

6381

ROYAL COMMISSION
ON
AGRICULTURE IN INDIA

Volume II

Part I

EVIDENCE

TAKEN IN THE

Bombay Presidency.



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CENTRAL PUBLICATION BRANCH
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INTERIM REPORT

6381

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 up to the 2nd of November 1926 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.

(„) GANGA RAM.

(„) 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.

15th May 1927.

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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.

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15. Veterinary.
16. Animal husbandry.

PART IV

17. Agricultural industries.
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22. Co-operation.
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24. Attracting capital.
25. Welfare of rural population.
26. Statistics.

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?

MINUTES OF EVIDENCE

TAKEN BEFORE THE

ROYAL COMMISSION ON AGRICULTURE.

Friday, October 22nd, 1926.

POONA.

PRESENT:

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

Sir HENRY STAVELEY LAWRENCE,
K.C.S.I., I.C.S.
Sir THOMAS MIDDLETON, K.B.E.,
C.B.
Raj Bahadur Sir GANGA RAM, KT.,
C.I.E., M.V.O.
Sir JAMES MACKENNA, KT.; C.I.E.,
I.C.S.

Mr. H. CALVERT, C.I.E., I.C.S.
Raja Sri KRISHNA CHANDRA GAMAPATI
NARAYANA DEO of Parlakimedi.
Professor N. GANGULEE.
Dr. L. K. HYDER.
Mr. B. S. KAMAT.

The Hon'le Sir CHUNILAL V. MEHTA (*Co-opted Member*).

Mr. J. A. MADAN, I.C.S. } (*Joint Secretaries.*)
Mr. F. W. H. SMITH.

Dr. HAROLD H. MANN, D. Sc., Director of Agriculture, Bombay
Presidency.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(a) I think that so far as the organisation of research work in the Bombay Presidency is concerned, which is within the power of the Bombay Agricultural Department, the method adopted and described on page 21 of the Bombay Memorandum* is satisfactory and is working well. We have excellent laboratories in most directions, though we should like better facilities in connection with horticultural investigation, with the study of plant diseases and with the study of insect pests. The field laboratories in connection with plant breeding work might also be improved and will be improved when money is available.

I may describe more in detail the method of organisation now adopted in the Bombay Presidency. The Director of Agriculture is the final referee in research matters. At the Agricultural College in Poona, there is a corps of experts, who are also responsible for the teaching of degree students, and for the training of post-graduate students and workers. So far as teaching is concerned they are under the control of the Principal of the college, but for research purposes they deal direct with the Director of Agriculture.

Beyond this we have a number of research stations in different parts of the Bombay Presidency each generally existing for a specific purpose or for research on a particular subject. Some of these are supported by Government (Rice Research Station, Karjat, Tobacco Research Station, Nadiad, Soil

* Control of Research Work by Committees whose members have special knowledge of the work in hand with the Director of Agriculture usually acting as Chairman. Some members may be from outside the department.

Physics Research Station, Manjri, etc.), while in other cases they are maintained on subsidies from other bodies, notably the Indian Central Cotton Committee (Surat, Dharwar, etc.). The most highly developed part of the work in these stations is plant breeding and in this we have had very great successes in cotton at Surat and Dharwar, at Karjat in rice, and at Nadiad in tobacco. But other lines of work are now under intensive study with fairly satisfactory facilities, such as cotton physiology, and cotton entomology at Surat, certain cotton diseases at Dharwar, dry land conditions at Manjri, etc.

In major work the usual plan is that the necessity of a particular line of work is discussed by the Director of Agriculture with the officer to whom he proposes to entrust it, and a policy in connection with it is laid out. The officer selected then places his plans for carrying it out before a committee nominated by the Director of Agriculture where criticisms are received and suggestions made. A definite programme is then drawn up by the officer in charge, and a progress report is made generally twice a year, to the same committee. We thus get the pooling of the experience of workers in allied subjects for the benefit of any piece of work.

This method has, on the whole, worked well. Without interfering with a research worker in carrying out what has been entrusted to him, it has prevented the squandering of energy on lines likely to be unproductive, has led to concentration on the main ends to which the work leads, has stimulated the men to steady work, and has often led to economy in carrying out the research.

I am getting more and more inclined to the idea that research work must be classified by subject of research, rather than by science. This does not mean that a piece of work which involves plant breeding will not be carried out by men who are essentially botanists and so on. But we expect a worker who is studying, say the grass land of the Deccan and its improvement, to envisage the problem as a whole, and similarly a man who is entrusted with the improvement of tobacco in a particular region is expected to see how not only selection and purification of the plants grown, but also other lines of attack can be employed to advantage.

As regards the financing of research work, the line I have taken in recent years is to put up to Government definite schemes, specifying the purpose of the work proposed, the length of time which I estimate will be required to obtain valuable results, and asked for grants on this temporary basis. Many schemes proposed have, of course, been turned down, but a number have been undertaken, and in some cases definite results have been already achieved.

It would be an exceedingly satisfactory thing if a permanent fund could be created in the Presidency, from which researches could be financed, so that their continuance would not be subject to the fluctuations of provincial finance. But I recognise that this is likely to be a counsel of perfection, at any rate in the near future.

Of course, if we were provided with larger grants for research, we could do much more, and we have men now in fair number, who could be entrusted with the responsible charge of investigations—provided these are conducted under the general direction and control described above. Such an extension of research work is very much needed now as in many parts of the Presidency the people are coming to look to us for a solution of their difficulties in a way which was inconceivable ten years ago.

Under this head, I suppose I am to consider the question of the relationship of the research work done in a Province like Bombay, to that done by the Central Government at Pusa and elsewhere. I may say that we have got valuable help from the researches done at Pusa, more especially in connection with Mr. Howard's work in the improvement of crops, and also from the work on the improvement of sugar-cane done at Coimbatore. Pusa with its resources also form a valuable centre of information. But our research work is hardly dependent in any way on that at Pusa, nor would it be possible, I think, without general injury to the work, to have it in any way directed

from the Central Government, either by an All-India Research Board or otherwise.

