not ashamed of being in debt (182) 62887-93, (188) 62992-5.
- Measures to relieve agriculture's burden of debt: fixing interest and wages, and binding labourers so as to prevent loss to cultivators (171). Legislation prohibiting excessive interest, of which public must be informed; non-liability to attachment for debt of implements, etc. (174).
- Moneylenders: not driven away by co-operation (182) 62894-7, (186) 62954-63.
- Repayment prevented by: high interest and expenses of paddy land (171), (173).
- Sources of credit: local wealthy persons and chetties (171); and co-operative credit societies (173).

AGRICULTURAL LABOUR :

- Wages: high; should be fixed by law and labourers should be bound so as to prevent loss to cultivators (171).

ANIMAL HUSBANDRY :

- Pathways, lack of, to grazing grounds (169).

CO-OPERATION :

- Adult education, an opening for societies (181) 62869-70.
- Audit, cost should be borne by Government (185) 62940-9.
- Colonisation societies: land leased from Government, allotted by committee; Government advanced money, but not enough, leading to resort to moneylenders; a success; 82 such societies at present; Yitkangyi Colony (184-5) 62920-39. Pegu Kayan Railway not of much use to Colony (186) 62964-6. No improved methods of cultivation used (186-7) 62974-9. Land belongs to Government (189) 63017-9.
- Credit societies: weaknesses of (177); should be put in order before starting selling societies (181) 62865-6. Reserves (181-2) 62882-6.

MAUNG, U BA, AUNG, U TUN, MAUNG, U BA and ROMEZ, Mr.—*contd.*Co-OPERATION—*contd.*

- Debt : priority should be given to that owing to societies and imprisonment for debt due to private individuals should be abolished (172).
- Department, officers of (except Registrar) should act merely as propagandists and instructors (174). Relations with non-officials good (187) 62989-91. Staff, inadequate (177).
- Deposits : mainly from public. Under Act III of 1923, local bodies can deposit their funds with the Central Banks approved by Local Government, but so far Government have refused sanction (188) 63003-10. Could be obtained from public at lower interest if Government made loans to societies (188) 62011-6.
- Education : co-operative training schools should be opened at expense of Government (177); has not been neglected (178) 62824.
- Einme Township Bank : majority of shares held by societies; dividend limited to 8 per cent; in giving loans acts upon reports of Junior Assistant Registrars and auditors; no delay in dealing with applications; bad communications, roads, etc., sometimes prevent repayment by societies; no societies independent of Central Bank (183) 62901-17. Capital about Ra. 3,000; 4 or 5 societies members; 7 societies members of union; established 9 years; audits societies (186) 62967-73. Honorary organiser appointed by Deputy Commissioner (190) 62035-8.
- Fragmented holdings, societies for aggregation of, do not exist (178).
- Government loans should be made through co-operative societies (172), (177).
- Health improvement work in rural parts not done by societies who do not consider it their work (189-190) 63022-34.
- Improvement societies should be tried where there are fisheries and canals (177-8).
- Industrial societies should be financed by Government (177).
- Interest : rates paid by and to co-operative societies should be controlled by Government (172-3). Rural credit societies charge 15 per cent to members and pay the Bank 10 per cent, while moneylenders charge from 24 to 60 per cent. Rate charged to cultivators should not be increased (180-1) 62846-62, (181-2) 62874-86, (186) 62954-63.
- Joint farming societies do not exist but should be introduced where credit societies are successful (178).
- Labour societies for contract work should be formed (178).
- Land mortgage banks : should be merged in Central Banks (177).
- Liability, unlimited : is understood by members; has not been enforced yet (183) 62898-900.
- Liquidation of societies caused by crop failure owing to flood and drought (178-9) 62824-5.
- Litigation, Government servants should give assistance to societies engaged in (174-5).
- Long term loans : necessity of. Government should provide funds at first (175) at 5 per cent per annum (176); careful supervision necessary (179) 62825-32, (181) 62863-4.
- Land mortgage banks should be merged in Central Banks (177).
- Machinery agricultural : societies for co-operative use of, do not exist but would be useful (178).
- Meetings : of most societies properly conducted; 90 per cent attendance of members at annual meetings of primary societies (179-80) 62833-45.
- Members : average per society 50 in Pegu District (179) 62835-7.
- Moneylenders : have not been driven away by credit societies (182) 62894-7, (186) 62964-63.
- Non-officials : Honorary organisers, instruction of (172), (187) 62984-8; travelling expenses should be borne by Government (177). Inefficiency of control by (183-4) 62918-9. Intimate association necessary between officers of Department and members of societies (172-3), (174). Relations good (187) 62989-91. Non-officials have not sufficient spare time (188) 62996-63002. Honorary organiser of Einme Township Bank appointed by Deputy Commissioner (190) 63036-8.
- Objects of societies achieved to a small extent (173); not yet achieved (175).
- Purchase societies : failure of, generally but a successful society among police in Pegu District (177).
- Recognition, greater, of societies, necessary (174).
- Registrar, Junior Assistant, one should be appointed by Government in every district (172).
- Reputation of movement not damaged (181) 62872-3; Government loan would improve prestige of co-operative banks (188-9) 63011-6.
- Sale societies, complete failure of (177).
- Seed distribution, help given by societies (181) 62867-8, (185) 62950.

MAUNG, U BA, AUNG, U TUN, MAUNG, U BA AND ROMEZ, MR.—contd.**CO-OPERATION—contd.**

Supervision, official: premature withdrawal of, cause of present disappointing condition of movement (178) 62820-3, (183-4) 62918-9; not caused by political non-co-operation movement (187) 62980-3. Non-officials had not sufficient spare time (188) 62996-62002. Government supervision necessary (189) 63016; removed in 1921; movement desired it should be removed (190) 63039-43.
 Supreme association, non-officials being in majority on controlling board, subsidised by Government, should be formed (174-5).
 Tenants' societies should be formed and given leases of land (177).
 Thrift, Burman has no sense of (188) 62992.

CROPS AND CROP PROTECTION:

Seed distribution: Absentee landlordism retards in Pegu (176). Of paddy seed partly unsuccessful owing to unsuitability (170); help of co-operative societies (181) 62867-8.

DEMONSTRATION AND PROPAGANDA:

Field demonstrations on paddy land (170-1); more necessary (176).
 Of improved implements, necessary. (173-7).
 Paddy seed: distribution of; partly unsuccessful owing to unsuitability (170); great benefit resulting from demonstration of pure seed (176).

EDUCATION:

Adult: libraries necessary (170); co-operative societies should help (181) 62869-70.
 Agricultural: should be taught in all educational institutions (170); schools should be established in every important agricultural district (175).
 Attendance suffers from lack of employment for educated persons (170).
 Co-operation: training schools should be opened at the expense of Government (177).
 Fees, none should be charged for children at school (170).
 Institutions, insufficient (169).
 Pupils: drawn mainly from agricultural classes (170); those who have studied agriculture are employed in the Agricultural Department; none carry on agriculture on their own account (170).
 School plots should be allotted to every school (170).
 Tax, educational, should be levied locally and paid to teacher, not as regular salary but by way of rewards (170).
 Teachers: supply insufficient. Should have knowledge of co-operative accounting and science of agriculture (169). Should not receive a regular salary but should receive rewards (170).

FERTILISERS:

Cost, a deterring factor (176).
 Demonstration necessary (172), (176).
 Farmyard manure, the only inexpensive fertiliser (176).
 Increased use of manures on high paddy land (172).

FINANCE:

Chetty: charges 24 per cent per annum for seasonal loans (181) 62874-81.
 Government should lend to cultivators on mortgage (171).
 Tacavi should be given only where no co-operative society can be formed; necessity of publicity (173).

IRRIGATION:

Distribution of canal-water, method satisfactory (172).
 Excess of water in Irrawaddy Division (171).
 Tanks should be provided (171).
 Wells should be provided (171).

MAUNG, U BA, AUNG, U TUN, MAUNG, U BA AND ROMEZ, Mr.—concl'd.**LAND TENURE :**

Absentee landlordism retards seed distribution in Pegu (176).
Colonisation co-operative societies : *see under* CO-OPERATION.

RESEARCH :

Funds, lack of, retards progress (169).
Laboratories, insufficient (169).
Seeds, grain : wishes of people should be ascertained (169).
Workers, skilled, required (169).

SOILS :

Bund construction : embankments leading to flooding on higher lands should be prohibited (169), (172), (185) 62951-3.
Reclamation of land : by drainage (189) 63020-1. By construction of bunds, by Government (172).

VETERINARY :

Assistants should be under control of circle boards (172).
Department should be under Director of Agriculture (172).
Dispensaries : District boards, should not be under control of (172).
Use of, by agriculturists, not full (172).
Inspector should be under control of district board (172).

WELFARE OF RURAL POPULATION :

Co-operative societies not giving medical assistance ; not considered to be part of their work (189) 63024-33.
Quinine : no distribution of (189) 63023-4 ; people appreciate value of (190) 63034.
Sanitation in villages (189) 63022.

MAUNG, U KHIN (witness) (*see under* TUN, U PAW. etc.)

McKERRAL A., M.A., B.SC., I.A.S., Director of Agriculture, Burma (1—55). Past experience and appointments : (15).

ADMINISTRATION :

Agricultural Adviser : should be Administrative Head of Department (50) 61469-70.
_____ connection with Burma (50) 61464-8.
_____ should be liaison officer between Central and Provincial Departments (5).
_____ should be secretary to Government (5).
_____ separation of duties of, from those of Director of Pusa advocated (5).
Board of Agriculture should be maintained as a purely advisory body (14).
Central Agricultural Department : Advantages derived by Burma from research under Central Government (37) 61250-62.
_____ Contributions to the Provinces should not be made (48) 61444-9.
_____ Control, none, over Provincial Departments ; American federal system probably the best model (4), (13), (31-2) 61163-75 ; Australian experience (21) 60992-3.
_____ Provincial stations for crops of All-India importance (5), (21) 60983-9.
_____ Recruitment to, suggestion (4).
Central Agricultural Research Committee, Proposals for :
_____ Advisory to Pusa (21-2) 60993-4.
_____ Central Cotton Committee should be absorbed (14), (35) 61223-30.
_____ Functions would be mainly administrative (14), (15), (45) 61375.

McKERRAL, A.—*contd.*ADMINISTRATION—*contd.*

- Central Agricultural Research Committee, Proposals for:—*contd.*
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- Fund, special, for financing research: should be provided by an acre cess and not export cess (14), (22) 61001-3; not technically land revenue (49) 61451-62.
-
- Meeting annually (44) 61374.
-
- Representatives of Central and Provincial Departments and Chambers of Commerce (14), (32) 61178-83.
-
- Sub-committees for different subjects (41) 61322.
-
- Tea Association Station, difficulty in absorbing (35) 61225-30.
- Cess on the export of rice (49) 61450.
- Committee of departments concerned with rural betterment required (6).
- Committee for agricultural improvement, five started (42) 61325-7, (50) 61472-4.
- Conferences, not sufficient in number (32) 61176-7.
- Director-General of Central Research, proposal *re* appointment of, and duties (15).
- Pusa Research Institute: Central Research Committee would advise (22) 60993-5.
-
- Director should be distinct from Agricultural Adviser (5)
-
- Extension to agricultural engineering, horticulture, economics and statistics, and enlarged botany section, proposal (4).
-
- Post-graduate training (44) 61371-3.
-
- Prestige should be restored (5); has fallen greatly (22) 60996-8, (43) 61343-5, (50) 61463-4; has fallen relatively (55) 61538-9.
- Superior Provincial Agricultural Service, no announcement as to (23) 61017-8.
- Transport: Arakan and Tenasserim require increased facilities (6), (34) 61208-10.
-
- Motor, popular (23) 61031-2.
-
- Prices of agricultural produce, effect upon (54) 61519-22.
-
- Railways insufficient (6), (23) 61028-30. Shan States, increased cultivation in, with increased railways (34) 61210.
-
- Steamers, Burma very well catered for by Irrawaddy Flotilla Company (7).

AGRICULTURAL DEPARTMENT:

- Agricultural College, Mandalay (16) 60905.
- Budget, small cuts (55) 61533.
- Committees for agricultural improvement, five started (42) 61325-7, (50) 61472-4.
- Demonstrators: mostly graduates of Poona Agricultural College and have practical knowledge (16) 60910-3.
- Deputy Directors: when appointed have not sufficient knowledge of plant breeding (17-8) 60928-35; control experimental farms and district work (42) 61331-2; in touch with village life (47) 61411-2.
- Distribution of activities, fair as between demonstration and research (16) 60914-5; sufficient attention given to Lower Burma wet area and dry area of the mid-zone, but not much to Northern area (17) 60923-7; not much assistance given to planters (22) 61004-9.
- District farms for experiment (16) 60906.
- Engineers, agricultural, to be added to cadre of Superior Provincial Service (30) 61143-6.
- Forestry Department: does not come much into touch with (28) 61114-5.
- Indebtedness, not immediately concerned with (46) 61398-402.
- Legislative Council: friendly attitude of (42) 61339-40; (55) 61543-7.
- Peripatetic demonstrators: two senior agricultural assistants for each district (16) 60908-9.
- Personnel (16) 60905.
- Sericultural Section, four senior assistants and four fieldmen (16) 60905.
- Staff: insufficient in subordinate grades; increased pay necessary (5), (22) 60999-61000; insufficient correlation with other departments (5); short term appointments inadvisable (21) 60990-1; promotion from subordinate service (30) 61151-3, (42) 61328; training abroad (42) 61328-30; vacancies to be filled by short term agreements (42) 61337-8; method of recruitment in England (43) 61346-8.

McKERRAL, A.—*contd.*AGRICULTURAL DEPARTMENT—*contd.*

Superior Provincial Agricultural Service, no announcement as to (23) 61017-8.
Tenasserim: planting problems, an experimental farm in, department not in touch with quinine growing (22-3) 61010-4.

AGRICULTURAL INDEBTEDNESS:

Agricultural Department not immediately concerned with (46) 61398-402.
Important factor in relation to agricultural progress (23; 61025-7).
Thrift, advantages of, not appreciated (13); (53) 61504-10.

AGRICULTURAL INDUSTRIES:

Bee-keeping, objected to by Buddhists (11).
Carting in slack season (11).
Cutch boiling in slack season (11).
Fruit: growing hampered by theft and low prices (11); canning, nothing done by Government (52-3) 61503.
Fuel cutting in slack season (11).
Ghi-making in Sagaing District, probably originated by Indians (10).
—— vegetable, or margarine, not used in Burma (52) 61502.
Government could not do more than private enterprise has done (11); better without Government aid (52-3) 61498-503.
Industrial concerns: are set up in rural areas (12).
—— Intensive study of each rural industry would be useful; industrial inefficiency (12).
—— Rural wages affected by (19) 60963-6.
Lao culture, unprofitable on the plains (11).
Leisure period varying (11).
Mat making in slack season (11).
Oil pressing: Cotton seed all used for oil extraction or sowing (11); mills, European and Japanese (33) 61200-2. Soap making in Rangoon (52) 61501.
Poultry rearing, objected to by Buddhists (11).
Rice straw: paper making and industrial alcohol not tried (11).
Rope making: cultivators make ropes for their own use (11).
Sericulture, objected to by Buddhists (11).
Thatch making in slack season (11).
Wheat (very small area); straw used for cattle food (11).

AGRICULTURAL LABOUR

Migration of labour to rice fields from Madras and Upper Burma (48) 61439-40. No displacement of Burmese by Indians (48) 61441-3.

ANIMAL HUSBANDRY:

Buffalo: as a draft animal unpopular (26) 61082-5; numbers stationary and decreasing in proportion to bullocks (38) 61263-5.
Castration: no attempt made to encourage (27) 61103-5, (28) 61109-13. People have no prejudice against (36) 61243.
Cattlebreeding: no control exercised over (27) 61103-5. Deterioration owing to crossing (28) 61109-13, (34) 61217. Government stock breeding farm opened but nothing done yet (41) 61313-4. Under the Agricultural Department (41) 61320-1.
Condensed milk: imports of the value of 41 lakhs of rupees for the year 1925-26 (10), (27) 61098-102.
Dairying: none except at Sagaing (10).
—— insanitary conditions (11).
Deputy Director of Live Stock Breeding proposed (26) 61078-80.
Draft: animals to pull heavier loads required (10); in the dry middle tract (20-1) 60977-82.
—— More important than milk (26) 61081, (27) 61096.
Fodder: Insufficiency of (11); in the dry middle tract (20-1) 60978-80.
—— Numbers of cattle should be limited (11).
—— Paddy straw should be more carefully conserved (11).

McKERRAL, A.—contd.**ANIMAL HUSBANDRY—contd.**

- Fodder, Silo : experiments successful but not adopted by cultivators (27) 61091-7.
- , Storage (33) 61191-9.
- Goats are pests (26-7) 61086-9.
- Import of cattle from Indian Peninsula should be stopped or controlled (10), (27) 61090. Trade not large (33) 61189-90.
- Numbers of livestock (11), (55) 61534-7.
- Pastures : generally over-stocked (11).
- cattle, sheep and goats kept by parasitic Indians paying no land revenue (11) ; compulsory registration and castration advocated (28) 61109-13.
- Rinderpest : serious : 100,000 deaths in some years (27-8) 61106-8.
- Sheep are pests (26-7) 61086-8.

BURMA VILLAGE ACT :

- Gives power to District Officers to deal with cattle disease (10) ; forbids villagers to live on their holdings, but is now in this respect a dead letter (46) 61397 ; enacted to prevent crime (52) 61497.

CAPITAL, ATTRACTING OF, TO AGRICULTURE :

- Improvements, factors tending to discourage (13).
- Land, a popular form of investment (12).
- Large estates, formation of, leads to absentee landlordism or to capitalist enterprise and formation of large landless class (12), (35) 61231-2.
- Thrift, advantages of, not appreciated (13), (53) 61504-10.