For all the help that the Central Government can give we are thankful. The determination, however, of the nature of the problems that need investigation and on which money should be spent in the Bombay Presidency must be a matter in which the local authorities should have a dominating voice. And, yet, the Indian Central Cotton Committee has shown how an All-India body can, while preserving a very broad outlook, assist and stimulate agricultural research in every part of India. This body, composed of business men and farmers, as well as agricultural experts, is furnished with large funds from the cotton trade, which are to be devoted to agricultural research in the improvement of cotton cultivation. This it does on the one hand by subsidising a research institute at Indore, and on the other, by giving grants to local agricultural departments for the investigations of special problems in cotton growing. These grants are applied for by the local agricultural department, with a statement as to how the work is proposed to be carried out. The organisation adopted and the detailed programme is submitted for approval to the Indian Central Cotton Committee, while the progress made comes under review once a year. The grants are nearly all definitely for five years.

Now, a similar scheme might be adopted for the participation of the Central Government and its workers, in investigations in matters of interest in several Provinces. I would suggest that a Central Agricultural Research Board should be provided with funds, and that these should be utilised by a series of committees each dealing *ad hoc* with one large subject of agricultural research in a manner similar to the way in which the Indian Central Cotton Committee works. I should consider it essential that such committees should meet at least twice a year, and should contain a substantial proportion of representatives of Provinces, of business and of agricultural interests. There is the germ of something of this sort in this Sugar Bureau and the Tobacco Bureau at Pusa, but such committees must be in no way tied to Pusa, if they are to function satisfactorily.

QUESTION 2.—AGRICULTURAL EDUCATION.—Before attempting to answer the specific questions put in the Questionnaire sent to me, I should like to make clear what object I have in view in dealing with agricultural and rural education. Then we will see how far these purposes are being achieved in the Bombay Presidency.

There are four purposes which, in a country like India, agricultural and rural education should try to serve. These are—

- (1) to saturate ordinary primary rural education with the agricultural outlook, especially with boys from ten or eleven years upward;
- (2) to provide specialised agricultural education, in the vernacular, to well-to-do peasants and small cultivators. These will go back to their land, and, being cultivators themselves, will be centres of influence. These schools should be good and will not be cheap;
- (3) to provide secondary education, including agriculture, either in special secondary English schools or in the ordinary English schools, leading up to a genuine test, including agriculture, of matriculation standard. These men should be preferred for all minor official positions in the rural areas, for clerks to zamindars, etc., and
- (4) to provide college education of the highest standard of as high a standard as in any part of the world, in every Province. The men so produced would become the leaders in improvement, as they are becoming here in Bombay.

Now, at present, in Bombay we are trying to meet all these purposes except (3). The first purpose is attempted in the agricultural-bias schools, and the extension of these is only limited by the supply of trained teachers, for I can only train twenty teachers each year for the Educational Department, and hence progress will be slow until a regular centre for training these men,

on a large scale, in each of our language areas is provided. I am sure this line of work is in the right direction.

The second purpose is attempted in the vernacular agricultural schools of which Loni is the type. Details as to the present position of these have been separately supplied to the Chairman of the Commission, with details as to the evidence of their popularity.

The third purpose is as yet unfulfilled, and is undoubtedly a hiatus. One high school (at Bordi, District Thana) is now proposing to take a definite step in this direction.

The last purpose, college education, is one where we have tried in Bombay, to reach the highest standard, and I think I may say that the standard is high and is improving.

As regards the specific questions asked, I may reply as follows:—

- (1) There is need for another Agricultural College of University standard in Sind, and the proposal to establish one has been put forward by an important Committee in 1924. We can staff now all the institutions demanded, except the agricultural-bias schools conducted by the Educational Department in consultation with the Agricultural Department.
- (2) No.
- (3) Teachers in rural areas should by preference be drawn from the agricultural classes. We have, however, to get qualified teachers where we can.
- (4) The attendance at existing institutions is as great as can be accommodated, or nearly so. The Poona Agricultural College is overfull, and 85 applications were rejected this year. The vernacular agricultural schools are nearly full, except in the case of Jambul (Konkan). They would be full but for the leakage which takes place after boys join.
- (5) No remarks.
- (6) At the vernacular agricultural schools the pupils are nearly all drawn from the cultivating and landowning classes. In the Poona Agricultural College about 25 per cent belong to the cultivating and many more to the landowning class. The proportion from families definitely identified with agriculture is increasing.
- (7) I do not think that any modification in the course of study is called for.
- (8) In agricultural-bias schools we have definitely gone in for an area of $\frac{1}{2}$ to 1 acre per school. Larger areas involving the use of bullock power and large scale implements are not desirable as a rule. In the vernacular agricultural schools of the Loni type we have a regular farm with about one-fifth of an acre of land per boy. I think this is necessary.
- (9) The bulk of the students who pass through the Poona Agricultural College do it in order to make a career for themselves. In the past a very large number have been utilised in the Bombay Agricultural Department or in the Agricultural Departments of other Provinces and States. About 18 to 20 per cent have gone in for cultivating or managing their own lands. The number who have done this in a series of years is shown below, with the number graduating in that year.

I regret I have not data up to date.

	Total number graduated.	Number going in for private farming.
1913	14	6
1914	18	2
1915	20	4
1916	23	3
1917	30	5
1918	18	3

(10) We have two methods of assisting our graduates to improve technical knowledge. The first is by the provision of eight positions of graduates in training. These are trained on a farm of the Agricultural Department until an opening either in the department or outside opens.

The other is the offer to train men in business farming on the Jalgaon farm—living accommodation being provided but nothing else. This has not so far attracted candidates.

(11) No remarks.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—As to the methods of getting improvements introduced into Indian Agriculture, I would refer the Commission to a series of four reports, which I edited and which were published from 1909 to 1912 by the Imperial Department of Agriculture. I do not think that any new methods have been devised since that time, though, of course, with increasing experience, the stress laid on the different methods has altered.

But it must never be forgotten that the essential difference between agricultural departments in the East and in the West is that the latter have arisen to meet the spontaneous demands of the cultivators of the soil, while the former have been created by a Government anxious to give all the help it can to its agricultural citizens. In India, therefore, and this certainly applies to Bombay, it is necessary for the Agricultural Department to put forth every effort, first to ascertain the needs of the cultivators and then to demonstrate how they can most effectually be met.