CO-OPERATION :

- Adult education, an important instrument for (29) 61137.
- Agricultural Department not directly concerned with (46) 61398-410.
- Colonisation Department, now Government Estates Department (48) 61432-3.
- Financial Commissioner for Transferred Subjects to co-ordinate Co-operative and Agricultural Departments (46-7) 61398-426.
- Seed distribution, help given to Agricultural Department (25) 61061-2.
- Success, lack of (29) 61133-6.
- Taluka development associations compared with Agricultural improvement committees (50-1) 61472-9.

CROPS AND CROP PROTECTION :

- Cinchona plantations under Government of India (55) 61532.
- Cotton, Cambodia, area small but increasing (8).
- , Seed, germination percentage low : (42) 61325.
- , Selected, premiums given for (8).
- , Value as a money crop (20) 60969-72.
- Destructive Insects and Pests Act, 1914, probably necessary to revise to protect Burma from pests from India (9) ; should be done as soon as possible (26) 61073-5 ; by system of certificates (36) 61246-9.
- Fodder : many new crops tried but failed (8).
- Gram, improved : increased yield 5 lakhs of rupees per annum (8).
- Groundnuts, introduced during the last 20 years and covering 400,000 acres (8) ; oil extraction in India, oil and cake exported (40) 61300-3.
- Improvement : Agricultural Department attempting to improve rice, cotton, beans, gram, chillies, groundnuts, sesamum, tobacco and juar ; all crops capable of improvement (8).
- Juar : best fodder crops in the dry zone (8) ; liable to fungus attack (8).
- New crops, introduction of, not hopeful (8).
- Pemyit, leguminous, roots and pods food crop, in irrigated rice areas of Upper Burma (8).
- Peseinsa, leguminous, root food crop, Lower Burma and alluvial tracts (8).
- Potato cultivation increased in Shan States owing to Scotch seed and extension of railway (4), (19) 60967-8, (34) 61210.
- Rangoon bean, important commercially (8).
- Rice, Burma supplies 63 per cent of Western world's requirements ; quality not inferior (43-4) 61355-8.

McKERRAL, A.—*contd.***CROPS AND CROP PROTECTION—*contd.***

- Rice: Diseases, remedy burning stubble (38) 61281-3.
 —: Flood-resisting varieties (55) 61529-31.
 —: Heaviest yielding food crop (8).
 —: Premium given for improved variety (8).
 —: Quality and quantity (40) 61304-7.
 —: Seed, demand greater than supply; help of co-operative societies; private seed growers (25-6) 61060-9.
 —: Yield not decreasing (45) 61378-81; (52) 61493-4.
 Rubber, introduced during the last 20 years; 79,437 acres (8); not much assistance from Agricultural Department (22) 61004-9.
 Seeds, distribution of, by Government, not private agency (8).
 Tapioca (cassava), increased area (8).
 Wild animals, damage caused by, comparatively insignificant (8).

CULTIVATION:

- Agricultural improvement committees, five started (42) 61325-7; informal (45) 61390-4.
 Cotton, difficulty of introducing row-sowing instead of broadcasting (9).
 Culturable waste: 20 million acres; most would be unprofitable to work (48) 61427-35. Rate of increase of area cultivated diminishing (54) 61523-7.
 District Councils take no interest in agricultural matters (45) 61395-6.
 Improved methods, introduction of, not very successful (9).
 Middle tract, shortage of moisture a limiting factor; green manuring (20-1) 60973-82.
 Sugarcane, economies can be effected (9).

DEMONSTRATION AND PROPAGANDA:

- on Cultivators' own fields, the best method (3), (19) 60962; use of Ammo-phos (7).
 Demonstrators, mostly graduates of Poona Agricultural College and have practical knowledge (16) 60910-3.
 Distribution of activities, fair, between demonstration and research (16) 60914-5.
 Farms, special demonstration, subject to criticism (3); but necessary in special circumstances (31) 61161.
 Gram, substitution of immune variety (4).
 Groundnut, cultivation increased from nothing to over 400,000 acres in 20 years; cotton ginning factories could deal with groundnut (4).
 Peripatetic lecturing (3).
 Potato cultivation increased in Shan States owing to Scotch seed and extension of railway (4), (19) 60967-8, (34) 61210.
 Rice, spread of improved varieties (4).
 Short courses for cultivators at central farms (3).
 Shows, cattle or produce (3), held every year (17) 60916-7.
 Successes, due to filling market need and giving immediate profit (4).

DEVELOPMENT COMMISSIONER:

- Now called Financial Commissioner for Transferred Subjects (47) 61413-4; to co-ordinate Agricultural, Veterinary and Co-operative Departments, an awkward arrangement (6); had no control over Education, Public Health or Irrigation (47) 61413-22. Board should be substituted (47) 61423-6.

EDUCATION:

- Adult education in rural tracts by farm schools and continuation schools: teaching 9 months, touring and demonstrating 3 months, suggestion (3), (12).
 Cost (31) 61157-60, (33) 61203-7.
 Cultivators at Agricultural Department central farms (2), (18) 60946-53, (19) 60959-61.
 Stipends of Rs. 20 per month (36) 61238-40.
 Students: go back to the land; some the scum of the village (40) 61308-12.
 Agricultural education, Importance of (29) 61131-2.
 ———, Value educational rather than vocational (54) 61516-8.

McKERRAL, A.—*contd.*EDUCATION—*contd.*

- Agricultural College, Mandalay : mainly training staff for Agricultural Department (2); personnel (16) 60905, (17) 60918-9; no post-graduate training (23) 61019-21, (44) 61371. Research discussed by College Council and Conference (43) 61349-53. Agricultural economics taught (44) 61361. Not affiliated to University of Rangoon owing to refusal to give 4-years' course (53) 61511-4.
- Buddhist monastery schools, teaching meagre (3), (12).
- Estate managers, no demand for (23) 61015-6.
- Incentive to study agriculture : Government service only (3), (19) 60954-5.
- Mechanics, no demand for tuition (19) 60963.
- Nature study useful in developing intelligence, but not of direct vocational value (3); work not well done (19) 60956-8.
- Pusa Research Institute should give post-graduate training (44) 61371-3.
- Pyinmanā Middle School, of American Baptist Mission, subsidised by Government at present an experiment (2), (51) 61480-4; no other agricultural school (54) 61515.
- School farms expensive and useless (3).
- School plots useful in developing intelligence but not of direct vocational value (3).
- Subsidy of schools by Government (51) 61480-4.

FERTILISERS :

- Ammo-phos : controlled demonstrations carried out on cultivators' own fields (7); profitable (8); imported from America, for paddy, cultivators not using it (39) 61293-5.
- Artificial farmyard manure made at Hmawbi, but not profitable (7), (33) 61187-8.
- Calcium cyanamide, on swamp rice, inferior to sulphate of ammonia (7).
- Cattle manure : Fuel, use of, as, not practised (7).
- Lost on waste grazing land (7), (40) 61297-9.
- Nurseries, only enough for (7), (39) 61296-7.
- Tenancy-at-will system discourages use of (7), (34) 61213-5.
- Fish, not used (29) 61138-9.
- Guano, bat's, along Shan Hills; small quantities available (7).
- Legislation to deal with fraudulent adulteration (7).
- Lime of good quality found in abundance (7).
- Night soil, not used (30) 61140-2.
- Nitrates, poisonous to swamp rice (7).
- Nitrogen and phosphates, the limiting factors in Lower Burma rice soils (25) 61057-9.
- Potash has no appreciable effect on swamp rice (7).
- Prawn dust, small quantities exported from Lower Burma to the Straits (7).
- Prices of artificial fertilisers coming down and of rice going up (8); finance required (24) 61035.
- Research, sufficient (7).
- Sulphate of ammonia combined with phosphates increased rice yield up to 40 per cent but not profitable (7), (26) 61070-2.

FINANCE :

- Government loans under Agriculturists' Loans Act and Land Improvement Loans Act unpopular (35-6) 61233-4.
- Long-term loans necessary for improvements (24) 61033-8.

FINANCIAL COMMISSIONER FOR TRANSFERRED SUBJECTS :

- Co-ordinates work of certain departments (46) 61398-413.

FORESTS :

- Agricultural Department does not come into touch with Forestry Department (28) 61114-5.
- Teak (25) 61056.
- Variety of timbers, great (18) 60941.

HOLDINGS :

- Fragmentation : very little except in Arakan (24) 61039-40.
- Indians not displacing Burmese (48) 61441-3.

McKERRAL, A.—*contd.*

IMPLEMENTS :

- Agricultural Department has designed : ploughshare for Burmese plough body, screw water lift with windmill, seed drill, improved furnace for jaggery (9-10), (30) 61143-50, (51) 61485-7.
 Expert, whole time, required (10).
 Manufacture of ploughshares locally (51-2) 61488-92.
 Plough : for paddy apparently succeeding (9).
 ——— in the dry zone for cotton and groundnut (36) 61235.
 Requirements : light enough for bullocks, cheap, to be adjusted and repaired locally (9).
 Small implements, considerable scope for (36) 61235-7.
 Tractors, threshers and other heavy machinery too expensive and difficult to transport (9).

IRRIGATION :

- Irrawaddy, proposal to bund at neck of Delta to save silt (24-5) 61045-8, (34) 61216.
 Wells, country not suitable for (24) 61036-8, (52) 61495-6.

LAND TENURE :

- Government estates (54) 61528.
 Indians not displacing Burmese (48) 61441-3.
 Leases, yearly, rent in produce ; system detrimental (39) 61284-92.
 Manure, use of, discouraged by tenancy-at-will system (34) 61213-5.

MARKETING :

- Basket, uniform, should be legally enforced (36) 61241-2.
 Centralised exchange not possible (28) 61121-2.
 Co-operative marketing, very little (28) 61122-4.
 Cotton, regulation required (29) 61125-8.
 Cultivator suffering from complicated system (28) 61116-8.
 Education of cultivator the remedy (28) 61119-20.
 Surveys very important (29) 61129-30.

RESEARCH :

- Agricultural College, Mandalay : soils, plant breeding and other crop problems ; work co-ordinated by Principal (1) ; College Council and Conference (43) 61349-53.
 Central Government, advantages, derived by Burma from research under (37) 61250-62.
 Cotton, research required (44) 61364-8.
 Experimental farms of Agricultural Department : rotation, tillage methods, adaptability of new crops, manures and plant breeding (1).
 Fertilisers, artificial, research done (7).
 Lines of research suggested : economic value of wild plants, cold storage of fruits (2), (18) 60937-40 ; insect attack on board ship (2), (18) 60942-5, curing tobacco, horticulture (2).
 Plant breeding : Deputy Directors do most of the work (2) ; but when appointed have not sufficient knowledge of the subject (17-8) 60928-35.
 ——— Planting industry should pay for research by export duty on rubber (2).
 Records of experiments satisfactory (23) 61022-4.
 Rice : four stations experimenting (43-4) 61354-60.
 ——— Burma's problem is rice (44) 61367-8. Coimbatore in touch with (44) 61369-70.
 Rotations, no new, worked out yet (44) 61362.
 Teaching duties take up of much of time of research officers ; strong assistant teaching staff required (2).
 Veterinary : none.
 ———, College at Insein to be opened (2), (17) 60920-2, (18) 60936.
 ———, Provincial institutions required (10), (30-1) 61154-6.

SOILS :

- Alkaline land, no large tracts (25) 61050.
 Delta soils not uniform (25) 61052.

McKERRAL, A.—concl'd.**SOIL—concl'd.**

- Deterioration due to constant cropping without manure (7).
 Erosion due to deforestation following shifting cultivation in Shan Hills (25) 61053-6.
 Nitrogen and phosphates the limiting factors in Lower Burma rice soils (25) 61057-9.
 Silt waste in Irrawaddy (24) 61041-8, (32) 61184-6.
 Survey (25) 61051; by agricultural chemist (45) 61382-9.
 Virgin jungle, most of paddy area of South Burma reclaimed from, within the last 70 years (7).
 Waterlogging (25) 61049, (38) 61266-70.

STATISTICS :

- Methods satisfactory (30) 61147.
 Settlement Officer's reports contain full descriptions of agricultural conditions and practice (38) 61271-5.

VETERINARY :

- Cattlebreeding is under the Agricultural Department (41) 61320-1.
 Contagious diseases : Burma Village Act gives power to District Officers (10).
 _____, Frontier staff should be strengthened (10).
 Dispensaries, four, not much demand (10).
 Elephant, importance of (31) 61156, (34) 61211-2.
 Research : none yet ; College at Insein to be opened (2), (17) 60920-2, (18) 60936.
 _____ Provincial institutions required (10), (30-1) 61154-6.
 Rinderpest : serious, 100,000 deaths in some years (27-8) 61106-8 ; inoculation becoming more popular (41) 61318-9.
 Serum : Difficulty in obtaining (10).
 _____, Institute for preparation in Burma advocated (10) ; Committee in 1924 rejected this proposal (41) 61315.
 Veterinary Department : Agricultural Department, should be independent of (10), (26) 61076-7.
 _____ Progress made (41) 61316-7.
 _____ Under-staffed in superior grades, insufficient correlation with other departments (5).

WATER HYACINTH :

- Not so serious in Burma as in other Provinces (42) 61333-6.

WELFARE OF RURAL POPULATION :

- Deputy Commissioners, some take an interest in agriculture and welfare (55) 61540-2.
 Improvement in condition of people (45) 61376-7.
 Malaria at Minbu in Upper Burma (36) 61244-5.
 Surveys : Marketing, stockbreeding and coconuts (43) 61341-2.
 _____, Typical villages, not advocated (13) ; but reports prepared by Punjab Board of Economics very valuable (34-5) 61218-22.

METEOROLOGICAL DEPARTMENT (*see under ADMINISTRATION*).

MIDDLE CLASS (*see under EDUCATION*).

MILK (*see under WELFARE OF RURAL POPULATION*).

MONEYLENDERS (*see under AGRICULTURAL INDEBTEDNESS*).

MORTGAGES (*see under AGRICULTURAL INDEBTEDNESS*).

NATURE STUDY (*see under EDUCATION*).

NELSON, J. J. (witness) (*see under EDWARDS, E. L. and NELSON, J. J.*)

NYUN, U (witness) (*see under SHWE, etc.*).

PAN, SAYA, Agriculturist, Aingale Village, Tantabin Township, Insein District; **GALE, U MAUNG**, Agriculturist, Pegu District; **TUN, U**, Representative of the Burma Chamber of Commerce; and **HAN, U PO**, of Messrs. U Po Han & Co., Rangoon, dealers in machinery. Representative agriculturists from Lower Burma (190-205).

ADMINISTRATION :

Agricultural Department, services of (191), (195).
 Meteorological Department: unsatisfactory: reports should be published in all vernacular newspapers and by radio (196).
 Posts and Telegraphs: satisfactory (191), extremely unsatisfactory (196).
 Transport: Railways and steamers satisfactory (191); insufficient (196).
 ———, Roads: bridges necessary (191); insufficient; money wasted on motor roads instead of being spent on village roads (196).
 Veterinary Department: inadequate (190-1); not in close touch with cultivators (195).
 Wireless: can be of great service to agriculturists (196).

AGRICULTURAL DEPARTMENT :

Ammonium sulphate, good effect upon paddy nurseries demonstrated (192).
 Education, agricultural, should be left to Department (191).
 Services of, satisfactory (191).
 Staff: for research adequate (190).
 ———, Junior Officers should be recruited from cultivating classes (205) 63164-6.

AGRICULTURAL INDEBTEDNESS :

Buddhist religious desire to repay loans (196), (200) 63061.
 Causes of borrowing: high cost of living and floods (191); lack of means, crop failures, disease, human and animal, high interest, thriftlessness and gambling (196).
 Chettyars press for repayment when paddy prices low (198).
 Control of cultivators' credit by limiting mortgage and sale advocated (191); not advocated (196).
 Insolvency: Court relief would make indebtedness worse (196).
 ——— Attachment of plough cattle for debt, common (204) 63153-4.
 Measures to lighten agriculture's burden of debt: protection against flood, long-term loans, low interest (191); Insolvency Court will make indebtedness worse (196).
 Repayment, prevented by: crop failure due to floods and high interest (191); disease, human and animal, thriftlessness and gambling (196).
 Sources of credit: chetties, Government and moneylenders (191), (196).
 Usurious Loans Act, should be applied with discrimination (196).

AGRICULTURAL INDUSTRIES :

Bags and packing, manufacture may be established with Government aid (198).
 Basket making: practised all over Insein District (193); may be established with Government aid; obstacle is lack of knowledge (198).
 Bee-keeping, religious objection (193), (198).
 Employment, rural, can be increased by irrigation enabling more than one crop to be raised per year (198).
 Fruit: scarcity of land an obstacle (193); difficulty of transport and pests (198).
 Industrial concerns in rural areas would give subsidiary employment to rural population (193).
 Lac: religious objection (193), (198).
 Leisure period: in Insein District, field work 10 months in the year and carting fuel, bamboo, etc., during the remaining 2 months; cultivators have no spare time but labourers may take up subsidiary industries (193). On the average, cultivator works about half the year and amuses himself during the other half (197).
 Mats, straw, manufacture may be established with Government aid (198).
 Oil pressing: Government should help to establish (193).
 Preparation of agricultural produce for consumption, Government should help to establish industries connected with (193); on cottage scale (198).
 Pisciculture: religious objection (198).
 Poultry rearing, religious objection (198).
 Rice, making starch and flour, may be established with Government aid (198).
 Rope making: practised all over Insein District (193); from straw, may be established with Government aid. Obstacle is want of knowledge (198).

PAN, SAYA, GALE, U MAUNG, TUN, U and HAN, U PO.—*contd.***AGRICULTURAL INDUSTRIES—*contd.***

- Sericulture : religious objection (193), (198).
- Spinning, may be established with Government aid (198).
- Straw : mats, bags and packing, ropes, boards, pulpware ; manufactures may be established with Government aid (198).
- Study of rural industries necessary, with a view to introducing improved tools and appliances (193), (198).
- Sugar-making : Government should help to establish (193).
- Weaving : may be established with Government aid (198).

AGRICULTURAL LABOUR :

- Attraction of, by allotment of cultivable land, advocated (193).
- Colonisation schemes advocated to develop areas not at present under cultivation (194).
- Immigration from Indian Peninsula during reaping season, might be reduced by one-third if gambling ceased (194).
- Public Works Department and district councils might employ cultivators during the slack season (198).
- Shortage : not appreciable ; due to gambling (194) ; labour-saving machinery the remedy (198).
- Unemployment, a cause of the increase of crime (198).
- Wages, for harvesting rice, in kind, in paddy (204) 63152.

ANIMAL HUSBANDRY :

- Dairying, of doubtful benefit (193).
- Draught oxen ; satisfactory in Insein District. 4 yokes required to plough 53 acres (201) 63075-85. 8 yokes to plough 100 acres (204) 63141-4.
- Fodder : in Insein District sufficient grass and paddy straw ; kaing grass available in dry seasons in lowland areas. Scarcity may exist for 4 weeks (192-3), (201) 63084. Plenty in Lower Burma (197). In Pegu District shortage during working season ; paddy straw stored but grass more nourishing (201-2) 63084-91.
- Grazing : Enclosed pastures, none (193) ; absence of, not source of injury to cattle (197).
- , Over-stocking of common pastures, not cause of injury to cattle (197).
- , Sufficient (193).
- Milk, supply in large towns unsatisfactory ; Government or co-operative societies should undertake (197), (201) 63067.
- Mineral constituents, no injury to cattle through lack of (197).

CAPITAL, ATTRACTING OF, TO AGRICULTURE :

- Attracting capital to agriculture is impossible (195).
- Exemption from rates and taxes and Government loans should be given to encourage enterprising Burmans to cultivate land by machinery (199).
- Government estates, present policy with regard to formation of, objectionable (199).
- Improvements of agricultural lands by owners prevented by ignorance (195) ; want of funds, knowledge of power farming machinery and help from district officials (199).

CO-OPERATION :

- Credit societies, present demoralisation of, calls for strong Government action (194).
- Implements, should be distributed by Government or co-operative societies at cost price and by easy instalments (197).
- Machinery, agricultural, societies for use of : cultivators not in a position to utilise (194).
- Milk supply in large towns extremely unsatisfactory ; Government or co-operative societies should undertake (197).
- Minority should not be compelled to come into schemes for joint improvement (194).
- Objects, societies have not achieved (194).
- Sale societies : present conditions discouraging ; Government help needed (194) ; should store produce in godowns and make advances upon it (198).

PAN, SAYA, GALE, U MAUNG, TUN, U and HAN, U PO.—contd.**CO-OPERATION—contd.**

Seed, pure : societies for joint growing of pure strains and selling direct to millers, successful. Premia of 10 to 15 per cent paid by millers for improved paddy (191). Distribution should be to societies and not to individuals, to avoid mixing (191), (194).

CROPS AND CROP PROTECTION :

Fodder : in Insein District not extensively put down (192).

——, Saccoline in Upper Burma (192).

Improvement of crops, none (197).

New crops, introduction of : very little headway (197).

Outturn : 750 baskets of paddy from 100 acres (204) 63151.

Rice, improved, produced by Agricultural Department, better outturn and prices (192); sometimes cultivator does not share in improved price (202) 63092-6.

Seed, pure, distribution : societies for joint growing of pure seed and selling direct to millers, successful; premia paid by millers for improved paddy (191); but floods during last 5 years (192); unsatisfactory; should be distributed from township headquarters and advertised (197).

Wild animals, no damage by (192).

CULTIVATION :

Outturn : 750 baskets of paddy from 100 acres (204) 63151.

Plough, hire of, costs 75 baskets of paddy per yoke (204) 63150.

Rotation : none in Insein District, paddy being the only crop (192). Propaganda as to, by leaflets, cinema, broadcasting and demonstrations, advocated (197).

Theikpan plough designed by Agricultural Department, improved tillage by (192).

Tillage : not much done to improve (192); very little improvement can be made (197).

Tractors : use of, prevented by lack of capital; Government should assist (197).

DEMONSTRATION AND PROPAGANDA.

Agricultural education : propaganda necessary to induce lads to study (190), (191); on Cultivators' own plots, comparative demonstrations of improved and mixed seeds (191); of fertilisers (192), (197); and improved implements (192). Demonstrations on Department's land, regardless of expenditure, worse than useless (195), (200) 63058-9, (205) 63166.

Distribution of pure seed to individual cultivators fails owing to mixing; to societies will be successful (191), (195).

Expert advice, cultivators may be induced to adopt (195).

EDUCATION :

Adult : should be popularised by demonstration that profits are increased by improved methods (191).

Agricultural bias, in rural areas, advocated (194).

Agricultural : No institutions for, in the districts (190); boys of agricultural classes only have time to learn to read and write (191); should form part of rural education (191); should be left to Agricultural Department and financed by Government (191); schools, urgent need for (195); boys should attend at about 15 years of age (200) 63052-7; existing system bad (199), (201) 63068-70.

Attendance up to 4th class adversely affected by lack of practical agricultural value of teaching (194).

Compulsory primary education advocated, conditionally (203) 63121-5.

Demand for agricultural education should be stimulated by use of Burmese language and proving economic advantage (195).

Elementary : standard too low to benefit cultivators appreciably (194).

English, education in, wanted if not expensive (203) 63125-30.

Higher, not needed by agriculturists (194).

Mandalay Agricultural College and Research Institute sufficient for agricultural education (190); insufficient, a white elephant (195); schools more necessary (200) 63048-54.

Middle class youths : demonstrations in the field necessary to show advantages of studying agriculture (191); should be enabled to develop waste land, with financial aid if necessary (195).

PAN, SAYA, GALE, U MAUNG, TUN, U and HAN, U PO.—*contd.***EDUCATION—*contd.***

- Nature study : should be practical (191) ; advocated in all schools (195).
- Practical work, as much as possible should be introduced in connection with nature study, school plots and farms (191).
- Propaganda necessary to induce youths to study agriculture (190).
- Rural, should consist mainly of the three R's (199).
- Secondary : facilities for, should exist in rural areas (194).
- School farms : should be practical (191) ; advocated in all schools (195).
- School plots : should be practical (191) ; advocated in all schools (195).
- Students, majority who have studied agriculture are serving in Agricultural Department (191).
- Teachers : in rural areas, should be drawn from agricultural classes (190).
- Teaching facilities, urgent need for extension in all districts (190).

FERTILISERS :

- Adulteration, difficult to prevent (196).
- Ammonium sulphate, good effect on paddy nurseries demonstrated by Agricultural Department (192).
- Artificial, not so profitable as natural manures (196) ; and expensive (203) 63117-20.
- Cowdung, use of, as fuel, only by a few Indians (192), (197).
- Demonstration : on cultivator's plots necessary (192), (197).
- Green manuring profitable with mechanical power (196).
- Reclamation of land by use of fertilisers (192).
- Siltng : profitable with mechanical power (196) ; in delta lands by sluices (200-1) 63062-6.

FINANCE :

- Implements : Government should make loans for purchase of " Case " power farming machinery (199).
- Land mortgage banks : should be established by Government ; should give loans at low interest and easy repayment (196).
- Long term loans essential (191) ; for improved implements, *e.g.*, tractors (197).
- Marketing : Government should make loans to cultivators on easy terms (198).

FORESTS :

- Afforestation schemes in neighbourhood of villages would be detrimental to villagers in regard to their grazing (194).
- Erosion due to deforestation : difficulty of preventing (194).
- Extraction of wood for fuel and implements by cultivators should be permitted without license (194).

HOLDINGS :

- Consolidation : prevented by customs of inheritance and lack of spirit of co-operation (192).
- Fragmentation : a custom ; to interfere with would be against wishes of cultivators (192).

IMPLEMENTS :

- " Case " power farming machinery, the best (199) ; for dry land ; cannot be used on wet, muddy land (202) 63099-106, (204-5) 63155-9. Seven tractors sold (205) 63160-3.
- Competitions should be held (197).
- Demonstration : on cultivators' fields, has been successful (192), (197) ; " Case " dealers are prepared to give demonstrations (199).
- Distribution : not widespread ; should be at cost price on easy instalments by Government or co-operative societies (197) ; loans should be made by Government to cultivators for the purchase of complete sets of " Case " power farming machinery, costing Rs. 4,810, to be repaid in two years (199).
- Long term loans advocated (197).
- Manufacturers' lack of knowledge of local conditions, an obstacle (197).
- Middlemen's profits raise price above means of cultivator (197).
- Theikpan plough : has become very popular (192) ; one ploughshare can be used instead of two, saves time, surface and composition of soil are made even (204) 63145-7.

PAN, SAYA, GALE, U MAUNG, TUN, U and HAN, U PO—*contd.***IRRIGATION :**

Floods (191-2).

LAND TENURE :

Rent : of rice land in Insein District, 15 baskets of paddy per acre, owner paying revenue (204) 63148-9.

MARKETING :

Basket : rice sold by baskets which vary in size ; standardisation would be great benefit (202-3) 63107-16.

Bullinger system : by which big millers manipulate paddy market in a way highly detrimental to cultivators, should be prohibited by law (198). A pooling system by which competition among buyers is eliminated (200) 63060. European merchants buy 75 per cent of rice for export (204) 63135-40.

Chettyars press for repayment of loans when paddy prices low, which adversely affects paddy market (198).

Co-operative sale societies, with godowns, should make advances upon produce stored (198).

Facilities, not satisfactory (198).

Foreign trade, development of, would raise price of agricultural produce to indigenous consumers (194).

Government banks should make loans to cultivators (198).

Information as to market conditions, etc., should be placed at disposal of cultivators (194) ; by Burmese newspapers and broadcasting in English and Burmese (199).

Prices of agricultural produce, high (194).

Rice : Improved strains should gradually replace present inferior varieties (194).

— In clutches of big millers who manipulate market (198).

Tax collectors, try to complete Revenue collection before end of March, and exact payment regardless of hardship to cultivators ; collection should be postponed till end of June (198).

RESEARCH :

Indigenous theory and traditional methods of agriculture should be main line of research (190).

Staff of Agricultural Department adequate ; slow progress (190).

Veterinary, insufficient (190) ; provincial veterinary research institute advocated (193).

SOILS :

Clay, black, yield very heavy if sufficient rainwater (192).

Floods, serious for five years in Insein, Tharrawaddy, Hanthawaddy and Maubin (191).

Reclamation ; by fertilisers (192) ; by Government aid (196) ; by silting (200-1) 63062-6.

Sandy soils deteriorating (192).

STATISTICS :

Agricultural, arrangement and publication of, of no value (195).

of Livestock and implements, of doubtful practical value (195).

VETERINARY :

Department, inadequate (190-1).

Dispensaries : Insufficient under district boards (193).

————— Touring, none in Insein District (193).

————— Use of, by agriculturists, not full (193).

Inoculation, no fees charged (193).

Research : insufficient (190) ; provincial veterinary research institute advocated (193).

Serum, supply system unsatisfactory (193).

Superior veterinary officer with the Government of India, appointment of, would increase efficiency (193).

PAN, SAYA, GALE, U MAUNG, TUN, U and HAN, U PO—concl'd.

WELFARE OF RURAL POPULATION :

- Surveys, economic, in typical villages, advocated (195).
- Unemployment and poverty causes of increased crime (198).
- Usury, the root cause of economic difficulties of cultivators (195).

PAPER (see under **AGRICULTURAL INDUSTRIES**).

POPULATION (see under **WELFARE OF RURAL POPULATION**).

POSTAL FACILITIES (see under **ADMINISTRATION**).

POULTRY KEEPING (see under **AGRICULTURAL INDUSTRIES**).

PUBLIC HEALTH (see under **WELFARE OF RURAL POPULATION**).

PUSA INSTITUTE (see under **RESEARCH**).

QUININE (see under **WELFARE OF RURAL POPULATION** and under *Cinchona* under **CROPS AND CROP PROTECTION**).

RAILWAYS (see under **TRANSPORT** under **ADMINISTRATION**).

RESEARCH.

Agricultural Chemist, Burma, responsible for teaching, research and routine work, unable to leave Mandalay and become really conversant with agricultural problems in various parts of the Province; assistant lecturers should be appointed; Rs. 2,000 travelling expenses allowed (*Charlton*) (279); is also at present Principal of Mandalay Agricultural College and Agricultural Engineer (283) 63929-34, (287) 63997-9, (288) 64027-8; is not Member of Board or Faculties of University of Rangoon (288) 64031.

Agricultural Engineer: Agricultural Chemist and Principal of Mandalay College at present acting as (*Charlton*) (283) 63933; a very important post; holder has resigned and assistant offered his resignation; should be on the superior establishment (295-6) 64144-54.

Bee-keeping: No work being done; staff should be appointed (*Ghosh*) (298). (See under **AGRICULTURAL INDUSTRIES**).

Central Government, advantages derived by Burma from research under (*McKerral*) (37) 61250-62.

Chaulmoogra oil for leprosy (*Hopwood*) (123) 62326-7.

Commercial representation advocated (*Edwards* and *Nelson*) (232) 63457-61; financial contribution from merchants (234) 63485-91.

Co-ordination of central and provincial research: very little; Pusa might co-ordinate work of Provinces; inspection would not be helpful but conferences might (*Charlton*) (287-8) 64000-15.

Cotton, research required (*McKerral*) (44) 61364-8.

Dehra Dun Research Institute, has proved of value, with a view to finding market for agricultural products and increasing employment (*Hopwood*) (120) 62270-2.

Director-General of Research: proposal regarding appointment of, and duties (*McKerral*) (15).

Entomology: agricultural, dealing with crop pests should be centralised, with sufficient staff to cover Provinces in co-operation with Indian Museum (*Ghosh*) (298), (334-5) 64293-302, (338) 64359-62, (339).

————— Systematic, should be confined to the Indian Museum (*Ghosh*) (298), (330) 64198-200, (334-5) 64293-302. At present museums at Pusa, Dehra Dun and Coimbatore (337-8) 64358, (339).

Equipment for, equal to any in India (*Charlton*) (293) 64107-9.

Experimental farms of Agricultural Department: rotation, tillage methods, adaptability of new crops, manures and plant breeding (*McKerral*) (1).

Fertilisers, artificial, research done (*McKerral*) (7); (*Hendry*) (56-7); experiments carried out fairly thoroughly (58) 61549-50, (62) 61616.

Fish: (*Jolly*) (163) 62753-5.

Foreign experts should be encouraged to spend holidays in India (*Tun, etc.*) (205), (220-1) 63329-31.

RESEARCH—*contd.*

- Funds, lack of, retards progress (*Maung, etc.*) (169).
 Indigenous theory and traditional methods of agriculture should be main line of research (*Pan, etc.*) (190).
 Insectary, lack of at Mandalay (*Charlton*) (279), (284) 63958-9.
 Irrawaddy River: sufficient known as to silt and scouring action (*Stuart*) (251) 63611.
 Laboratories, insufficient (*Maung, etc.*) (169).
 Lines of research suggested: economic value of wild plants; cold storage of fruits (*McKerral*) (2), (18) 60937-40; insect attack on board ship (2), (18) 60942-5; curing tobacco, horticulture (2).
 Mandalay Agricultural College, Mandalay: soils, plant breeding and other crop problems; work co-ordinated by Principal (*McKerral*) (1); College Council and Conference (43) 61349-53.
 Millers: do not contribute financially (*Hendry*) (66) 61675-6. Organisation of committee advisable (66) 61677-9.
 Pests, research necessary (*Tun, etc.*) (205).
 Plant breeding: Deputy Directors do most of the work (*McKerral*) (2); but when appointed have not sufficient knowledge of the subject (17-8) 60928-35. Planting industry should pay for research by export duty on rubber (2).
 Plant diseases (*Charlton*) (289) 64038-42.

PUSA RESEARCH INSTITUTE:

- proposed Central Research Committee would advise (*McKerral*) (22) 60993-5.
 Contact with (*Charlton*) (287-8) 64000-15, (293) 64107-9.
 Criticism of (*Ghosh*) (329-30) 64192-200, (334-5) 64293-302, (339.)
 Director should be distinct from Agricultural Adviser (*McKerral*) (5).
 Extension to include agricultural engineering, horticulture, economics and statistics, and enlarged botany section (*McKerral*) (4).
 Post-graduate training (*McKerral*) (44) 61371-3.
 Prestige should be restored (*McKerral*) (5); has fallen greatly (22) 60996-8, (43) 61343-5, (50) 61463-4; has fallen relatively (55) 61538-9.
 Records of experiments satisfactory (*McKerral*) (23) 61022-4.

RICE:

- Burma's problem is rice (*McKerral*) (44) 61367-8. Coimbatore in touch with (44) 61369-70.
 Four stations experimenting (*McKerral*) (43-4) 61354-60.
 Hybridisation (*Hendry*) (59) 61567, (62) 61617-8, (64) 61643-4.
 Improvement (*Hendry*) (65) 61654-5. (*See under CROPS AND CROP PROTECTION and under MARKETING.*)
 Rotations, no new, worked out yet (*McKerral*) (44) 61362.
 Seeds, grain: wishes of people should be ascertained (*Maung, etc.*) (169). (*See SEED DISTRIBUTION under CROPS AND CROP PROTECTION.*)
 Soils (*see under that heading.*)
 Staff of Agricultural Department adequate; slow progress (*Pan, etc.*) (190); (*Hendry*) (62) 61619-21.
 Sugar cane at Hmawbi Farm (*Hendry*) (63) 61631-3.
 Teaching, elementary: association with, does not assist research (*Charlton*) (285) 63964-5.
 Teaching duties take up much of time of research officers; strong assistant teaching staff required (*McKerral*) (2).
 Veterinary (*see Research under VETERINARY.*)
 Weeds: (*Charlton*) (289) 64038-42.
 Welfare of Rural Population (*see Research under that heading.*)
 Workers, skilled, required (*Maung, etc.*) (169).