I would, however, urge that on the whole the people with whom we have to deal are not more conservative than they have to be. In fact, I am inclined to think that they are less conservative than an average English farmer. The position of a cultivator, however, faced with a recommended improvement, is that if it costs any money he can only receive it with very great caution and only after such local demonstration as makes its value completely certain. Hence, all advertisement whether by leaflets, by speeches, by meetings, or by lanterns and cinematographs are of very little effect unless accompanied by actual demonstrations on the spot. This is a definite opinion after a good many years observation. The place of these things is as an accompaniment to demonstration and they will have little effect apart from it.

Now, we have, on the whole, been successful in introducing a number of implements, a number of improved and imported seeds, a certain number of artificial manures, certain remedies for plant diseases, and a few other things, and in creating an interest in better cattle, in pumps for irrigation, in land improvement to prevent erosion in certain areas, and so on.

Thus, within the past twenty years the iron turnwrest plough has almost crushed out the old Deccan plough in many parts of the Deccan, and the Egyptian plough has almost completely replaced the Sindhi plough in large areas in Sind. In the matter of seeds, the demand for improved seed of cotton in many areas, of tobacco in Northern Gujarat, of rice in certain areas in the North Konkan is far greater than we can supply, even though a good deal is spent in maintaining and multiplying the seed. Among artificial manures, the success of sulphate of ammonia as a more efficient partial substitute for fish and oil-cake in the Deccan Canal tracts only really dates from 1919, and the consumption is now nearly 3,000 tons per annum. The treatment of *jowar* seed for smut has very rapidly increased under intensive propaganda in the last three years during which the area for which treatment has been sold has increased as follows:—

	Acres.
1923-24	250,348
1924-25	343,976
1925-26	682,188

One of the most successful pieces of work of this kind has been the spraying of grapes on the Deccan for mildew. The industry was a dying one in 1908

on this account, now it is advancing very rapidly in the favoured areas and nobody would think of growing grapes without using the remedy. These are a few established successes, and I may note a few principles which I think have to be adopted if real success in introducing improvements is to be achieved.

1. The man who approaches a body of cultivators must have previously gained their confidence either by previous successful recommendation or in some other way. An expert, *qua* expert, will get little hearing. When I first worked among the potato growers of the Poona district, they listened but would do nothing. Only when I had been able to check potato moth, after guaranteeing them against financial loss if they used my method, was I able to get a hearing with regard to other matters. Now I can get men willing to test anything I recommend.

2. (This winning of confidence, as a necessary preliminary to any success in propaganda, makes it necessary that practically all field demonstration should be done on the fields of cultivators.) Generally this has been done under a guarantee to make good any loss, but if care is exercised no financial liability has in my experience ever resulted. Government demonstration farms, or even plots managed by the Agricultural Department are usually very ineffective. I pin my faith to working with the cultivators on their land, just coming in the one operation that we desire to recommend.

3. (The necessity for gaining confidence emphasises the necessity of non-official agency being used for propaganda wherever possible.) Until recently local agricultural associations had not been a great success except in a few cases. But we think, in Bombay, we have now got to the stage when Taluka Development Associations as established by Sir Chunilal V. Mehta when Minister of Agriculture, under a scheme which I drew up, promise to become one of the very important factors in agricultural advance here. They have certainly become very popular in several of our divisions though not universally and are doing very good work.

These bodies are formed for a Taluka containing 100 to 200 villages, and are intended as the agents of co-operative, agricultural and other forms of development. They receive an annual subsidy from Government equal to their other income but limited to Rs. 1,000, on condition that they employ a demonstrator approved by the Agricultural Department. These have undertaken the spreading of the use of improved implements, of improved seed, the formation of co-operative societies for various purposes, and they also supervise the non-credit co-operative societies in their areas. They are supported by subscriptions from individuals, from Co-operative Societies and in the last year or two, by grants from Taluka and District Local Boards. In recent cases, the tendency has been to obtain in the first instance a large capital fund, and make the interest on this a large factor in their income. I was at the inauguration of a Taluka Development Association in Gujarat a few days ago, which started with a capital fund of Rs. 12,000 specially collected for the purpose.

Their value depends on the guarantee of work which is given by the presence of an approved fieldman, on their non-official character, while the Government subsidy gives a title to stimulate work, and guide it in suitable direction.

4. Propaganda must usually follow a realised need or else improvements must be so introduced as to make a need realised. Many efforts have been failures because while good in themselves, they have not met a real need. I may illustrate by the many efforts to introduce winnowing machines. They are not wanted. The existing method is as good, only requires more time and there is plenty of time.

5. Improvement of organisation and finance may be wanted to make technical improvement possible. This indicates the need for close local study area by area, and even village by village.

6. (The improvement must be worth while. That is to say, the increased return must make enough difference to make the risk worth while. In the case of a crop, I generally will not push an improvement unless I am confident it will give an increased net return of 15 to 20 per cent.) ✓

Most of these points are perhaps platitudes, but success in propaganda, in my experience, depends on—

- (1) Winning confidence.
- (2) Keeping official people in the background.
- (3) Having an improvement which meets what people want, and giving a large net return.
- (4) Being able to command finance, and to organise financial help if necessary.

One difficulty occurs when the success of propaganda depends on common action by a large number of people as in schemes of land improvement in the dry areas of the Deccan, or as in schemes of fencing a large area against wild pig in which we have had considerable success in Western Dharwar. In these cases, we do need legislation to provide that when such schemes are agreed to by a large proportion (say, 75 per cent) of the owners of land, the remaining landowners can be compelled to come into the scheme.

In Bombay, propaganda is now carried out as a combined effort of the Co-operative and Agricultural Departments. A programme of work is drawn out for each unit of area under the control of one agent of either department, and the work contained in that programme whether for co-operative development, or for technical agricultural improvement, is looked after by one man in that area. These men have their programmes passed and their reports received by the Divisional Board of Agriculture, composed of four non-official members, the Deputy Director of Agriculture, and the Assistant Registrar of Co-operative Societies, and work directly, as to policy under its control.

I really think that now, in many areas of the Bombay Presidency the idea of agricultural improvement has got into the minds of a considerable proportion of the rural population, and I anticipate that advance may be much more rapid in the next ten years than in the last. My fear for the future is rather that we shall not be able to meet the demands of the people.

QUESTION 4.—ADMINISTRATION.—I feel that the Government of India may usefully supplement the efforts of the various Provincial Governments towards agricultural improvement. But it may be well at once to state that they must come in as co-operators with the local agricultural departments, and must not, in any sense, come in as directors of what should be done. Within their own Province, the local Agricultural Departments (including in these the Co-operative Departments) know, I think, what is wanted better than any one else can.

I think the Government of India may undertake the following duties:—

- (1) They may act as a centre of information and as a central publication centre;
- (2) they may have a corps of experts, at Pusa or elsewhere, who can undertake fundamental investigations of general application. These would not necessarily be better men than those in the Provinces, but their work would, while directed definitely to practical problems, be more of a general character than is possible with local agricultural departments;
- (3) they may establish a Central Agricultural Board, well supplied with money, which would form *ad hoc* committees for the co-ordination and subsidising of research in matters which are of interest in several parts of the country. I have fully described what I mean by this under question 1 (Research);
- (4) they can establish national bodies where this is necessary, as, for instance, to maintain herd books of the chief breeds of Indian cattle;

- (5) they can organise the co-operation of various Provinces and States where such co-operation is necessary, as, for instance, in the checking of infectious cattle disease, or the prevention of the import of plant pests or diseases.

I do not think that there is any need for these purposes to increase materially the scientific staff of the Government of India. This may, however, be necessary as lines of research activity develop on the lines suggested above.

As regards services mentioned in (c) under this head, I only wish to remark on the difficulties of high railway freight in the marketing of agricultural products. I may also refer to the complaints against coasting steamers in the marketing of perishable articles like mangoes. Details with regard to this last matter will be found in the report of the Mango Marketing Committee sent to the Commission in connection with my replies to the questions about marketing.

As regards the Meteorological Department, I think there should be much closer co-operation between this latter and the Agricultural Department. There are a multitude of matters on which joint or closely co-ordinated investigations are necessary. I desire, in particular, to emphasise the importance of finding out such things as the maximum effective rainfall and the study of such questions as periodicity of rainfall, tendencies regarding the distribution of rainfall in the year as well as its total amount, the possibility of fixing critical dates or periods throughout the year when the course of events for the remainder of the season can be forecasted with reasonable probability, and the best distribution of rain from a crop point of view. All these are of great importance particularly in the precarious tracts, and if there were close co-operation between the meteorologists and the Agricultural Department not only in examining existing data but also in deciding the additional data to be collected, I believe that progress might be made. I hope to place graphs showing the results of some of my studies of the Deccan rainfall before the Commission.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—The actual condition of things with regard to the fragmentation of holdings, as a result of the present laws and customs of inheritance, has so often been described that there is no need to stress the fact. But there are one or two points which perhaps may be made clear.

Apart from a general increase in the value of land, the number of holdings and the number of fragments seem to tend to increase to a definite maximum. I have recently reinvestigated, at the request of the Hon'ble Mr. A. M. K. Dehlavi after nine or ten years, two Deccan villages which were studied in 1915 and in 1917 respectively. The following table shows the number of holdings, in the villages at different periods, and the change in the number of land fragments at an interval of nine or ten years.

Number of Holdings.	Pimpal Soudagar.	Jategaon-Budruk.
1771-72	24	...
1785	...	42
1790	...	34
1791-92	41	...
1796	...	23
1811-12	43	...
1817	...	36
1823	...	50
1829-30	52	...
1840-41	54	...
1914-15	156	...
1917	...	146
1926	156	148

Comparing the character of the holdings at Pimpla Soudagar in 1914-15 and at present, we find a tendency for the size of holding to concentrate at about 1 to 5 acres. This means that agriculture on a man's own land is becoming more of a partial occupation, with labour for wages as subsidiary.

The number of each size has been as follows:—

Pimpla Soudagar.

Number of Holdings of different sizes.

	1914-15.	1926.
More than 40 acres	1	3
30 to 40 "	1	1
20 ,, 30 "	9	5
10 ,, 20 "	18	20
5 ,, 10 "	34	32
1 ,, 5 "	71	81
Less than 1 acre	22	14
	<hr/> 156	<hr/> 156

Similar figures for Jategaon-Budruk are as follows. It must be remembered that two severe famines have meantime occurred.

Jategaon-Budruk.

Number of Holdings of different sizes.

	1917.	1926.
More than 150 acres	1	1
100 to 150 "	1	1
50 ,, 100 "	5	3
40 ,, 50 "	4	3
30 ,, 40 "	6	12
20 ,, 30 "	16	14
10 ,, 20 "	43	37
5 ,, 10 "	34 ^a	35
1 ,, 5 "	25	34
Under 1 acre	11	8
	<hr/> 146	<hr/> 143

I think the tendency is probably in the same direction here as at Pimpla Soudagar.

2. Fragments of land separately owned.

Jategaon-Budruk.

Number of Fragments of different sizes.

	1914-15.	1926.
Over 30 acres.	3	4
20 to 30 „	8	8
10 „ 20 „	51	46
5 „ 10 „	95	101
3 „ 5 „	69	68
2 „ 3 „	58	73
1 „ 2 „	98	111
$\frac{1}{2}$ „ 1 „	34	26
$\frac{1}{3}$ „ $\frac{1}{2}$ „	31	28
$\frac{1}{4}$ „ $\frac{1}{3}$ „	51	61
$\frac{1}{5}$ „ $\frac{1}{4}$ „	40	27
Under $\frac{1}{5}$ „	13	21
Total plots in village	551	574

The general character of the distribution has not been altered, but there is evidence that some consolidation is taking place as well as further subdivision. The number of separately owned plots under one acre in size has gone down from 169 to 163.

In this village I noted in 1917 that the units of cultivation (in which from an agricultural point of view we are chiefly interested) were larger than the units of land held, and that a man appears to cultivate a less number of fragments than he owns. In this connection the following two statements will be found interesting:—

Number of Holdings and Areas of Cultivation held by one man.