RICE (*see above, and under*) CROPS AND CROP PROTECTION, MARKETING, TARIFFS AND SEA FREIGHTS, *and* WELFARE OF RURAL POPULATION).RINDERPEST (*see under VETERINARY.*)

RIPPON, CAPT. S. R., M.R.C.V.S., I.V.S., Superintendent, Civil Veterinary Department, Burma, in charge of South-Eastern and South-Western Circles, Rangoon (126-33.)

ADMINISTRATION :

District Councils responsible for maintenance of veterinary dispensaries, Assistants paid out of Provincial funds; system does not work well (126).
 Veterinary Department should be independent (126); but at present under Agricultural Department (127) 62362-5.

ANIMAL HUSBANDRY :

Castrations, a few at Insein Veterinary College but none in the districts: by the Italian method (128) 62396-9.
 Cattle-breeding entirely under the Agricultural Department (128) 62382; in the dry zone. Burmese bullocks a definite type. Indian cattle roam about the road-sides (130-1) 62414-20, 62430-8.
 Cross-breeding, local cattle with English bulls (130) 62421.
 Horse-breeding transferred to Military Police (128) 62383-5.
 Trade, transfrontier: ponies, mules and cattle used (130) 62427-9.

EDUCATION :

Insein Veterinary College (*see under VETERINARY*).

VETERINARY :

Agricultural Adviser with the Government of India not a veterinarian (127).
 Calcutta Veterinary College, staff receive a stipend while training (131) 62439-41.
 Castrations, a few at Insein Veterinary School but none in the districts: by the Italian method (128) 62396-9.
 Cattle-breeding entirely under Agricultural Department (128) 62382. Agricultural Committee of 1925 recommended that breeding should be done by Veterinary Department and distribution by Agricultural Department; could not be done with present staff (132) 62461-2. No Advisory Committee though recommended by Agricultural Committee (132) 62463-4.
 Contagious diseases: Difficulties in dealing with (126); legislation necessary (126).
 Cattle Disease Rules, 1914 (127) 62369-70; Policing necessary (127) 62370-2; system of reporting adequate but not carried out properly (132) 62457-60.
 Department should be independent (126); is at present under Agricultural Department (127) 62362-5.
 Dispensaries:
 District Council responsible for maintenance while Assistants in charge paid out of Provincial funds; system does not work well (126); should be provincialised (127) 62366-8, (131-2) 62448-56; municipalities asked to contribute (133) 62491-6.
 Equipment should be improved (126).
 Expansion not adequate (126).
 Promote, average of 2 animals treated daily (126).
 Provincial authority, control should be transferred to (126).
 Touring dispensaries, full use not made of (126), (133) 62485-6.
 Use of, by agriculturists, not full (126).
 Elephant diseases, no investigation of (130) 62425 6; high mortality through anthrax, etc.; research officer sanctioned but not yet appointed (133) 62487-90.
 Horse-breeding transferred to Military Police (128) 62383-5.
 Inoculation, no fee charged except to municipalities and wealthy owners (126); obstacles to popularising (126).
 Insein Veterinary School (*see under VETERINARY*).
 Research: further facilities desirable (126); no officers at present engaged on (131) 62445-6. Provincial institutions advocated as well as Muktesar (126), (128) 62378-81.
 Rinderpest: serum-simultaneous inoculation (127) 62373-4.
 Serum: occasional difficulty in obtaining (126); station for manufacturing in Burma (128) 62375-7; would be very expensive (133) 62478-84.
 Superior Provincial Veterinary Service to be trained at Insein; must take a very long time (128) 62386-95.
 Superior Veterinary Officer with the Government of India should be appointed (127).
 Veterinary Assistants: pay, which is inadequate, has been revised (130) 62422-3; false statements of touring expenses (130) 62424.

ROBERTSON, H. F., B.Sc., I.A.S. Professor of Agriculture, Mandalay Agricultural College; was Deputy Director of Agriculture, Myingyan Circle, Meiktila. (340-50) Experience in Burma since 1921 (343) 64371-4.

AGRICULTURAL DEPARTMENT :

Myingyan Circle: interest taken by cultivators; farmers' associations organised (348-9) 64474-8.

Staff: trained labourer cultivators should be permanently appointed for demonstration (340); in Myingyan Circle (348) 64459-62.

AGRICULTURAL LABOUR :

Roads, improved, and migration of labour (350) 64497-9.

ANIMAL HUSBANDRY :

Breeding of, cattle: very little control exercised (345) 64396-7.

———— Indian blood: investigation of effect of slight admixture necessary (342); better milk, size and weight (346) 64421-2; introduces inferior strain but not disease (348) 64469-70.

———— Profits favourable (343), (346) 64425. Selection within Burmese breeds advocated (342); give 7 lb. milk a day (346) 64417-24. Shows advocated (343).

Dairying: Not usual owing to Burman religious objection (342).

Fodder :

Green: Serious effect of almost total absence of, during dry season (343).

Hay is made (345) 64389-9.

Insufficient for breeding cattle (343).

Jowar: damaged by pest "Pwinbyu" (*striga lutea*); methods of resisting (343) is stored (345) 64400-2.

Manuring advocated (343).

Season of great shortage: March-May (343).

Silo, pit, advocated (343); has never known a cultivator to dig one (345) 64403-4.

Well-irrigated grass advocated (343).

Grazing :

No enclosed pastures (343).

Shortage, serious effects of (342).

Plough Cattle: mainly Burmese; first cross with Indian not good (346) 64417-20; treated better than breeding cattle (343) 64425-9.

CO-OPERATION :

Payitkon, in Lower Chindwin, successful purchase-society (340-1).

Purchase and sale societies, advocated (340-1).

CROPS AND CROP PROTECTION :

Cotton: climate difficulty of spreading improved strain in dry tract (344) 64376. (*See under seed below*). Requires deep ploughing (345-6) 64405-13.

Gram, Karachi, introduction in Upper Burma a great success (348) 64471-5.

Groundnut, introduction in dry tract has increased prosperity (343-4) 64374-5; no rotation (347-8) 64455-8.

Pests: "Pwinbyu" (*striga lutea*) damaging jowar fodder; remedies (343).

———— Smut on jowar, copper sulphate used (340), (348) 64463-6.

Seed: Cotton cultivators' difficulty in getting high prices charged by local ginners; average price Rs. 5 to Rs. 7 early in the season to Rs. 17 later; some seed extremely bad germination; setting up of Government gineries not advisable; regulations insisting on standard of germination; hand ginning a retrograde step (349-50) 64482-96.

CULTIVATION :

Drill sowing recommended (342).

Dry tract, extreme uncertainty of season (343-4) 64374-85; 30 ins. of rainfall in 6 months; local plough, implements used; mixed cultivation: groundnut and pigeon pea, sowed broadcast; in proper groundnut tracts no rotation (347-8) 64448-58.

ROBERTSON, H. F.—*contd.*CULTIVATION—*contd.*

- Inter-cultivating recommended (342).
- Line sowing recommended (342).
- Theikpan ploughs recommended (342).

DEMONSTRATION AND PROPAGANDA :

- Copper sulphate, demand for, as anti-smut treatment of jowar, as the result of free demonstration issue (340), (348) 64463-6.
- Expert advice, cultivators should be induced to adopt, by best-holding competitions with prizes (340), as has been done in Myingyan Circle (344) 64379-81; cultivator willing to adopt (345) 64393-5, (348-9) 64474-8.
- Farms, Government experimental, have little effect (340).
- Improvements of holdings might be financed by Government (340); under existing Acts (344) 64382-5.
- Leaflets, lecture, lantern slides, should follow demonstration on cultivators' fields (340).
- Manures, natural, demonstration of storing, etc., necessary (342).
- On cultivators' fields, under ordinary conditions, the only successful method (340).
- Staff: trained labourer cultivators should be permanently appointed for demonstration (340); in Myingyan Circle (348) 64459-62.
- Theikpan plough shares, great demand for, as the result of practical demonstration (340).

FERTILISERS :

- Natural manures, greater use of, the only thing that can be done at present (341); demonstration of storing, etc., necessary (342).

FINANCE :

- Improvement, land, loans, careful extension of, advocated (341).
- Payitkon, in Lower Chindwin, successful purchase co-operative society (340-1).
- Purchase and sale co-operative societies, advocated (340-1).
- Taccavi: does not reach poorest; growing crops might be accepted as security. Difficulty and trouble in applying for. Advances in kind after a bad season; danger of too facile credit (341).

IMPLEMENTS :

- Chaff-cutting machines used in dry zones (347) 64445.
- Cultivators: not unduly conservative in use of improved implements (347) 64445-7.
- Distribution, should be by local traders after popularisation by Agricultural Department (342); local traders would require 25 per cent profit (346-7) 64430-40.
- Improved: requirements: seed-drill, harrows, inter-cultivator, implements for collecting cotton and jowar roots, and for harvesting groundnuts (342), (347) 64441-4; in dry tract (347) 64449, (348) 64467-8, (349) 64481.
- Price of imported implements the main difficulty; payment by instalment advocated (342).
- Seed-drill: improvement of, requires investigation (342); leaves a furrow which heavy rain fills with soil and seed does not come up; cross-harrowing suggested (346) 64414-6.
- Theikpan plough advocated (340), (342); combines some advantages of western plough with cheap frame; a little heavier than indigenous plough and goes a little deeper; cotton requires deep ploughing (345-6) 64405-13.

IRRIGATION :

- Canals: Surplus water should be applied to *mayin* instead of *kaukgyi* crops (349) 64479-80.
- Supervision of construction of small tanks advocated (341); not control but giving advice; an officer should be responsible (344) 64386-91.
- Wells, in dry zone: possibilities should be investigated (341); no tube-wells (344) 64377-8. Should be undertaken by Agricultural Engineer (344) 64392.

ROBERTSON, H. F.—concl'd.

SOILS :

Erosion : improved lay-out of holdings, construction of kazins and drains, advocated (341).

ROADS (*see under TRANSPORT under ADMINISTRATION*).

ROMEZ (witness) (*see under MAUNG, U BA etc.*).

ROPE-MAKING (*see under AGRICULTURAL INDUSTRIES*).

SEA FREIGHTS (*see under TARIFFS AND SEA FREIGHTS*).

SEEDS (*see under CROPS AND CROP PROTECTION*).

SEIN, U, Manager, The Burma Provincial Co-operative Bank, Ltd., Mandalay : (351-71).

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : increased cost of living owing to introduction of civilised luxuries (351); decreased incomes of cultivators, increased cost of land and labour (352). Net return on capital invested in agriculture 9 per cent; yet cultivators borrow from chetties at 24 per cent; rise in value of land has increased credit and so led to increased borrowing (359) 64584-93.

Extent of : eighty per cent of people are seriously indebted and many have become landless tenants; position has become much worse in the last 10 years (358) 64556-70.

Moneylenders : Co-operators borrow from, at 36 and 60 per cent after crop failures (357-8) 64552-5; do not regard co-operative movement as a serious competitor (360) 64601-2; live in luxury by exploiting cultivators (367) 64703-6.

Repayment prevented by high interest which exceeds return on capital invested in agriculture (351-2), (358) 64556, (363) 64653-4 (*see under Standard of living under WELFARE OF RURAL POPULATION*).

Thrift is practised by cultivators (367) 64703-6.

AGRICULTURAL INDUSTRIES :

Co-operative societies for establishing cottage industries should be introduced among housewives (352).

ANIMAL HUSBANDRY :

Breeding cattle : Obstacles of lack of capital and religious prejudice (352), (364-5) 64677-80.

Dairying : No religious objection to using milk, butter, etc., as food (364) 64678.

BURMA VILLAGE ACT :

Restrictions on villagers living on their holdings should be abolished (353-4), (364) 64667-9.

CAPITAL, ATTRACTING OF, TO AGRICULTURE :

Capitalists should not be allowed to take to agriculture; if they do, small cultivators will become landless tenants (353).

Government should supply capital (353).

Improvement of land by owners prevented by lack of capital (353).

CO-OPERATION :

Audit : Should be done by Government free (368) 64723-4.

Better farming and better living societies : hopeful if agricultural department assist (357) 64550-1.

Burma Provincial Co-operative Bank, Ltd., Mandalay :—

AUDIT : by chartered accountants (357) 64541.

CAPITAL :

Cash position of Bank sound, sufficient fluid resources for a year without repayments from societies (362) 64639-40, (369) 64747-8.

SEIN, U—*contd.*Co-OPERATION—*contd.*Burma Provincial Co-operative Bank, Ltd., Mandalay—*contd.*CAPITAL—*contd.*

European Government servants have subscribed nearly 60 per cent of deposits (356) 64531-3.

Government:

Should provide greater part of capital; this is contrary to co-operative principles but must be done to avert failure (356-7) 64534-9.

Should provide 75 per cent of funds for 30 years unless Land Mortgage Bank is established (359) 64580-3, (368) 64725.

Government securities, 34 lakhs (369) 64742-6, (369) 64742-6.

Loans repayable in 10 years required to build godowns, which Bank cannot make, as its deposits are for four years; Government have been asked to make advances (361-2) 64625-36.

Local deposits, 4½ per cent paid for one year, 8 per cent for 3 years; in future expected to be possible to get all money required on current account at 3 or 2½ per cent, but money at call would be dangerous (360) 64607-10.

Paid-up, over 6 lakhs (355) 64508-11.

Societies have not deposited much money (360) 64603-6.

Working, 130 lakhs (366) 64695.

Conferences, provincial, once in four years (361) 64618.

INTEREST:

Depositors receive 7½ per cent (357) 64539.

Societies cannot work unless the Bank can borrow at 3½ or 4 per cent (358) 64560-1.

Societies pay the Bank 10 per cent (357) 64540.

LOANS:

Arrears can be recovered by liquidator as land revenue, with the approval of the Registrar (361) 64611-3.

Government liable for loans, as loans to primary societies are made on authority of Registrar, who is a Government official (362-3) 64641-4. solely Guided by department as to loans (356) 64519-21.

Maximum borrowing limit of primary societies fixed by Government officer upon forecasts prepared by committees of management (363) 64649-54.

Outstanding, 85 lakhs of which 30 lakhs is in arrears; financial crisis anticipated next year unless Government help (356) 64522-30.

to Societies, next to individual members (356) 64516-8. many Written off (356) 64522.

MANAGEMENT:

Directors, fourteen in number, are business men (355) 64512-13; are non-officials (366) 64695.

Manager: whole time salaried (355) 64514-5.

PROFITS:

Accrued entered in books as paid but a reserve created (370) 64760-70.

Margin is difference between 7½ per cent paid to depositors and 10 per cent paid by societies for loans (357) 64539-42.

Treasury should allow Bank to open personal ledger account, to assist checking (370-1) 64771-6.

Cattle-breeding societies: obstacles of lack of capital and religious prejudice (352).

Conferences: district, once a year and provincial, once in four years (previously two years) (361) 64617-20, (369) 64750-6.

Cottage industries societies should be introduced among housewives (352).

Credit societies: unsuccessful owing to high interest, insufficient finance and long-term loans (352); none really successful (353). Committee of management in each society; prepare forecasts, upon which Government officer fixes maximum borrowing limit; Committee sanctions loans to individual members (363) 64649-51; Committees take sufficient interest but societies are unsuccessful because incomes of members are too small for them to make repayments (363) 64652-4 (see Standard of living under WELFARE OF RURAL POPULATION). Audit should be done by Government free (368) 64723-4.

SEIN, U—*contd.*CO-OPERATION—*contd.*

- Discipline : a Burman quality (370) 64757-9.
 Education : Should be taught in village lay schools (353), members well educated in principles; should be done mainly by non-officials (359-60) 64590-5.
 Fragmented holdings, societies for aggregation of : would not be much use in Burma (352).
 Godowns : *see under* Sales societies *below*.
 Guaranteeing unions, system unsatisfactory and should be abolished (363) 64645-8.
 Government : Should provide funds (351), (368) 64725 ; at 5 per cent (355) 64500-7; should have entire control (352), (363) 64658-9. Is expected to do everything for the people (362) 64635-6. Should do audit free (368) 64723-4. State bank advocated (368) 64725.
 Improvements : societies for affecting, should be tried as to irrigation and drainage (352).
 Interest : Banks charge societies 10 per cent ; societies charge members 15 per cent ; excessive ; has ruined societies and will strangle cultivators (351) (*see* Causes of borrowing *under* AGRICULTURAL INDEBTEDNESS).
 Joint farming societies : premature, difficult problem of unity ; should be introduced when Co-operation generally is successfully established (352).
 Liquidation : Act gives liquidator, with approval of Registrar, power to recover contributions as arrears of land revenue. Delays in liquidation due to appointment of honorary liquidators. Paid liquidators then appointed and now junior Assistant Registrars (361) 64611-6 ; official liquidators paid by Government (361) 64622-4.
 Local bodies have power to deposit funds in Central Banks, but have not done so owing to opposition by Government (367-8) 64717-22.
 Machinery, agricultural, societies for use of, would be advantageous if working with their own money and not with money borrowed from banks (352).
 Manure societies : (362) 64634.
 Minorities, compulsion to come into schemes of joint improvement (353).
 Moneylenders : Members of societies borrow from, at 36 and 60 per cent after crop failure (357-8) 64552-5 ; do not regard co-operative movement as a serious competitor (360) 64601-2 ; live in luxury by exploiting cultivators (367) 64703-6.
 Non-officials : should do propaganda (352), (363) 64655-7. Objection to exclusion of, from board of control of proposed Land Mortgage Bank. Provincial Bank and Central Banks managed by (366) 64691-7.
 Progress : Movement going backwards ; enquiry called for (367) 64712-6 ; due to higher standard of living though Burmans more advanced than in the Indian Peninsula ; lack of capital ; not due to bad report issued by Registrar which was justified by the facts. Societies in the dry tracts in a very bad way. Education and knowledge of co-operative principles good. Lack of cheap credit. Land mortgage banks will give relief (368-9) 64726-41.
 Purchase societies : not many ; should be started among members of credit societies, after reformation (352).
 Sale societies : should be started among members of credit societies, after reformation ; should have godowns, built with their own money or from intact reserve funds of credit societies (352) ; not speculative (357) 64547-9. Unlucky attempt 8 years ago leading to demoralisation. To build godowns long term loans, repayable in 10 years, necessary ; Provincial Bank cannot make such loans ; application made to Government (361-2) 64625-33.
 Seed societies : (362) 64634.
 Supervision, official ; withdrawal of, a cause of trouble in co-operative movement (357) 64545-6 ; witness's changed opinion (361) 64621 ; Government should have entire control (352), (363) 64658-9.