	1917.		1926.	
	Holdings.	Areas cultivated by one man.	Holdings.	Areas cultivated by one man.
Acres.				
Above 100	2	1	2	1
50—100	5	5	3	4
40—50	4	9	3	2
30—40	6	9	12	17
20—30	16	21	14	13
10—20	43	27	37	41
5—10	34	24	35	20
Under 5	36	18	42	22
	146	114	148	120

2. Number of Fragments held and cultivated by one man.

The table shows the number of men holding and cultivating various number of fragments.

	1917.		1926.	
	Holdings.	Cultivation.	Holdings.	Cultivation.
	Number with specified number of fragments.	Number with specified number of fragments.	Number with specified number of fragments.	Number with specified number of fragments.
1 Fragment	30	24	28	19
2-5 "	87	59	89	65
6-10 "	26	29	24	26
11-15 " . . . . .	...	2	4	7
16-20 "	2	...	3	2
22-25 " . . . . .	...	...	...	1
above 25 "	1	...	...	...
	146	114	148	120

These figures seem to show pretty clearly that the natural process of consolidation has now proceeded, in the last ten years, as rapidly as that of further fragmentation. This means of course the sale and consequent recombination of the holdings. As regards cultivation, the units are decidedly larger than those of land held; we have, in fact, in all appearance, reached a stable position in which, unless something happens to increase the value or the productivity of the land, it is not likely that the situation in this respect will get materially worse.

The position is, however, bad enough now, and it is urgently necessary to deal with it. The Punjab experience has shown that in flat land, with limited variation, it is not an insurmountable problem to deal with the problem by co-operative methods. With us in Bombay, such areas occur to a very limited extent, and in the areas where the problem is most acute, the irrigated areas of the Deccan, the Konkan, etc., the soils differ so widely that restriping is a matter of the extremest difficulty. In spite of this, a committee of which I am the chairman has, by the orders of Government, taken in hand the planning of a restripement in the irrigated village of Manjri Budruk. The present position will be shown to the Commission on a map, and the proposed lines of work explained.

For the purpose of restripement by voluntary agency, I feel only one piece of legislation is needed, namely to provide that when the owners of 75 per cent of the land agree to a plan, the remainder can be compelled to come into the scheme. For the present, I propose that Government should bear the cost of survey and replanning, and the remapping of the area including the setting up of boundary marks.

As regards future fragmentation, legislation is under consideration in Bombay to prevent this taking place beyond a certain limit. But as I am not in close touch with the position of this proposed legislation, I cannot say anything about it.

QUESTION 20.—MARKETING.—(a) I am not sure I have understood the meaning of this question. Marketing of all sorts of marketable produce in Bombay presents no difficulty at present, in the sense that there is no real trouble in getting a market for it. The arrangements for disposing of any agricultural produce are, in fact, very highly organised, and with those which are common market commodities a man need usually not leave his holding in order to sell, and many products, like fruit, are often taken possession of before reaping and reaped by the purchaser. So that I cannot say that in Bombay there is any lack of facilities for marketing; whether the arrangements are such as to give the biggest return to the producer is a different matter, and will be dealt with under the next heading. But if the question intends to ask whether there is usually any difficulty in selling produce after it is grown, I should say, No, as far as the Bombay Presidency is concerned. I do not know of a case where produce is not grown because it cannot be disposed of, except in the case of new or improved products, and here there certainly is difficulty.

I need, therefore, only refer to the marketing of such new and improved products and quote the case of certain improved cottons. When an improved cotton has been produced, it has been found generally difficult to get a proper price for it. This has happened when we introduced Broach cotton in Dharwar, improved cotton in Surat and American cotton in Sind. In the first of these cases (Broach cotton in Dharwar) in order to secure a fair price for an infant production, we introduced special Government auctions of *Kapas* in Dharwar, which were successful. We did the same with the lint of improved cotton at Surat, but there the problem was not so difficult as Surat is a lint market and not a *Kapas* market. In Sind the difficulty was temporary and now I think that the American *Kapas* gets its proper price.

(b) To this I think it is obvious that the answer must be No. Nothing like this is ever perfect. But I would insist that for important products the system is very highly organised, and every link in the chain has its function. The repeated and frequent failure of amateur attempts to replace the present system by something apparently much simpler shows either that the system on the whole works well, or else that there are vested interests in it so powerful as to be able to resist any but very well-considered changes backed by very general support of the producers. Probably both alternatives are correct.

But I am not sure that, except in a few cases in the Bombay Presidency, we know very much about the whole course of the marketing of any product. This certainly came to light in connection with the enquiries I recently organised for the Indian Central Cotton Committee on the finance of cotton production and marketing in Khandesh and in Upper Gujarat. First a questionnaire was issued to people thought to be likely to know the whole of the process through which *Kapas* passes before it reaches the larger buyer in the markets. Answers were received from a considerable number of people. Then it was decided to organise an extensive enquiry in a number of villages and in all the local markets. The result, in Khandesh at any rate, has been to show that the impression given by the answers to the questionnaire was very largely incorrect, to show that the reputed dependence of the cotton grower, in regard to the marketing of his produce, on the moneylender is a myth, and that there is generally a preference to sell his produce in the village to petty traders over taking it to market because of bad market practices. The complaint was not against the recognised market charges, but on account of (1) disputes about the rate after weighing had commenced, and (2) arbitrary deductions from the weight.

Now I am not aware that any investigation of a really serious character, apart from the above, has been undertaken in any part of the Bombay Presidency, on the course of marketing of a product from the actual grower until it reaches the big merchant and so enters the ordinary stream of com-

merce. Hence it is not now possible to give an account of the chain of hands through which a product passes, as desired in the Commission's questionnaire. What we do know is that—

- (1) with almost every product, there is a certain amount of forward sale before crops are reaped. The proportion of the whole to which this applies is quite unknown in any case;
- (2) with almost every product there are a considerable number of compulsory deductions in the market, for religious and charitable purposes, for samples and the like;
- (3) in many cases, in the same market, the unit weight for buying from the cultivator is larger than the unit weight for selling by the dealer. Thus in the *gul* market in Poona, the cultivator-seller has to supply 256 lbs. per *palla*: on the other hand, the unit for a purchaser of *gul* from the middlemen is 240 lbs. per *palla*. In the same market, potatoes are purchased from the cultivators at 300 lbs. per *palla* and sold to the public at 280 lbs. per *palla*;
- (4) { in most products there are, at present, two necessary middlemen in any market, if a cultivator is selling, the *adti* or *aradya* who represents the seller, and the *dalal* who negotiates on behalf of the buyer. The *dalal* will not deal direct with the seller. There seems little justification for the two middlemen. Thus with potatoes in Poona, all the stuff must pass through the hands of five *adtis*;
- (5) bargains are usually made secretly by manipulation under a cloth, and without the knowledge of the cultivator-seller. This is always brought up as a grievance by the people, but open marketing is usually resisted by the *dalals*;

How much weight must be attached to each of these criticisms must be different in each case and requires a series of special investigations. I have recently asked the Government of Bombay, to allow me to organise two such inquiries, in the cases of ground-nuts and *gul* (in the Deccan) in the coming year. We have now a Professor of Agricultural Economics (Rao Bahadur P. C. Patil) and the actual control of the work would be with him. It is intended that these should be the first of a number of such marketing studies.

In one case, namely that of mango marketing, we have recently had an investigation by a committee into the present organisation and its report* is attached, and gives a very vivid illustration of the difficulties in the way at present. It insists on the evils of the secret buying system above described, and on the careful grading of the produce, before being sent to market. The whole question of action under this report is now before Government.

(c) As to steps to be taken to improve the quality, purity, grading, and packing of agricultural produce, I find difficulty in saying very much. I have not studied the question as regards the export market, and as regards the Indian market only in a few cases. The safeguarding of the purity and quality of the produce from any special tract has only been a matter for action in two cases. The first of these is cotton, where an attempt has been made to secure that cotton of standard quality for a particular area should be marketed by itself. This has been done in three areas by different methods.

- (1) In Gujarat the first step was the organisation of the supply of pure cotton seed of improved, even, standard quality in the South Gujarat area. This dates from 1919. Since that time the Agricultural Department organises the growth of seed from freshly selected materials, each year over from 5,000 to 9,000 acres, and rogues the fields in which this is grown, in five different centres. This is supposed to give seed for 100,000 acres at least in the following year. This seed is ginned in selected gins and graded under the supervision of the Agricultural Department. There is

* Not printed: Report of the Mango Marketing Committee—Bombay—Government Central Press—1925.

a demand to be included in the 9,000 acres from which seed is obtained, as the lint from this always secures a specially high price. The seed so produced is bought by Government and sold so as to cover the actual cost. There is now a very great demand for this seed. Locally two Indian States (Rajpipla and Chota-Udaipur) have forbidden the growth of any other seed in their States, and this policy is being considered for certain areas in Baroda.

But the reputation of this cotton was made when the sales of the produce from our 9,000 acres of seed area were conducted by auction by the Agricultural Department and in the first years regular auctions were held under the supervision of a committee in Surat of merchants and cultivators. Now the importance of keeping it pure is fully realised and auctions are no longer needed.

The whole work has been very materially helped by the Cotton Transport Act, which by prohibiting the entrance of cotton, cotton seed, *Kapas*, or cotton waste into the area where the improved seed will grow except under license, has prevented adulteration, which, if it did not spoil the lint, would certainly have spoilt the seed.

I should like the financial and selling part of the organisation to be now taken over by a non-official agency and this will probably come. It has been hindered hitherto by the fact that the most suitable bodies for this purpose, the Cotton Sale Societies in Lower Gujarat, have not been hitherto convinced of the advantage of the improved seed to the grower.

- (2) In the Bombay Karnatak the first step was that the Agricultural Department began about 1910 to organise auctions for Broach cotton at Dharwar. This was then a new introduction and serious complaints were received that the proper value could not be obtained for the *Kapas* produced. Hence auctions with grading of the *Kapas* on the basis of ginning percentage were opened and succeeded beyond expectations. These were applied also to improved type of Kumpta and Dharwar American (Upland) cotton and were finally taken over by Cotton Sale Societies in 1919. A supply of pure seed for 5,000 acres in each case promised and (1) also the roguing of this area and (2) the grading of the *Kapas* for the societies. On the other hand the societies were to finance the cotton seed and distribute it in the area where the cotton is grown. This has continued and has proved a great success and the graded improved cotton always has fetched a higher price in auction than could be obtained otherwise and it is much appreciated by the trade. Arrangements are being made now to supply pure improved seed for a larger nucleus area of Dharwar American cotton and a very strong demand has risen for a very large increase in the case of Kumpta cotton.

Here also the Cotton Transport Act has helped but the centre of the success of the system is, I think, the Government grading of improved cotton for auction.

- (3) In Sind where the cultivation of Punjab American cotton is rapidly growing on the Jamrao Canal the arrangement is that *Kapas* grown from seed supplied by the Agricultural Department is given a certificate of the fact when it is taken to the factories of the big buyers in Mirpurkhas and some other centres. This is much valued and at the same time enables the Agricultural Department to secure good seed for further distribution and the cultivators to obtain a full price. This applies, of course, only to a small part of the area under American cotton but the rest now secures its fair price.

The above is the only case in which the Agricultural Department or other public authority has attempted to take any part in grading produce. The Co-operative Bank which markets so much of the Deccan *gul*, grades its

produce and of course many merchants do so also. But there is no other grading by a public authority. In the case of ground-nuts where the present value of Khandesh ground-nuts very largely depends on the fact that pure Spanish peanuts are grown, originally introduced by the Agricultural Department, we use every moral suasion possible to prevent the invasion of the area by other varieties. The same is the case with the small Japan variety grown in the Panch Mahals. But no public authority has attempted more than this. Questions of packing have not been seriously studied in Bombay except in the case of mangoes (*vide report* sent herewith*). (d) As regards market information for the use of growers and up-country merchants, I find that for products like cotton and oil-seeds with a world market, traders are generally as quickly informed in any local market as could be arranged by any agency, I can think of. As regards the cultivators our experience is that they quickly learn what the course of the market is or is likely to be when they are anxious to sell their produce.

I do not think that there is opening at present for much action in the direction suggested under this heading in the questionnaire.