CROPS AND CROP PROTECTION :

- Groundnut in Pakokku district, has brought in a large amount of money (358) 64570.
 Sesamum seed, price increased from Rs. 7 to Rs. 17 (358) 64571-2.

EDUCATION :

- Agriculture, scientific, should be a subject in village lay schools (353).

SEIN U—*concl'd.*EDUCATION—*cont'd.*

Attendance in fourth class, small proportion due to poverty of parents compelling them to make their children work, and lack of appreciation of education (353).

Compulsory, preferred in rural areas (353); would not involve extra expenditure (362) 64637-8, (364) 64670-6.

Co-operation should be taught in village lay schools (353).

Thrift should be taught in village lay schools (353).

FINANCE :

Land Mortgage Bank : Bill proposes to establish bank independent of co-operative banks ; this would adversely affect co-operative banks by draining away their securities. Instead of this, Government should give financial assistance to co-operative societies to replace loans issued for land redemption or purchase ; advantages of this proposal. Government advances to societies would start on a small scale increasing to a maximum of 3 crores. Staff of societies efficient to deal with such a large sum and investigation of titles of borrowers. Objection to proposal, in the Bill, of a non-elected board of control (365-6) 64681-97. State bank advocated (368) 64725.

WELFARE OF RURAL POPULATION :

Crime : caused by poverty (364) 64675.

Homesteads should be on the cultivated holding and not in the village ; this will lead to better cultivation, greater care of cattle, improved health of the family, investment of savings in banks instead of in jewellery, etc. (353-4) ; restrictions should be abolished (364) 64667-9.

Hygiene in villages cannot be improved, there being no drains and cattle being kept near houses (353).

Standard of living : Largest earning of a family after deducting expenses Rs. 20 or Rs. 30, which is insufficient to pay 15 per cent interest on loans. (Adam Smith and Sismondi quoted) (351-2), (355), (364) 64664-6, (366) 64698-711, (368) 64728-33.

Surveys, economic, in typical villages, advocated ; statement of scope and method of enquiry (354-5) ; should be done by mixed official and non-official committees (363-4) 64660-6, (367) 64707-11.

SERICULTURE (*see under* AGRICULTURAL INDUSTRIES).

SHWE, U, GALE, U YIN, and NYUN, U, Representatives of Co-operators of Upper Burma. (378-95).

All Union Chairman (394) 64807-8.

ADMINISTRATION :

Services, unsatisfactory, of Agricultural, Veterinary, Meteorological, Posts and Telegraphs Departments, and Transport (380).

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : lack of capital and having to rent land, failure to prepare estimates of future expenses and profits (380) ; recklessness and extravagance (387) ; irregularity of rainfall, insect pests, cattle disease, smallness of income (391).

Mortgages, redemption should be facilitated, and should be cancelled by payment of principal and of interest equal to principal (380).

Repayment, prevented by excess of expenditure over income (391).

Restriction of credit of cultivators, such as limiting right of mortgage and sale, advocated (380).

Sources of credit : Landowners and wealthy villagers for those who have little security to offer, *Chettis* and Chinamen for those who have adequate security ; co-operative loans are insufficient and have to be supplemented by other sources of credit (380), (391).

AGRICULTURAL INDUSTRIES :

Industrial concerns, establishment of, in rural areas should be encouraged (384).

Leisure period : work on holding occupies 4 months ; in the slack season cultivator does manuring, clearing, etc. (384) ; none in one district (392).

SHWE, U, GALE, U YIN and NYUN U—*contd.***AGRICULTURAL INDUSTRIES—*contd.***

- Preparation of agricultural produce for consumption, industries connected with should be encouraged by Government (384), (392).
- Public works, roads, irrigation, railways, etc., co-operative officers should arrange for cultivators to obtain subsidiary employment in (389).
- Study, intensive, of each rural industry advocated (384).

AGRICULTURAL LABOUR :

- Attraction of, by co-operative and Government loans and allotment of land (384-5) ; by taking measures against cholera (392).
- Myitkyina district : colonisation measures adopted by Government (392).
- Shortage, in Burma (385) ; no shortage in one district (392).

ANIMAL HUSBANDRY :

- Breeding : Cattle do not thrive owing to neglect (378), (384).
- Fodder : Burning of straw and dry grass in the dry season should be stopped (384).
- Crops : paddy stubble, jowar stalks and bean husks (391).
- Forest reserve pastures should be increased (384).
- Landowners need instruction as to (384).
- Scarcity for 120 days from March to June (384) ; for 8 weeks from October to December (392).
- Water storage by weirs, advocated (384).

CAPITAL, ATTRACTION OF, TO AGRICULTURE :

- Improvement of land prevented by indiscriminate leasing of land (387), lack or excess of water (393).

CO-OPERATION :

- Cattle breeding societies should be formed as an experiment (386) ; Registrars should circulate advice (390).
- Consolidation of holdings societies advocated (386).
- Department : should give more advice and support (394) 64811-2.
- Government : should lend to societies at low interest (388), (393) ; should exercise closer supervision and give more assistance (390) ; should take charge of Co-operative Council (393), (394) 64813, 64819-20.
- Guaranteeing unions : in some cases have had to pay (395) 64821-7.
- Improvement societies advocated as an experiment (386).
- Interest : excessive (388), (393).
- Joint farming societies : require advice of Registrar (389).
- Liability, unlimited, a good thing (394) 64806.
- Long term loans necessary (388).
- Machinery, agricultural, joint use of : should be undertaken by credit societies (386) ; requires advertisement by Agricultural Department (389).
- Members : important that they should understand principles (394) 64809-10.
- Minorities should be compelled to come into schemes for joint improvement (386) ; not feasible as to irrigation (393).
- Non-officials should help by propaganda, by newspapers, schools, etc. (389).
- Objects, societies have not yet achieved (386), (393).
- Progress : enquiry as to cause of decline advocated (388), (394) 64814.
- Purchase societies advocated (386) ; Government help necessary at first (389).
- Registrars, should continue in office for at least 12 years (388).
- Repayment, time should be extended (390).
- Revenue, payment should be postponed to 30th June (388).
- Sale societies advocated (386) ; have collapsed, require finance (389).
- Subsidiary employment on public works, roads, irrigation, supply of timber, etc., to railways, should be arranged by Co-operative officers (389).
- Supervision, closer, by Government necessary (390).
- Treasuries, societies should be able to deposit funds with (388).
- Women : Registrars should form industrial, handicraft, saving and other societies (390).

CROPS AND CROP PROTECTION :

- Fodder : Paddy stubble, jowar stalks and bean husks only (391).
- Heavier yielding food crops should be grown (382).
- New crops, demonstration of, necessary (382).

SHWE, U, GALE, U YIN and NYUN, U—*contd.*CROPS AND CROP PROTECTION—*contd.*

- Paddy, long lived, *Nga-sein-gyi*, successfully introduced by Agricultural Department (391).
- Protection : insufficient (392).
- Seed distribution depots advocated (391).
- Seed, pure, distribution of, facilitated by showing cultivators that higher prices are paid for crops grown from pure seed (382).
- Wild animals, methods of scaring away (391).

CULTIVATION :

- Breaking of surface before rains not possible (394) 64816-8.
- Gwin-set plough, a great improvement (390-1).
- Instruction needed as to rotations, mixtures, periods of planting, destruction of insect pests (382-3), (391).
- Protective measures ineffective (382).
- Tillage, existing system defective (382), (391).
- Waste of time through growing unseasonal crops, bad implements, poor seed (378), (383).

DEMONSTRATION AND PROPAGANDA :

- Fertilisers, demonstration of, necessary (382).
- Gwin-set revolving harrow should be demonstrated (390).
- New crops, demonstration of, necessary (382).

EDUCATION :

- Administration : should rest with school committees and teachers under control of Government which should give grants-in-aid (390).
- Adult : should be encouraged by Government giving preference to educated persons (379), (390).
- Agriculture, should be a compulsory subject in schools (386-7).
- Agricultural : Agricultural classes, teachers in rural areas should be drawn from (378).
 - Extension, urgent need of (378), (390).
 - Students mainly drawn from agricultural classes (379).
 - Teachers insufficient (378), (390).
- Attendance, in fourth class, small proportion, due to parents lack of desire for education and requiring their children to work (387), (393).
- Careers of agricultural students : majority become paid servants (379) ; students, higher or collegiate, should be compelled to serve in Agricultural Department and be trained in agriculture before going to other departments (386).
- Compulsory : advocated in suitable places (393).
- Facilities, insufficient (393).
- Garden cultivation should be taught in schools (379).
- Handicrafts should be taught in schools (379).
- Middle class youths should be attracted to agriculture by education (379) ; by lease of waste jungle land free of revenue (390).
- Nature study advocated (379).
- Physical exercises should be taught (384).
- Poor children should be educated as boarders at school, their expenses being paid (379).
- Practical as well as theoretical education advocated (390).
- Recreations for lads should be arranged (390).
- School farms advocated (379).
- School plots advocated (379).

FERTILISERS :

- Adulteration : analysis should be made by experts (382).
 - is unknown (391).
- Artificial, not used (391).
- Charcoal as a fuel advocated (391).
- Demonstration necessary (382).

FINANCE :

- Short term loans should be issued by Government at 10 per cent per mensem (380).

SHWE, U, GALE, U YIN and NYUN, U—*contd.***FORESTS :**

- Afforestation advocated near villages (385) ; no opening for (393).
- Agricultural purposes, full use not being made for (385).
- Cultivation, should be extended (385), (393).
- Erosion of soil, none in consequence of deterioration of forests and floods (385).
- Extraction of timber and bamboo for implements, building and firewood, licenses should be extended (385), (393).
- Grazing: facilities should be extended ; forests are not suffering from excessive grazing (385), (393) .

HOLDINGS :

- Arbitration by village committees advocated (391).
- Consolidation : owners of adjacent holdings should have right of pre-emption (381).
- Legislation necessary for consolidation (391).
- Legislation necessary to deal with minors, widows and persons legally incapable, and to keep disputes out of the Courts (381).

IMPLEMENTS :

- Government, should supply agriculturists with funds to buy implements (383).
- Gwin-set revolving harrow should be demonstrated (390-1).
- Loss of time and outturn owing to inefficient implements (383).
- Weed cutter, mechanical, advocated (392).

IRRIGATION :

- Bribery of officers of Canal Department (381).
- Distribution of canal water, system unsatisfactory (381), (391).
- Floods, measures to prevent, necessary (391).
- Minor Schemes, advice necessary (394) 64815.
- Paddy, water should be given earlier (394) 64814.
- Schemes necessary (381), (391).
- Wastage by evaporation and absorption in the soil should be prevented by reservoirs and gardens and trees (381).

MARKETING :

- Facilities : unsatisfactory (385).
- Foreign merchants, Burmans should be put in direct touch with ; cultivators only get one-third of price paid by foreign merchants (385).
- Forward sales of crops before harvest is detrimental to producers ; remedy is to supply cultivators with funds (385).
- Information as to market conditions, etc., should be supplied to cultivators, etc. (386).
- Middlemen make excessive profits (385) ; cultivators only get one-third of price paid by foreign merchants (385).

SOILS :

- Alkali (usar) and other unculturable land can be reclaimed by mixing with sand and silt by canal water (381), (391).
- Reclamation : by bunds and irrigation (391).
- Silting, beneficial effects of (391).

STATISTICS :

- Forests, area of, should be ascertained (387).
- Land culturable but uncultivated, area should be worked out (387).

TARIFFS AND SEA FREIGHTS :

- Free trade advocated (386).

VETERINARY :

- Department should be under Director of Agriculture (383), (392).
- Diseases : Contagious : Legislation as to notification, segregation, compulsory inoculation, etc., not advocated (383), (392).

SHWE, U, GALE, U YIN and NYUN, U—*concl'd.*VETERINARY—*cont'd.*

Dispensaries :

- District boards, should not remain under control of (383).
- Expansion inadequate (383), (392).
- Provincial control advocated (383), (392).
- Touring : facilities afforded by, are unknown to agriculturists (383).
- Use of, by agriculturists, not full (383) ; is full (392).
- Inoculation : obstacle, corrupt practices of veterinary assistants (383) ; no fee charged but people have no faith in it (392).
- Muktesar Institute : should be extended (383).
- Provincial Veterinary Research institution advocated (383).
- Research : Further facilities advocated (383) ; not desirable (392).
- Serum : supply sufficient (383) ; insufficient if general inoculation were attempted (392).
- Superior Veterinary Officer with the Government of India, appointment of, advocated (383).
- Veterinary Assistants : take bribes (383).

WELFARE OF RURAL POPULATION :

- Hereditary occupations followed (387).
- Hygiene : regulations necessary as to buildings, cattle breeding and water supply (387), (393).
- Surveys, economic, in typical villages advocated ; scope and method suggested (387) ; not necessary (393).
- Thrift, lack of appreciation of advantages of (387).

SHIFTING CULTIVATION (*see under SOILS*).

SOILS.

- Alkaline land : no large tracts (*McKerral*) (25) 61050 ; (usar) and other unculturable land can be reclaimed by mixing with sand and silt by canal water (*Shwe, etc.*) (381), (391).
- Analyses, occasional requests for (*Hendry*) (59) 61569 ; useless without accurate knowledge of the district (*Charlton*) (292-3) 64101-3.
- Bund construction : embankments leading to flooding on higher lands should be prohibited (*Maung, etc.*) (169), (172), (185) 62951-3.
- Chindwin, Lower, inundation owing to ruined state of old tanks (*Gyi, etc.*) (398), (402) 64877-8.
- Clay, black, yield very heavy if sufficient rainwater (*Pan, etc.*) (192).
- Delta soils not uniform (*McKerral*) (25) 61052.
- Deterioration due to constant cropping without manure (*McKerral*) (7).
- Erosion : Due to deforestation following shifting cultivation in Shan Hills (*McKerral*) (25) 61053-6. (*See under FORESTS*).
- Improved lay-out of holdings, construction of kazins and drains, advocated (*Robertson*) (341). (*See under SHIFTING CULTIVATION below*).
- Floods, serious for 5 years in Insein, Tharrawaddy, Hanthawaddy and Maubin (*Pan, etc.*) (191).
- Jungle, culturable, should be sold to cultivators, payment being by easy instalments (*Gyi, etc.*) (398) ; could be worked at a profit (402) 64879.
- Nitrogen and phosphates the limiting factors in Lower Burma rice soils (*McKerral*) (25) 61057-9. (*See under FERTILISERS*).

RECLAMATION OF LAND :

- By drainage (*Maung, etc.*) (189) 63020-1 ; by construction of bunds, by Government (172) ; by bunds and irrigation (*Shwe, etc.*) (391) ; by fertilisers (*Pan, etc.*) (192) ; by Government aid (196) ; by silting (200-1) 63062-6 ; schemes in Delta by pumping silt will improve public health (*Jolly*) (163-4) 62761-2.
- Sandy soils deteriorating (*Pan, etc.*) (192).

SHIFTING CULTIVATION :

- In Cachin Hills causes soil erosion and landslides (*Hopwood*) (116). Causes serious damage (117) 62221-7. Control impossible without reservation (117) 62228-30.
- Silting, beneficial effects of (*Shwe, etc.*) (391).

SOILS—*contd.*SHIFTING CULTIVATION—*contd.*

Silt waste in Irrawaddy (*McKerral*) (24) 61041-8, (32) 61184-6. (*See Silting under IRRIGATION*).

SURVEY :

(*McKerral*) (25) 61051; by agricultural chemist (45) 61382-9; (*Charlton*) (292-3) 64101-6; very imperfect, but some definite information obtained; samples taken by the auger to depth of 6 or 7 ins. (297) 64177-82; in Pegu District not quite completed owing to lack of staff (*Hendry*) (59) 61568.
Virgin jungle, most of paddy area of South Burma reclaimed from, within the last 10 years (*McKerral*) (7).
Waterlogging (*McKerral*) (25) 61049, (38) 61266-70.

STANDARD OF LIVING (*see under WELFARE OF RURAL POPULATION*).

STATISTICS.

Agricultural: arrangement and publication of: of no value (*Pan, etc.*) (195); importance of (*Jevons*) (273) 63884-6.
Co-operative societies, progress of (*Dunn*) (81) 61777-83.
Experiments as to yields advocated (*Edwards and Nelson*) (229) 63404.
Forests, area of, should be ascertained (*Shwe, etc.*) (387).
Groundnut: all channels of consumption should be traced (*Edwards and Nelson*) (227), (231) 63434-5.
Hydrographical, being collected and collated (*Stuart*) (249).
Land outurable but uncultivated, area should be worked out (*Shwe, etc.*) (387).
Land Records Department: crop reports of very little commercial importance as regards cotton and groundnut (*Edwards and Nelson*) (227); on an acreage basis; accurate as to rice (228-9) 63402-4; earlier information required; inaccurate as to groundnut (236-7) 63531-41.
Livestock and implements, of doubtful practical value (*Pan, etc.*) (195).
Methods satisfactory (*McKerral*) (30) 61147.
Settlement Officer's reports contain full descriptions of agricultural conditions and practice (*McKerral*) (38) 61271-5.
Surveys: economic (*see under WELFARE OF RURAL POPULATION*).
Surveys: soils (*see under SOILS*).

STUART, J. D., A.M.I.C.E., M.I.E., Chief Engineer, Public Works Department (Irrigation), Burma (240-54).

CROPS AND CROP PROTECTION :

Kyaukse District: canals irrigate about half total irrigated area bearing crops other than rice; double cropping, e.g., sesamum before rice (242).
Rice: occupies ninety per cent of the whole irrigated area (242).

IRRIGATION :

Ava Canal, reservoir on the Samon river being investigated (245).
Average annual irrigation decreased in 1901-5; explanation (241-2).
Bawle Island in Insein District, attempt to prevent floods (249).
Bunds: (*see under Embankments below*).
Canals, four major: figures of irrigation done by; ninety-nine per cent under rice (242); constructed from funds supplied by Government of India, but purchased by Government of Burma in 1921-2 (243).
Consolidated rate charged on all irrigated areas (243); does not lead to less economy in use of water (253) 63647-54.
Cost of irrigation low, but lack of opportunity (253), 63645-6.
Department: responsible for maintenance of navigable channels declared main waterways by Local Government (249) 63585; can manage both subjects (251) 63619.
Distribution of water: application of more scientific methods has increased area irrigated (244).
Drainage and reclamation: (248-9).
----- Contour surveys (248).
----- River training without embankments very successful (248).

STUART, J. D.—*contd.*IRRIGATION—*contd.*

- Embankments: receive a credit of 50 per cent of gross land revenue demand on areas protected by them; particulars; committee to examine the question (247-8); benefit protected areas but detrimental to areas outside protection, because they force up flood levels (250) 63603; not insanitary (250) 63604-5; should be removed (251) 63620-5, (252) 63628-9, (254) 63662.
- Financial results: table (243).
- Floods: practically every year, doing an enormous amount of damage; two committees appointed; department dealing with (252) 63636-40.
- Irrawaddy: problems of conservancy, not irrigation (249) 63581-4; a building-up river; deposit of silt (250-1) 63597-612.
- Kalabyagi Canal in Yamethin District under consideration (245).
- Kyaukse District: canals irrigate about half total irrigated area bearing crops other than rice; double cropping, *e.g.*, sesame before rice (242); area irrigated 1901-25 (244); Panlaung River scheme (244); Pyaungbya and Paleik Canals being re-modelled (245).
- Land Records, Superintendent of, works in consultation with Executive Engineer (243), (253) 63647-50.
- Levels of older works followed, with one unfortunate exception (254) 63664.
- Magwe District: survey being prepared (245).
- Man Canal in Minbu District remodelled (245).
- Meiktila District: tank projects being considered, for protective purposes (245-6).
- Mileage of Government irrigation channels increased 45 miles per annum for 25 years (242).
- Minor irrigation works: in Sagaing District, handed over to cultivators; Government maintenance unnecessary (251-2) 63626-7, (252) 63630-5.
- Mon, North, Canal, a new distributary sanctioned (244).
- Mu Canal in Shwebo District: surveys in progress (245).
- Myanaung embankment area: drainage problem to be considered (248).
- Navigation channels (246).
- Paleik Canal being re-modelled at cost of 3½ lakhs (245).
- Panlaung River: scheme for construction of flood—modulating reservoir sanctioned for 43 lakhs (244).
- Progress since 1901; lists of canals and costs (240-2).
- Pyaungbya Canal: being remodelled: cost 7 lakhs (245).
- Pyuntaza Plain streams: annual flooding (248).
- Research: River Irrawaddy: sufficient known as to silting and scouring action (251) 63611.
- Revenue: Collected by Civil Officers (244).
- Canal Revenue staff amalgamated with Land Revenue staff on Shwebo Canal; arrangement being introduced in other districts (243-4); a satisfactory system (253-4) 63655-61.
- Salin Canals: scheme for remodelling sanctioned: cost 27 lakhs (244).
- Scope for irrigation for 100,000 acres in Sagaing and Kyaukse districts, but cost prohibitive (254) 63663.
- Shwebo Canal: to be remodelled: cost 10 lakhs (244).
- Silting: by River Irrawaddy; scouring and silting actions; difficult to increase deposit by sluice gates in the embankments. Research: sufficient already known (250-1) 63597-612.
- Sittang River: most unstable, danger of cutting bunds (252-3) 63641-4.
- Staff: inadequate (249).
- Statistics, hydrographical, being collected and collated (249).
- Taunggan tank in Mandalay District being remodelled: Rs. 62,000 (245).
- Thitson and Samon rivers: contour survey carried out with a view to co-ordination (245).
- Toungoo District: attempt to reclaim by drainage (249).
- Tube well, not satisfactory (251) 63613-8.
- Upper Burma: Area irrigated trebled since 1901 (240).
- Dry zone, irrigation has been practised from time immemorial (240).
- Water hyacinth: problem under Irrigation Department (249-50) 63589-96.
- Wundwin Chaung in Meiktila District: storage reservoir for 3 lakhs (245).
- Yenatha Canal in Mandalay District: estimate under preparation for construction of (245).

RESEARCH:

- Irrawaddy River: sufficient known as to silt and scouring action (251) 63611,

STUART, J. D.—concl'd.**STATISTICS :**

Hydrographical, being collected and collated (249).

WATER HYACINTH :

Problem under Irrigation Department ; certain channels badly blocked ; condition remaining the same ; should be dealt with on an all-India basis ; information should be collected from all over the world (249-50) 63589-96.

SUGARCANE (*see under CROPS AND CROP PROTECTION*).

SURVEYS, economic (*see under WELFARE OF RURAL POPULATION*).

SURVEYS, soils (*see under SOILS*).

TACCAVI (*see under FINANCE*).

TANKS (*see under IRRIGATION*).

TARIFFS AND SEA FREIGHTS.

Cotton and groundnut products : customs duty and sea freight do not adversely affect prosperity of cultivator (*Edwards and Nelson*) (226), (233) 63477-8.

EXPORT CESS :

On rice, of Rs. 5-4-0 a ton, does not affect competition with other producing countries (*Edwards and Nelson*) (235) 63498-9 ; on bran, would not affect price in Burma (235) 63502 ; incidence largely on producers (*Jevons*) (275) 63908-11.

On rice and oils, has been appropriated to Central Revenues ; special taxes for particular purposes are very useful in early stages of development (*Jevons*) (276-7) 62923-8.

On rice and hides injurious to cultivators (*Dunn*) (69), (72) 61701-5.

Free trade advocated (*Shwe, etc.*) (386).

Fodder : export duty on bhoosie, i.e., bran, advocated (*Tun, etc.*) (208), (211-2) 63198-206.

Groundnuts : (*see under Cotton above*).

Hides, export has decreased owing to export tax (*Dunn*) (69), (72) 61701-5.

Import duties injurious to cultivators (*Dunn*) (69), (72) 61699-700.

Oils (*see under EXPORT CESS above*).

TELEGRAPH FACILITIES (*see under POSTS AND TELEGRAPHS under ADMINISTRATION*).

TIN, U PO, Assistant Registrar, Co-operative Societies, Pegu, East Division, Rangoon (104-115). Experience : 14 years with co-operative movement (105) 62005-7, (108) 62077-8.

AGRICULTURAL DEPARTMENT :

Co-operative societies help in seed distribution (106) 62035-6 ; and receive help from Department (110) 62109-11.

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : improved standard of living and higher rate of interest (104).

Chetty : interest 18 to 36 per cent ; insists upon valuable security ; not elastic (104).

Co-operative society : interest 15 per cent ; on personal security of members, loans extended in bad years ; the best method (105).

Measures necessary for lightening agriculture's burden of debt : improvement in production and marketing, joint purchase, reduced rate of interest, thrift, Usurious Loans Act, redemption of mortgages (105).

Moneylender, village : high rate of interest : 36 to 60 per cent in cash and 100 per cent in kind ; personal contract and elasticity (104).

Repayment, causes preventing (105) ; co-operators also live beyond their incomes (114) 62192-7.

Restriction or control of cultivators' credit not advisable (105).

Sources of credit : village moneylender, chetty and co-operative society (104).

Usurious Loans Act should be rigidly enforced (105) ; provisions should be brought to the notice of Judges (114) 62198-200.

CO-OPERATION :

Audit, primary, by Co-operative Council, good but broke down owing to lack of funds to pay auditors (113) 62182-6.

Buddhist priests : many have nothing to do with worldly affairs but some have started societies (114) 62201-2.

TIN, U PO—*contd.*CO-OPERATION—*contd.*

- Burma Co-operative Association, unofficial, activities limited (110) 62113-8.
 Capital of societies (113) 62180-1.
 Cattle insurance, not working well (114) 62203.
 Decline in movement: mainly due to relaxing of Government supervision (105-6) 62008-14; which should be done gradually (109) 62079-82. Supervision should take the place of super-audit (109) 62084-7. Failures due to small margin and high cost of management (109) 62088-90; not due to rate of interest being too low, nor to cultivators' fear of offending moneylenders (110-1) 62121-33. Upper Burma (114) 62203-13.
 Department, comparative size of (109) 62083.
 Educational influence (110) 62112, (113-4) 62187.
 Finance: interest 15 per cent on personal security of members; loans extended in bad years; co-operative, the best method (105).
 Reserve fund, share capital, current profits, loans: movement solvent (113) 62167-79.
 Guaranteeing unions: recommend loans and guarantee repayment to Central Bank; the last resort in liquidation (112) 62145-54.
 Interest: should be lowered (104); joint stock banks 6 to 7 per cent: Central Banks 10 per cent, primary societies 15 per cent, (105), (106-7) 62037-42; rates have decreased as the result of co-operation (109-110) 62100-4. Co-operative failures not due to interest being too low (110-1) 62121-8.
 Liquidation: 300 societies; outstanding liabilities 10 lakhs; 12 per cent recovered in one year; sale of members' land, unlimited liability of members called upon in one case, guaranteeing unions; 8 years to liquidate owing to employment of non-officials (112) 62145-61.
 Literature issued by Department in vernacular (110) 62105-8.
 Lower Burma wet tract, movement satisfactory (106) 62024-7.
 Management of primary societies, cost too high; majority of members take an interest in management (109) 62090-9.
 Middle dry tract, movement particularly disappointing, owing to bad seasons (106) 62015-23.
 Non-official help, activities limited (110) 62113-8.
 Primary societies, membership (107) 62046-8.
 Propaganda, none being done by department except in Arakan; unofficial propaganda not sufficient (106) 62029-34.
 no Records of work done by department (108) 62062-3.
 Repayments: about 24 per cent, in cash; period between repayment of loan and granting fresh loan; guaranteeing unions the final resort (111-2) 62141-54.
 Reputation, not very good (107) 62043-5.
 Reserve fund: 37 lakhs (113) 62167-70.
 Sale societies: groundnut: 80 per cent advance; satisfactory but ceased during War (107) 62049-57, (108) 62074-6.
 Seed distribution, help given to Agricultural Department (106) 62035-6; help received from Agricultural Department (110) 62109-11.
 Shares: 37 lakhs paid up in cash (112-3) 62162-6.
 Staff, training and recruitment: annual courses and examinations (111) 62134-40; book-keeping and accountancy not strictly enforced subjects (114) 62188-91.
 Supervision by department (108) 62064-9.
 Taccavi should be lent through co-operative banks at rates of interest not exceeding rate at which Government borrows (104); but not for non-members (108) 62070-3, (110) 62119-20.
 Thrift has been promoted (109) 62100.
 Upper Burma: 4,000 credit societies (107-8) 62058-61, (114) 62203-13.

FINANCE:

- Chetty: interest 18 to 36 per cent; insists upon valuable security, not elastic (104).
 Co-operative movement should be encouraged and interest should be lowered (104).
 Moneylender, village: high interest, personal contact and elasticity (104).
 Reserve fund, share capital, current profits, loans; movement solvent (113) 62167-79.
 Taccavi should be lent through co-operative banks at rates of interest not exceeding rate at which Government borrows (104); but not for non-members (108) 62070-3, (110) 62119-20.

TIN, U PO—concl'd.**MARKETING :**

Co-operative sale societies : groundnut : 80 per cent of value advanced, satisfactory but ceased during War (107) 62049-57, (108) 62074-6.

TIN, THUGYI U BA (witness), (see under GYL, etc.)**TUN, U (witness) (see under PAN, SAVA, etc.)**

TUN, U PAW, A.T.M., M.L.C., Bar.-at-Law ; DUMONT, J. L., B.Sc. (Edin.) ; and MAUNG, U KHIN, B.A., M.L.A. (205-223). Conference of landowners and cultivators to prepare evidence (209) 63170-1.

ADMINISTRATION :

Local self-government, beneficial to agriculture (212) 63207-16, (214-6) 63248-70.

Roads (217-8) 63292-301.

Posts and Telegraphs : dilatory or non-existent, a great handicap to agricultural population (206).

Transport : (see under Agricultural Department below).

———— Lack of, frustrates work of Agricultural and Veterinary Departments (206).

———— Provincial and district contributions to, and control over ; figures (217-8) 63292-301.

———— Railways and steamers, agriculture very poorly served by, owing to lack of roads and landing jetties (206), (213) 63221-2.

———— Roads : network required (206).

———— (see under Veterinary below).

AGRICULTURAL DEPARTMENT :

Claims of, as to improvements (209-11) 63176-87.

Services of : owing to lack of communications, nothing done for cultivators ; conditions the same as 50 years ago (206), (209-11) 63176-87. (see under Crops below).

Staff : more junior officers required for village work (210-1) 63184-7.

Yamethin Township ; farm benefits only the immediate neighbourhood (209) 63176.

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : poverty, loss of cattle, high price of cattle owing to slaughter by licensees, crop failures owing to drought and flood, fisheries, lack of irrigation (206) ; not litigation, which is caused by indebtedness (223) 63367-70.

Land mortgage banks, should be established (207).

Measures to lighten agriculture's burden of debt : Usurious Loans Act, rigid enforcement of ; land mortgage banks, extension of Government loans, co-operative societies (207).

Repayment prevented by : poverty, high interest, early sale of crops to pay land Revenue in March, crop failure owing to drought and flood (207).

Sources of credit : chettyars, Government and co-operative societies (206).

Usurious Loans Act : essential to enforce with more rigidity and more extensively (207).

AGRICULTURAL INDUSTRIES :

Health conditions : education and propaganda by vernacular pamphlets and travelling cinemas in the slack season to induce people to devote spare time to improving (208).

Leisure period : May to September cultivating work ; October and November collecting grass ; December to February cultivating ; March and April, little to do but collecting supplies (208).

Preparation of agricultural produce for consumption : Government might do more (208).

AGRICULTURAL LABOUR :

Attraction of, by labour agents, reduced fares and exemption from capitation taxes (208), (221) 63332-42.

Machinery, introduction of, would oust manual labourer from his occupation (207).

Wages : Rs. 10 a month with food and clothing (214) 63243-7.

TUN, U PAW, DUMONT, J. L. and MAUNG, U KHIN—*contd.*

ANIMAL HUSBANDRY :

- Cattle-breeding much less profitable than agriculture (220) 63327.
- Epidemics : cause serious loss to agriculturists (211) 63195-6.
- Fodder : bhoosie, i.e., bran, high cost of, causes deterioration of cattle ; export duty advocated (208), (211-2) 63198-206.
- Grazing : grounds, inadequate (208).
- Horse-racing, encouragement of, by Government officials, deprecated (207-8).
- Indebtedness : caused by loss of cattle (206), (211) 63195-6.
- Prices of plough cattle, three times what they were 30 years ago ; due to enormous slaughtering of cattle by licensees (206), and disease ; inadequate veterinary staff (217) 63285-7, (220) 63321-8, (222) 63348-52. Rs. 275 recently paid for a pair of bullocks (223) 63371-4.
- Shows, exhibitions, competitions and prizes should be given to improve breeds (207).

BURMA VILLAGE ACT :

- Restrictions on villagers living on their holdings should be abolished (208), (213) 63223-4.

CAPITATION TAX :

- Labourers should be exempted from (208) ; under Burma Rural Self-Government Act, 1921, district councils have option to convert into a tax on circumstances and property ; but has not been done owing to opposition of Government ; should be done (221) 63332-42.

CO-OPERATION :

- Credit societies (206-7).
- Government should encourage (211) 63188.
- Non-officials : help insufficient (216) 63271-8 ; receiving encouragement from Department (218-9) 63302-9.
- Progress : not flourishing so well in Upper Burma as in Lower Burma (211) 63188 ; not so active as 5 years ago (216) 63271-3.

CROPS AND CROP PROTECTION :

- Egret, preserved because a great insect feeder (205).
- Foreign markets : varieties of paddy suitable for, should be made known to cultivators (207).
- Frogs : insect feeders (205), (209) 63172-5, (222) 63364-5.
- Gram : distribution of immune varieties by Agricultural Department (210) 63181-2.
- Outturn : paddy, generally 8 baskets per acre, 15 years ago and now (210) 63176-80 ; 50 per cent greater with seed from Agricultural Department (213) 63225-40.
- Pests : Protective measures should be taken immediately (207) ; Research necessary (205).*
- Price of paddy : considerable increase (210) 63179-80.
- Rats : do a great deal of damage (209) 63173-4.
- Seed distribution : should be centre of distribution in each village tract (207), (209) 63176.
- Farms, 25 to 30 acres, required in each village tract (205-7) ; should be self-supporting (219-20) 63310-20.
- Snipe, great insect feeders (205), (222) 63366.

CULTIVATION :

- Kazins, importance of (208), (213) 63217-20, (214) 63238-42.
- Paddy : present method most suitable (207).
- Plough cattle, price of (*see under* Animal Husbandry *above*).