Generally as regards marketing for the future, I pin my faith to the development of co-operative marketing. But it will have to be much better-informed organisation than has been usual in the past, and must be based on very close study of the whole existing organisation, for the disposal of produce with a world market—up to the time when it enters into the stream of wholesale commerce. I append a copy of a note* which was drawn up by Mr. Rothfield and myself in 1923 embodying our experience up to that date. The principles therein laid down I still believe should guide development. I shall refer to this again under another heading.

QUESTION 25.—WELFARE OF RURAL POPULATION.—Under this head I propose to consider the problem of rural development as a whole, in what must be its ultimate object, namely the welfare, the happiness and comfort of the rural population. (At present in the Bombay Presidency the village population has rather been left in a backwater, but the time has come to look at the rural problem as a whole, and see to whether definite progress cannot be made not merely in the technical improvement of agriculture, or the organisation of village finance, or in pushing village sanitation, or in increasing the number of villages with schools, but in taking all these things as part of one end, the recreation of the villages as self-conscious units, with the idea of progress and of improvement.)

Such a conception, it will be said, requires a missionary, and so it does. It can hardly be created by a Government agency, though if such an agency can be developed there is no reason why Government should not aid it. And I would, hence, like to see an agency develop, more or less on the lines of a number of educational societies in the Bombay Presidency and elsewhere, which will provide the missionaries needed to carry out the idea. The general conception was suggested to me by the Hon'ble Sir Chunilal V. Mehta, and seems a most productive one. It would work from the Taluka Development Association as a base, and would envisage the village problem as a whole. The link would be to study a typical village in a tract on thorough lines. My own village study of Jategaon-Budruk in the Deccan would, perhaps, serve as a type. This would be done, as mine was, with the close and hearty co-operation of the people. Then the needs would be considered and the possibility and cost of satisfying them.

(In most of our Bombay areas the needs are usually primarily economic. The land does not produce its maximum, even without greater current expenditure than is now made, a too large proportion of the value is taken away by others than those who have had a share in producing it, and there is too much waste of time. Once produce a hope of better economic position, and the desire for sanitation, for education, and for land improvement will follow.) With the proper missionary, who has the resources and information

* Not printed.

of the agricultural, co-operative, sanitary and other departments at his back, the future is more than possible. To me this is no fancy sketch. I know villages where work could be taken in hand at once, provided the men are available, and here the scheme for a Society of "Servants of Rural India" suggested by Sir Chunilal V. Mehta seems to supply the missing link, if only the men can be found who will accept the conditions and devote themselves to the work. I would strongly recommend any move in this direction, and be prepared to subsidise such missionaries, without in any way limiting their independence.

Only by some such means can the all round progress be made which alone results in increase of happiness and welfare. It is useless to have technical improvement if all the extra produce is to be taken by unsuitable expenditure: it is useless to provide co-operative credit, if this means (as has often been the case in the dry tracts of the Deccan) that the extra credit is used to the full without care enough, and is lost in the next year of scarcity.

My scheme would, therefore, be—

1. A Society of "Servants of Rural India" to inspire and supply men, and inspire the movement. It is hoped that the plan would attract large public funds, which with Government subsidies would in the first instance provide the men.
2. Local Development Associations, which would organise the area in which such men should be placed, beside doing more general propaganda over the whole area to which they belong, and preparing the way for the intensive work in villages and groups.

Again I would insist on the consideration of the village problem as a whole, and the attack on the present uneconomic, and despairing condition of the people of many of our villages, as perhaps the most serious problem in the country at present. Whether enthusiasm can be organised and whether men can be found who will devote themselves to such a purpose, which can never be under the direct auspices of Government or even of semi-Government bodies, is a matter which can only be tested by trying. It is, however, I feel a matter to which Government resources might well be devoted, and to that extent the general creation of further extensive Government paid staff, whether for agricultural, co-operative, sanitary or other similar propaganda.

APPENDIX A.

Village Economic Studies. (Vide Question 25 of the Questionnaire.)

I have, with a number of colleagues, conducted several intensive village economic studies. Two of these done in the Deccan in 1914-15 and in 1917, respectively, have been published and results are available to the Commission. Another from the Konkan is now awaiting final working up for publication.

I was however, recently requested by the Hon'ble Minister for Agriculture, Bombay, to re-examine the villages studied in 1914-15 and 1917, and with the help of my colleague Mr. N. V. Kanitkar, this has been done. I can now give a comparison of conditions in the village of Jategaon Budruk in 1917 and 1926. This is a village in the *very* precarious region, and it has had two serious seasons of scarcity since the former study, namely, in 1918-19 and in 1920-21. It represents a fair picture of a large proportion of the Eastern Bombay Deccan.

1. *Population—*

1917	736
1926	667 Loss 9.3 per cent.

In the Census of 1921, the population was only 458. This is partly due to famine, and partly due to the season when the figures were taken.

2. *Cattle Population—*

	1917.	1919.	1926.
Bullocks and bulls	306	178	238
Cows	182	57	110
Calves	171	no record	58
Buffaloes and calves	25	...	16
Goats	97	...	292

The 1919 figures show the *immediate* result of famine. The 1926 figures show the slow recovery.

3. *Balance Sheet for the Families in the Village.*—The following figures are based on the income of all families added together, and the necessary expenditure at the people's own standard of living added together. These families had to be omitted in 1926:—

Income.

	1917.	1925-26.
	Rs.	Rs.
Income from land	15,802	11,682
Income from other sources	8,546	14,736
Income from trees	615	

The crop was taken as of the same *anna* valuation in the two years. Omitting the trees the total income per family compares as follows:—

1917	Rs. 166
1925-26	208

Expenditure.

	1917.	1925-26.
	Rs.	Rs.
Interest on debts	6,755	4,868
Necessary personal family expenditure	32,221	31,304

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The standard expenditure per family in the two years was as follows:—

	1917.	1925-26.
	Rs.	Rs.
Interest on debts	46	33
Necessary personal family expenditure	219	241
TOTAL	265	274

These figures seem to show that—

(1) On the people's own standard of life, the village is not at present an economic proposition even without allowing for debts, taking the average season of the last ten years as the basis. Without counting interest on debts the deficiency per family has been—

	Rs.
1917	53
1926	38

This would be made up by under-feeding and under-clothing, or by movement of a portion of the population away for part of the year.