DEMONSTRATION AND PROPAGANDA :

- Farms, 25 to 30 acres, for demonstration, required in each village tract (205-6) ; should be self-supporting (219-20) 63310-20.
- Foreign markets : varieties of paddy suitable for, should be made known to agriculturists (207).

TUN, U PAW, DUMONT, J. L. and MAUNG, U KHIN—*concl.*DEMONSTRATION AND PROPAGANDA—*contd.*

Hmawbi Farm : excellent for research work but for demonstration serves only 5 miles radius (205).
Staff : more junior officers required for village work (210-1) 63184-7.

EDUCATION :

Agricultural : small scope for employment of educated persons (217) 63288-91.
Local control necessary (214-6) 63248-70.
Primary, a crying need (214) 63248-54.

FERTILISERS :

Artificial : not suitable for paddy cultivation, washed away by heavy rains (207).

FINANCE :

Amount : Rs. 20 or Rs. 30 to Rs. 55 per acre (211) 63192-4, (222) 63353-63.
Co-operative societies (206-7).
Government loans : formality, delay, inadequacy, repayment instalments too large. Township officers should have authority (206-7) ; Government should finance agriculture (211) 63189-94. French system at Pondicherry should be adopted (221-2) 63343-7, (222) 63353-63.
Kazins, loans should be granted for building (208), (213) 63217-20, (214) 63238-42.
Land mortgage banks : should be established (207).

HOLDINGS :

Plots : should be about 2 acres ; loans should be granted for building high and straight kazins (208), (213) 63217-20, (214) 63238-42.
Size, average : paddy land, 25 to 30 acres : the suitable size (207).

IMPLEMENTS :

Existing implements are best adapted to needs of the country (207)
Machinery : introduction of, would oust manual labourer from his occupation (207).

IRRIGATION :

Nankwe scheme, in abeyance (212) 63213-6.
Plots : should be about 2 acres in size ; loans should be granted for building high and straight kazins (208), (213) 63217-20.
Upper Burma : urgent need in Yamethin, Meiktila, Myingyan, etc. (207).

MARKETING :

Rice : premium price (213-4) 63225-40.

RESEARCH :

Foreign experts should be encouraged to spend holidays in India (205), (220-1) 63329-31.
on Pests, necessary (205).

TARIFFS AND SEA FREIGHTS :

Fodder : export duty on bhoosie, i.e., bran, advocated (208), (211-2) 63198-206.

VETERINARY :

Department, owing to lack of communications, has done nothing for cultivators ; no signs of improvement in animal diseases (206), (207), (211) 63195-7.
Staff : inadequate (217) 63285-7.

WELFARE OF RURAL POPULATION :

Diet : Changed very little (216-7) 63281-2.
—— Condensed milk, not consumed in rural parts (216) 63281.
Dress : no change (217) 63283.
Plots (208).
Standard of living : in Lower Burma has not appreciably improved during the last 10 years (216-7) 63279-85.
Status of agriculturists too low (208), (221) 63331.

USURIOUS LOANS ACT (*see under* **AGRICULTURAL INDEBTEDNESS**).
VETERINARY.

Agricultural Adviser with the Government of India not a veterinarian (*Rippon*) (127).

ASSISTANTS :

Should be under control of circle boards (*Maung, etc.*) (172); pay, which is inadequate, has been revised (*Rippon*) (130) 62422-3; false statements of touring expenses (130) 62424; keeps medicines in his own residence (*Gyi, etc.*) (400) 64843-5; does not make unauthorised charges (404) 64910; take bribes (*Shwe, etc.*) (383).

Calcutta Veterinary College, staff receive a stipend while training (*Rippon*) (131) 62439-41.

Castrations, a few at Insein Veterinary School but none in the districts: by the Italian method (*Rippon*) (128) 62396-9.

Cattle-breeding entirely under Agricultural Department (*Rippon*) (128) 62382; (*McKerral*) (41) 61320-1. Agricultural Committee of 1925 recommended that breeding should be done by Veterinary Department and distribution by Agricultural Department; could not be done with present staff (132) 62461-2. No Advisory Committee though recommended by Agricultural Committee (132) 62463-4.

CONTAGIOUS DISEASES :

Difficulties in dealing with (*Rippon*) (126); legislation necessary (126). Cattle Disease Rules, 1914 (127) 62369-70; Policing necessary (127) 62370-2; system of reporting adequate but not carried out properly (132) 62457-60. Burma Village Act gives power to District Officers (*McKerral*) (10).

Frontier staff should be strengthened (*McKerral*) (10).

Legislation as to notification, segregation, compulsory inoculation, etc., not advocated (*Shwe, etc.*) (383), (392); (*Gyi, etc.*) (398).

Department: Should be under Director of Agriculture (*Dunn*) (67), (70-1) 61695-8; (*Shwe, etc.*) (383), (392); (*Maung, etc.*) (172); (*Dunn*) (67), (70-1) 61695-8; should be independent (*Rippon*) (126); but at present under Agricultural Department (127) 62362-5; should be independent (*McKerral*) (10), (26) 61076-7.

Services: satisfactory (*Maung, etc.*) (171); progress made (*McKerral*) (41) 61316-7; has brought immense benefits to agriculturists (*Gyi, etc.*) (396), (400) 64842; unsatisfactory (*Shwe, etc.*) (380); inadequate (*Pan, etc.*) (190-1); not in close touch with cultivators (195); owing to lack of communication, has done nothing for cultivators; no signs of improvement in animal diseases (*Tun, etc.*) (206), (207), (211) 63195-7; very strong in numbers (*Dunn*) (103) 61996; understaffed in superior grades; insufficient correlation with other departments (*McKerral*) (5).

DISPENSARIES :

Demand: not much (*McKerral*) (10); none for increased number (*Dunn*) (67)

District Boards: responsible for maintenance while Assistants in charge paid out of Provincial funds; system does not work well (*Rippon*) (126); should be provincialised (127) 62366-8, (131-2) 62448-56; municipalities asked to contribute (*Rippon*) (133) 62491-6; should not remain under control of (*Shwe, etc.*) (383); (*Maung, etc.*) (172); only four; district councils contribute to, but do not control (*Dunn*) (67).

Equipment should be improved (*Rippon*) (126).

Expansion not adequate (*Rippon*) (126); (*Shwe, etc.*) (383), (392).

Insufficient number of, under district boards (*Pan, etc.*) (193).

Prome, 2 animals treated daily on average (*Rippon*) (126).

Prome District Council has objected to paying for (*Dunn*) (67).

Provincial authority, control should be transferred to (*Rippon*) (126); (*Shwe, etc.*) (383), (392); control should not be transferred to (*Dunn*) (67).

Touring dispensaries: full use not made of (*Rippon*) (126), (133) 62485-6.

—facilities afforded by, are unknown to agriculturists (*Shwe, etc.*) (383).

—none in Insein District (*Pan, etc.*) (193).

Use of, by agriculturists: not full (*Maung, etc.*) (172); (*Rippon*) (126); (*Pan, etc.*) (193); (*Shwe, etc.*) (383); is full (*Shwe, etc.*) (392); freely used by agriculturists (*Gyi, etc.*) (398); none in Monywa Township (400) 64843.

Elephant diseases, no investigation of (*Rippon*) (130) 62425-6; high mortality through anthrax, etc.; research officer sanctioned but not yet appointed (133) 62487-90; importance of (31) 61156, (34) 61211-2.

VETERINARY—contd.

- Horse-breeding transferred to Military Police (*Rippon*) (128) 62383-5.
- Inoculation : no fee charged (*Rippon*) (126); (*Pan, etc.*) (193); (*Gyi, etc.*) (398); (*Shwe, etc.*) (392); except to municipalities and wealthy owners (*Rippon*) (126); obstacles to popularising (126).
- obstacle, corrupt practices of veterinary assistants (*Shwe, etc.*) (383); no fee charged but people have no faith in it (392); often too late (*Dan*) (238).
- Insein Veterinary School : for training staff of Superior Provincial Veterinary Service (*Rippon*) (128) 62386-9; vernacular training in the past but English in future if possible; comparison with London (129) 62400-13, (131) 62442-6, (132) 62465-6; attendance 13 (132) 62467-77.
- Inspector should be under control of district board (*Maung, etc.*) (172).
- Legislation dealing with notification, segregation, etc., very necessary (*Dan*) (238).
- Muktesar Institute : should be extended (*Shwe, etc.*) (383).
- No popular demand for expansion of service (*Dunn*) (103) 61993-5.
- Research : College at Insein to be opened (*McKerral*) (2), (17) 60920-2, (18) 60936.
- Further facilities required (*Rippon*) (126); (*Dann*) (238); (*Shwe, etc.*) (383); (*Pan, etc.*) (190); not desirable (*Shwe, etc.*) (392).
- No officers at present engaged on research (*Rippon*) (131) 62445-6; (*McKerral*) (2).
- Provincial institutions advocated as well as Muktesar (*Rippon*) (126), (128) 62378-81; (*McKerral*) (10), (30-1) 61154-6; (*Pan, etc.*) (193); (*Shwe, etc.*) (383).

RINDERPEST :

- Serious, 100,000 deaths in some years (*McKerral*) (27-8) 61106-8; inoculation becoming more popular (*McKerral*) (41) 61318-9; serum-simultaneous inoculation (*Rippon*) (127) 62373-4.

SERUM :

- Institute for preparation in Burma advocated (*McKerral*) (10); Committee in 1924 rejected this proposal (41) 61315.
- Station for manufacturing in Burma (*Rippon*) (128) 62375-7; would be very expensive (133) 62478-84.
- Supply :
- Difficulty in obtaining (*McKerral*) (10); occasional difficulty in obtaining (*Rippon*) (126); system unsatisfactory (*Pan, etc.*) (193); sufficient (*Shwe, etc.*) (383) insufficient if general inoculation were attempted (*Shwe, etc.*) (392); sometimes insufficient (*Gyi, etc.*) (398).
- Staff : inadequate (*Tun, etc.*) (217) 63285-7.
- Superior Provincial Veterinary Service to be trained at Insein; must take a very long time (*Rippon*) (128) 62386-95.
- Superior Veterinary Officer with the Government of India : should be appointed (*Rippon*) (127); (*Shwe, etc.*) (383); would increase efficiency (*Pan, etc.*) (193); not recommended (*Dunn*) (67).

WATER (see under Drinking Water under WELFARE OF RURAL POPULATION).

- Waterlogging : (*McKerral*) (25) 61049, (38) 61266-70.

WATER HYACINTH.

- Not so serious in Burma as in other Provinces (*McKerral*) (42) 61333-6.
- Problem under Irrigation Department; certain channels badly blocked; condition remaining the same; should be dealt with on an all-India basis; information should be collected from all over the world (*Stuart*) (249-50) 63589-96.
- Research necessary as to insect, fungus and bacteriological enemies (*Charlton*) (279); nobody actively engaged on now (297) 64171.
- Sprays, chemical : merely mitigation; only arsenical spray likely to be effective (*Charlton*) (279); but cannot be used as it would poison cattle (289) 64038.

WEAVING (see under AGRICULTURAL INDUSTRIES).**WEIGHTS AND MEASURES (see under BASKET under MARKETING).**

WELFARE OF RURAL POPULATION.

- Beri-beri : a few outbreaks, mainly in isolated districts, forests, etc. ; not alone due to consumption of polished rice ; very little polished rice eaten (*Jolly*) (158) 62683-9.
- Board of Economic Development, advocated (*Jevons*) (269) 63842.
- Buddhist religion : prejudice against taking life leads to spread of plague through rats (*Jolly*) (147), (165) 62780.
- point of view compared with Western materialism (*Jevons*) (272) 63869-80.
- Central Public Health Department under-staffed ; must be developed (*Jolly*) (149), (153).
- Character of the people : take an uneconomic view of life, but character not fixed (*Jevons*) (270-1) 63856-9, (272) 63869-80.
- Charity : (*Gyi, etc.*) (403) 64905-7.
- Children : medical inspection in Anglo-vernacular schools, a rudimentary system. Child welfare work valuable as educational propaganda (*Jolly*) (151) ; practically no rural child welfare shows held in the towns (163) 62750-2.
- Proposed Assistant Director of Public Health for schools (164) 62772.

CHOLERA :

- Causes panic but not so serious as malaria, hookworm, dysentery including diarrhoea (*Jolly*) (154) 62627-30. Outbreaks begin in dry weather when wells are low ; a problem of water supply (161) 62721-3 ; an occupational disease, characteristic of harvest workers, due to drinking filthy water when thirsty (*Jevons*) (264).
- Cinema : Would be appreciated as a novelty (*Gyi, etc.*) (403) 64909.

COMMUNICATIONS :

- Importance of, in creating desire for better living (*Jevons*) (268) 63835-6, (276) 63917-22.
- Improvement of, destroying isolation of village which is its only defence against infectious disease (*Jolly*) (148), (161) 62728.

CO-OPERATIVE SOCIETY :

- For improvements should be established after formation of health service under district councils (*Jolly*) (147). Distribute quinine. No anti-malaria societies (157) 62674-5 ; not giving medical assistance ; not considered to be part of their work (*Maung, etc.*) (189) 63024-33.

CRIME :

- Caused by poverty (*Sein*) (364) 64675 ; great increase (*Dunn*) (97) 61924-5 ; partly due to lack of education (240) 63567 ; no connection with slack season (*Dan*) (240) 63570-4.
- Tharawaddy District : large proportion of crime in (*Dan*) (239) 63551-3.
- Has become quieter (*Hendry*) (64) 61650-3.
- Deputy Commissioners, some take an interest in agriculture and (*McKerral*) (55) 61540-2.

DIET :

- Adequate and well balanced (*Jolly*) (147), (167) 62804. Beri-beri, not alone due to eating rice ; very little polished rice eaten. Has not heard of any lathyrism. Nutrition problems of great importance ; central institution should be set up with outlying laboratory in Burma (158) 62681-94. Compared with Punjab diet (160) 62715-20. Research at Public Health Institution (163) 62753-5. "Pe-bin-pank" eaten in Burma and China (160) 62719, (168) 62815-6. (*See under* Eggs, Fish, Milk and Rice, *below*).
- Changed very little (*Tun, etc.*) (216-7) 63281-2.
- Condensed milk, not consumed in rural parts (*Tun, etc.*) (216) 63281 ; rise in standard (*Dunn*) (99) 61941-2.

DISEASE :

- Conditions of living favour the spread of communicable disease (*Jolly*) (147). Malaria, hookworm, dysentery and diarrhoea the most serious ; cholera not so serious (154) 62626-30. Preventible disease causes immense economic waste by deaths of workers at prime of life, loss estimated at over 10 crores of rupees per annum (*Jevons*) (264), (266) 63810,

WELFARE OF RURAL POPULATION—*contd.*

DISPENSARIES :

For distributing medicine and treatment of disease ; do not help in public health ; Sub-Assistant Surgeons in charge. Has not come across any lady doctors in dispensaries (*Jolly*) (161-2) 62732-8. Municipalities run their own dispensaries with financial aid from district boards and provincial revenues, under technical supervision of Inspector General of Civil Hospitals (162-3) 62744-9.

DISTRICT HEALTH SERVICE :

Practically none : part-time services of one Medical Officer per 300,000 persons and 26 Sanitary Inspectors in a rural population of 12 millions (*Jolly*) (148). Should precede treatment of special diseases (151-2). Scheme approved by Finance Committee (157) 62670-1, 62676. Financial difficulties (164) 62772-6. Organisation into districts and circles (161) 62729-31, (164-5) 62775-7. For many years its work will be mainly educative ; legislation necessary (165-7) 62787-98.

Health Officers :

At present only nominal ; should be full-time, Burmans, one for each circle, half-pay grant system (*Jolly*) (148-9) ; (*Jevons*) (265). Should be well paid (*Jolly*) (152). District Health Officer is the Civil Surgeon ; carries on private practice and is over-worked (162) 62743.

Dress : no change (*Tun etc.*) (217) 63283.

DRINKING WATER :

River supply dangerous (cholera) ; properly constructed shallow wells should be provided (*Jolly*) (149-150). Very little done to improve ; practically all rivers contaminated (157-8) 62677-80. Cholera, a problem of water supply (161) 62721-3. Very little done towards safeguarding (*Jevons*) (265), pure supply importance of, economically (266-7) 63811-5

See under Wells below.

Economic surveys : (*see under Surveys below*).

Efficiency of Burman labour compared with that of Indian and British (*Dunn*) (97) 61926-33.

Eggs : very little eaten (*Jolly*) (159) 62704-5.

Engineering Section of Public Health Department should be strengthened (*Jolly*) (150), (152).

Environmental conditions : not much can be done to improve, in the absence of district health service ; villagers must be aroused to possibilities of improvement (*Jolly*) (149). Change of attitude towards, in the towns, but not in rural areas (165) 62778-80. Village not more subject to disease than town (167) 62799-00.

Expectation of life, though higher than that of other Indian Provinces, pitifully low compared with European standards (*Jolly*) (147).

Finance : Municipalities receive financial aid from district boards and provincial revenues for dispensaries (*Jolly*) (162-3) 62744-9. Finance Committee sympathetic to public health service (163) 62757-8. Grants from Indian Research Fund Association for beri-beri research and Pasteur Institute. No assistance from Rockefeller Institute (164) 62764-8. Small proportion of public health budget spent in rural areas (164) 62771. Financial difficulties (164) 62776.

Fish : fresh or dried (*Ngapi*) eaten with rice (*Jolly*) (159) 62700-3, as a relish (159) 62708. Research (163) 62753-5.

Government Estates Department colonies (*Dunn*) (94) 61883-91.

Hereditary occupations followed (*Shwe, etc.*) (387).

Homesteads should be on the cultivated holding and not in the village ; this will lead to better cultivation, greater care of cattle, improved health of the family, investment of savings in banks instead of in jewellery, etc. (*Sein*) (353-4) ; restrictions should be abolished (364) 64667-9.

Hookworm : Latrines (*Jolly*) (150). No general policy except propaganda. Use of latrines decreases incidence. Infection mostly through the feet ; shoes or sandals a principal preventive. Experiments in Assam very significant but conditions different (156) 62653-7, (167) 62805-6. Excessive heat and rain destroy hookworm (165) 62786. Less prevalent among the Shans who eat raw meat (167) 62807-9.

HOUSING :

Mat and thatch raised on piles, possibly protects against Kala-azar, but affords cover for malaria mosquitoes ; offers facilities for rats ; a few minor alterations

WELFARE OF RURAL POPULATION—*contd.*HOUSING—*contd.*

in design would make a great difference (*Jolly*) (150), (167) 62799. Economic difficulty (165-6) 62789-90; vast increase in masonry buildings; use of corrugated iron (*Dunn*) (97) 61922. (*See under Homesteads above*).

HYGIENE :

- Regulations necessary as to building, cattle breeding and water supply (*Shwe, etc.*) (387), (393); in villages cannot be improved, there being no drains and cattle being kept near houses (*Sein*) (353).
 Improvement in condition of people (*McKerral*) (45) 61376-7.
 Individual health; measures to improve, should follow environmental hygiene; vaccination for smallpox an exception (*Jolly*) (151).
 Industrial development desirable to maintain standard of life; but sanitary conditions must be secured in towns (*Jevons*) (275-6) 63912-6.
 Infantile mortality terribly high (*Jolly*) (147); malaria one of the principal causes (155) 62646-9. (*See under Milk below*).
 Inspector-General of Civil Hospitals: in charge of medical training (*Jolly*) (159) 62696; of subsidised practitioners (157) 62672-3; and of maternity (162) 62740-2. Supervises hospitals under municipalities (162) 62744-5, (163) 62748.
 Isolation of villages prevents spread of disease (*Jolly*) (147); but no other defence, and improved communications are destroying this isolation (*Jolly*) (148), (161) 62728.
 Kala-azar: Mat and thatch houses raised on pile possibly protect against (*Jolly*) (150). Not endemic. Can be mistaken for malaria. Arakan threatened with (154-5) 62637-40.
 Lathyrism: has heard of none (*Jolly*) (158) 62690.
 Latrines: in dry zone deep pit; in flooded areas septic tank. Officer on special duty should be appointed (*Jolly*) (150). Wearing of shoes when visiting (151).
 "Makkalam": used as the name of many diseases (*Jolly*) (167) 62801-3.

MALARIA :

- Co-operative societies distribute quinine; no anti-malaria society (*Jolly*) (157) 62674-5.
 Cultivation, complete, principal factor in getting rid of malaria (*Jolly*) (161) 62724-7; handicapped by malaria (*Dunn*) (98) 61934-40.
 Housing, mat and thatch, shelters mosquito (*Jolly*) (147), (150).
 Imported infection worse (155) 62642-3.
 Kala-azar can be mistaken for (154) 62631-40.
 Kysukpyu; drainage and stopping wet cultivation (154) 62631-6.
 at Minbu in Upper Burma (*McKerral*) (36) 61244-5.
 Mosquito netting should be woven locally (*Jolly*) (150).
 Quinine necessary (*Jolly*) (150). Distribution insufficient; should be given free to everybody but financial difficulties too great (155) 62644-6. Cinchona febrifuge distributed: as good as pure quinine (155) 62650-2. Co-operative societies distribute (157) 62674.
 Season varies; worst at beginning and end of rains (*Jolly*) (155) 62641.
 Village site, improvement of (*Jolly*) (150-1).
 Milk: very little consumed except for a recent tendency to take condensed milk. Burmans get on very well without, very difficult to keep babies alive when not breast fed (*Jolly*) (159-160) 62706-10; in large towns supply unsatisfactory; Government and Co-operative societies should undertake (*Pan, etc.*) (197), (201) 63067.
 Municipalities run their own hospitals with financial grants from district boards and provincial revenues, under technical supervision of Inspector-General of Civil Hospitals (*Jolly*) (162-3) 62744-9.
 Opium smoking encouraged by Chinese (*Gyi, etc.*) (404) 64917-9.
 Plague, an occupational disease, affecting workers in and about rice-mills, grain godown and shops (*Jevons*) (264).
 Population, pressure on soil (*Jevons*) (268) 63830-7; compared with Western countries (272-3) 63881-4.
 Provincial Public Health Board: distributes grants; has a non-official majority (*Jolly*) (160) 62713-4.
 Public Health Act: does not exist but is necessary (*Jolly*) (164) 62769-70. Should leave wide powers of discretion to district councils (165-7) 62787-98.

WELFARE OF RURAL POPULATION—*contd.*

PUBLIC HEALTH DEPARTMENT:

- Has not been able to safeguard health of rural population except by vaccination and staying progress of epidemics (*Jevons*) (265); Central: under-staffed; must be developed (*Jolly*) (149), (153); in relation to the Medical Department (160) 62711-2; likely to develop (163) 62760; Engineering section should be strengthened (150), (152).
- Public Health Institution opened last year (*Jolly*) (163) 62753-5; Finance Committee approved full-time officer (164) 62772.
- Publicity: Hygiene publicity officer produces pamphlets, cinema films, etc. (*Jolly*) (157) 62668-9. Posters issued do not frighten people (164) 62763. Non-official assistance (165) 62785. Importance of education (165-6) 62787-94.
- Public opinion: great awakening as to public health in recent years (*Jolly*) (163) 62756-8; has been stimulated by grant of local self-government (164) 62775. Importance of education on public health matters (165-6) 62787-94.
- Punjab canal colonies: standard of living being raised (*Jevons*) (269) 63839.
- Punjabi compared with Burman as to physique; not much difference, both good; considerable immigration of Punjabis into Burma. Comparison of diets (*Jolly*) (160) 62715-20.
- Quinine: no distribution of (*Maung, etc.*) (189) 63023-4; people appreciate value of (190) 63034; (*Jolly*) (147). (See under Cinchona under CROPS AND CROP PROTECTION).
- Rats: Large number in houses; religious prejudice against killing (*Jolly*) (147); compared with China and Japan (165) 62780-4. Burman hut offers facilities to; slight alteration in design would make a great difference (150); methods of storing rice (151), (167) 62799.
- Reclamation schemes in the Delta by pumping silt will improve public health (*Jolly*) (163-4) 62761-2.
- Research: necessary (*Jolly*) (152); on diet at Public Health Institution (163) 62753-5.
- Rice: Beri-beri not alone due to eating polished rice; very little polished rice eaten (*Jolly*) (158) 62684-9. Fish nearly always eaten with rice (159) 62700-3, 62708. Disagrees with Col. McCarrison as to nutritive value of rice (160) 62719. Unpolished better than polished (167) 62810-4.
- Rubbish disposal should be dealt with by circle boards and village committees (*Jolly*) (150).
- Sanitary Inspectors: one required for each circle, total 287 (*Jolly*) (148-9).
- Sanitary precautions: very little instruction of the people (*Jevons*) (265).
- Sanitation in villages (*Maung, etc.*) (189) 63022.
- Schools: (see under Children above).
- Self-government, rural local, should be developed (*Dunn*) (70).
- Specific diseases, e.g., leprosy and venereal diseases, measures directed against should follow provision of adequate health service (*Jolly*) (151-2).
- Standard of living:
- Has risen (*Dunn*) (97) 61920-3; high, cause of indebtedness (*Dawson*) (255); high as compared with Indian Peninsula; probably gone up in recent years (*Dawson*) (261) 63781-5.
- Impossible to make a living out of agriculture (*Gyi, etc.*) (401) 64858.
- In Lower Burma has not appreciably improved during the last 10 years (*Tun, etc.*) (216-7) 63279-85.
- Largest earning of a family, after deducting expenses, Rs. 20, or Rs. 30, which is insufficient to pay 15 per cent interest on loans. (Adam Smith and Sismondi quoted) (*Sein*) (355), (351-2), (364) 64664-6, (366) 64698-711, (368) 64728-33.
- Raising of Literacy desirable but not necessary preliminary to; agriculture must be made more productive, but danger of increased production being eaten up by increased population; communication creates desire for better living (*Jevons*) (268) 63829-36, (276) 63917-22; importance of correlation and concentration of different measures for improvement; the Punjab example; Board of Economic Development advocated (268-9) 63837-42; Government should raise loans if necessary (270) 63853-8; industrial development desirable (275-6) 63912-6.
- Status of agriculturists too low (*Tun, etc.*) (208), (221) 63331.
- Sub-Assistant Surgeons:
- 20 employed at present; 4 years' training in the Government Medical School in Rangoon; pay starts at Rs. 100 and Rs. 150 (*Jolly*) (158-9) 62695-9.
- In charge of dispensaries; have not much time to do health work (*Jolly*) (162) 62734-7.

WELFARE OF RURAL POPULATION—concl.

Subsidised practitioners not used for public health work ; under Inspector General of Civil Hospitals (*Jolly*) (157) 62672-3.

SURVEYS, ECONOMIC, IN TYPICAL VILLAGES :

- Marketing, stockbreeding and coconuts (*McKerral*) (43) 61341-2.
 Of great value (*Jolly*) (152) ; advocated (*Pan, etc.*) (195) ; (*Sein*) (354-5) ; (*Shwe, etc.*) (387) ; (*Gyi, etc.*) (399) ; not necessary (*Shwe, etc.*) (393) ; not advocated (*McKerral*) (13) ; generally not advisable (*Dunn*) (70), (83) 61799-801.
 Reports prepared by Punjab Board of Economics very valuable (*McKerral*) (34-5) 61218-22.
 Statement of scope and method of enquiry (*Sein*) (354-5) ; (*Shwe, etc.*) 387 ; should be done by mixed official and non-official committees (*Sein*) (363-4) 64660-6, (367) 64707-11.
 Tharrawaddy District : has become quieter (*Hendry*) (64) 61650-3 ; large proportion of crime in (*Dan*) (239) 63551-3.
 Thrift, lack of appreciation of advantages of (*Shwe, etc.*) (387).
 Unemployment and poverty causes of increased crime (*Pan, etc.*) (198). Usury, the root cause of economic difficulties of cultivators (*Pan, etc.*) (195). (*See under AGRICULTURAL INDEBTEDNESS*).
 Vaccination: no prejudice against (*Jolly*) (165) 62781 ; an exception to the general principle of dealing with public health before individual treatment (151).
 Villages, lay-out, badly planned (*Jolly*) (150). (*See under Isolation above*).
 Water (*see under DRINKING WATER above*).
 Wells and tanks should be protected against contamination ; Engineering Branch of Public Health Department must be strengthened (*Jolly*) (150).
 Wireless, not known (*Gyi, etc.*) (403) 64908.
 Women : Lady doctors in larger hospitals, not in dispensaries ; except in bigger centres, no special provision for women's diseases ; not sufficient trained midwives (*Jolly*) (162) 62738-42.

GLOSSARY

Ahlu .. ..	.. A festival.
Akyosoung .. ..	.. An honorary organiser.
Arlein .. ..	.. A harrow.
Awza .. ..	.. Authority or dignity.
Bania .. ..	.. A Hindu grain trader who is generally also a moneylender.
Be-da-bin .. ..	.. The water hyacinth (<i>eichornia crassipes</i>).
Berseam .. ..	.. Egyptian clover (<i>trifolium alexandrinum</i>).
Bhamado .. ..	.. Interest on capital.
Bhoosi .. ..	.. The husk or chaff of grain ; the straw.
Bobabaing .. ..	.. Non-State land (as opposed to State land in Upper Burma).
Bulu .. ..	.. A race of silk-worms.
Bund .. ..	.. A dam ; field embankment.
Chasam .. ..	.. Tape made from the external layers of the cocoons of silk-worms.
Chaulmoogra .. ..	.. A tree (<i>gynocardia odorata</i>), the oil from which is used as a cure for leprosy.
Chaung .. ..	.. A creek.
Chetty, Chettyar .. ..	.. A moneylender.
Crore .. ..	.. Ten millions.
Dak .. ..	.. A post ; a stage or station.
Dal .. ..	.. A generic term for food pulses.
Dhainoha .. ..	.. A leguminous fibre plant (<i>sesbania aculeata</i>), often grown for green manuring.
Emata .. ..	.. A variety of paddy.
Eri .. ..	.. A type of silk-worm (<i>attacus ricini</i>).
Ghi .. ..	.. Clarified butter.
Gwin-set .. ..	.. A revolving harrow.
Hispa .. ..	.. A small insect which attacks paddy (<i>hispa armigera</i>).
Ingyin .. ..	.. A forest tree (<i>shorea siamensis</i>).
Juar (Juari) (Jowar) .. ..	.. The large millet (<i>sorghum vulgare</i>).
Kaing .. ..	.. Elephant grass (<i>saccharum spontaneum</i>).
Kapas .. ..	.. Cotton with seed still adhering ; unginced cotton.
Kason .. ..	.. A month in the Burmese calendar (about May).
Kaukgyi (Kauk-kyi) .. ..	.. Late maturing paddy.
Kauk-yin .. ..	.. Early maturing paddy.
Kazin .. ..	.. A small field bund.
Keseru .. ..	.. A small tree (<i>heteropanax fragrans</i>), on the leaves of which the eri silk-worm is fed.
Khamru .. ..	.. Home-reeled raw silk (Bengal).
Kikuya .. ..	.. An African fodder grass (<i>pennisetum clandestinum</i>).

Lakh .. ..	.. One hundred thousand.
Litohi (Liohi) .. ..	.. An evergreen fruit-tree (<i>nephelium litchi</i>).
Longie (Lungi) .. ..	.. The dress of the male Burman; a voluminous attire
Maistri .. ..	.. A foreman; head of a gang.
Makkalam .. ..	.. An indigenous name for an undefined disease.
Maund .. ..	.. A measure of weight of 82.28 lb. (standard maund); has different values for different commodities and for the same commodity in different localities.
Mayin .. ..	.. Summer paddy.
Merker .. ..	.. A grass (<i>pennisetum spontaneum</i>).
Mofussil .. ..	.. The country as opposed to the town.
Muga .. ..	.. A variety of silk-worm (limited to Assam) (<i>antherax assamwa</i>).
Mungoo .. ..	.. A bean crop (<i>phaseolus radiatus</i>).
Nadaw .. ..	.. A month in the Burmese calendar (November-December).
Nayone .. ..	.. A month in the Burmese calendar (about April).
Ngapi .. ..	.. Preserved fish.
Nga-sein-gyi .. ..	.. A main variety of late paddy.
Ngwe-pyan-toe .. ..	.. Interest, repayable in kind, actually repaid at the money value of the amount of crop due.
Padauk .. ..	.. A large timber tree (<i>pterocarpus indicus</i>).
Pagoda .. ..	.. A Buddhist religious edifice.
Patta .. ..	.. A document of lease.
Payapwe .. ..	.. A pagoda festival.
Pebyugale .. ..	.. A bean crop (<i>phaseolus lunatus</i>).
Pelun .. ..	.. A leguminous plant (<i>phaseolus calcaratus</i>).
Phongyi .. ..	.. A Buddhist monk or priest.
Phongyibyan .. ..	.. The funeral obsequies of a monk.
Poongyi kyaung .. ..	.. A monastery.
Pucca .. ..	.. Solid, correct, complete, etc. (the contrast in all respects to <i>kutchha</i>).
Purdah .. ..	.. A veil; screen; the practice of keeping women secluded.
Pwinbyu Pyaunghaing .. ..	.. A parasitic plant (<i>striga lutea</i>).
Pyatho .. ..	.. A month in the Burmese calendar (December-January).
Pyinkado .. ..	.. A forest timber tree (<i>xylic dolabriformis</i>).
Rabi .. ..	.. The spring harvest; crops sown in autumn and reaped at the end of the cold weather.
Ryot .. ..	.. A cultivator.
Sabape (Sababe) (Sabapay) .. ..	.. A system of borrowing in which the loan is repaid in kind at harvest, e.g., 'A' borrows Rs. 50 in May and repays 100 baskets of paddy in December.
Sapodilla .. ..	.. A species of fruit-tree (<i>achras sapota</i>).
Shin-byu .. ..	.. A religious ceremony which takes place when a small Burmese boy is received into a Buddhist monastery.
Tabaung .. ..	.. A month in the Burmese calendar (about February).
Tabodwe .. ..	.. A month in the Burmese calendar (about January).
Tacoavi .. ..	.. An advance made by Government to cultivators for agricultural purposes.
Tagu .. ..	.. A month in the Burmese calendar (about March).

Taluka (Taluqa)	..	A local revenue division of a district.
Tasar	.. . . .	.. A type of wild silk-worm (<i>anthraea graphia</i>).
Taungthu	..	.. A cultivator.
Tawthalin	..	.. A month in the Burmese calendar (about September).
Tazaungmon	..	.. Do. (about November).
Thadingyut	..	.. Do. (about October).
Thamadis	..	.. A village committee to assess the individual in advance of the <i>thathameda</i> demand in a village or town.
Thathameda	..	.. An Upper Burma tax on property and circumstances.
Theikpan (plough)	..	.. An improved plough.
Thugyi	..	.. A village headman.
Thugyiza	..	.. Land granted to a selected village headman as a reward for good service.
Usar	..	.. Land impregnated with sodium salt and thereby rendered barren.
Viss	..	.. A measure of weight equivalent to 3.6 lb.
Wagale	..	.. Short staple cotton.
Wagaung	..	.. A month in the Burmese calendar (about August).
Wagyi	..	.. Long staple cotton.
Wape	..	.. Repayment of an advance of cotton seed in cotton (<i>kapas</i>) at harvest time.
Wazo	..	.. A month in the Burmese calendar (about July).
Wunza	..	.. The amount of paddy set aside for domestic consumption.
Ya Miscellaneous upland cultivation.
Zamindari Property belonging to a big landholder.

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