(2) The pure cultivators, i.e., the people who depend solely on agriculture, are very much fewer in proportion. That is to say there is a tendency towards wage-earning, as supplementary to agriculture, among a large proportion of the population.

If we divide the families into three groups, namely:—

- Group I.—Solvent from land income alone,
- Group II.—Solvent from land and labour income, and
- Group III.—Insolvent.

We get the following results. Solvency is judged by the people's own standard.

	1917.			1926.		
	Group I.	Group II.	Group III.	Group I.	Group II.	Group III.
Number of families in Group .	10	12	125	7	16	107
Number of population in Group	43	25	664	44	55	556
Excess or Deficiency per family	+ Rs. 232	+ Rs. 18	—Rs. 137	+ Rs. 9	+ Rs. 170	—Rs. 123

Thus while in 1917, 15 per cent. of the families were solvent, in 1926, 18 per cent. were solvent. But the solvency is due to a very much greater extent to the receipts from labour than it was in 1917.

(3) The debts have diminished, even in this period, due to the falling in of mortgages and hence the cancelling of the corresponding debts. Several families have left the village as a result of losing their lands. Compared with 1917 the total debts were as follows:—

	Rs.
1917	29,384
1926	20,120

APPENDIX B.

The Problem of Precarious or Famine Tracts.

Perhaps the biggest problem before agriculture in the Bombay Presidency is that of the extreme precariousness of a large proportion of the area. In the latest edition of the Statistical Atlas, the area (excluding Sind) has been classed as follows:—

	Sq. miles.
Total area of Province	77,011
Area not liable to famine	24,498
Area somewhat liable to famine but with frequent scarcity	26,595
Area very liable to famine	25,918

Thus 33.6 per cent. of the total area is very liable to famine.

What this extreme precariousness means, can best be judged by two tests. The first of these is the suspensions and remissions of land revenue, which are chiefly given on account of failure of crops; the other is a test of the goodness of the season which I have devised, by combining the areas of the staple crops with the anna valuation of the crop obtained in each case.

The first method gives the following results for the years since 1918, for each of the natural divisions of the Bombay Presidency proper:—

Gujarat.

—	Current Revenue demand.	Current suspensions and remissions.	Proportion suspended and remitted.
	Rs.	Rs.	Per cent.
1918-19	95,14,666	56,57,302	59.5
1919-20	96,36,966	1,53,471	1.5
1920-21	96,27,011	42,10,123	43.7
1921-22	95,59,058	2,26,419	2.4
1922-23	96,15,292	4,07,462	4.2
1923-24	98,18,489	24,45,446	24.9
1924-25	1,00,81,855	1,18,697	1.2

16(iv)

Deccan.

	Current Revenue demand.	Current suspensions and remissions.	Proportion suspended and remitted.
	Rs.	Rs.	Per cent.
1918-19	1,47,42,781	82,32,837	55.8
1919-20	1,47,31,875	3,99,173	2.7
1920-21	1,51,64,073	67,39,515	44.4
1921-22	1,55,52,188	20,90,929	13.4
1922-23	1,58,55,987	18,47,932	11.7
1923-24	1,62,83,234	18,28,186	11.2
1924-25	1,67,59,837	6,85,139	4.1

Karnatak.

	Current Revenue demand.	Current suspensions and remissions.	Proportion suspended and remitted.
	Rs.	Rs.	Per cent.
1918-19	68,64,289	15,29,072	22.3
1919-20	69,14,299	65,771	1.0
1920-21	68,95,374	15,62,554	22.7
1921-23	69,06,351	1,10,329	1.7
1922-23	69,58,778	12,67,347	18.2
1923-24	71,72,179	14,12,116	19.5
1924-25	72,62,169	1,23,346	1.7

Konkan.

	Current Revenue demand.	Current suspensions and remissions.	Proportion suspended and remitted.
	Rs.	Rs.	Per cent.
1918-19	51,26,014	12,98,626	25.3
1919-20	51,41,705	47,689	0.9
1920-21	52,02,625	73,274	1.4
1921-22	51,67,803	34,334	0.7
1922-23	52,68,819	40,683	0.8
1923-24	54,35,159	59,855	1.1
1924-25	54,72,704	54,158	1.0

Now I take it that when over 40 per cent. of the current Government land revenue has to be remitted or suspended, it means essentially a crop failure over very large areas; when over 10 per cent. is remitted or suspended, it means a very bad year. Therefore, we have for the seven years quoted.

	Crop failure.	Serious deficiency of crops.	Normal.
Gujarat	2 (29 per cent.)	1 (14 per cent.)	4 (57 per cent.)
Deccan	2 (29 ")	3 (42 ")	2 (29 ")
Karnatak . . . . .	..	4 (57 ")	3 (43 ")
Konkan . . . . .	..	1 (14 ")	6 (86 ")

Thus taking the last seven years in Gujarat, two have meant crop failures over very large tracts, one had a serious deficiency, and the others were normal. In the Deccan only two years were normal while five had serious crop deficiency or failure. In the Karnatak, there was never a crop failure over such large areas as in the two former divisions, but four years out of seven had a serious crop deficiency, while in the Konkan, only in the almost unprecedented famine of 1918-19 were the crops seriously affected. Thus in Gujarat the crops are likely to be seriously deficient or a failure in 43 per cent. of years (or say two out of five), in the Deccan in 71 per cent. of years (or say in seven years out of ten), in the Karnatak in 57 per cent. of years (or say in three years out of five) and in the Konkan in 14 per cent. of years (or say in one year out of seven).

These figures are for certain areas confirmed by the results of the other method. In this I have taken 1915-16 as the standard good year for four Deccan districts (Poona, Ahmednagar, Sholapur and Bijapur), and called this year 100. My records extend for 39 years. I have classified all years giving over 60 per cent. of the goodness of 1915-16 as "reasonably good." Those from 40 to 60 per cent. of the year 1915-16, as "poor," and those below 40 per

cent. as "bad," meaning that there was an extensive crop failure. On this basis the following are the results:—

	"Reasonably Good."	"Poor."	"Bad."
Poona	22	8	9
Ahmednagar	21	8	10
Sholapur	24	9	6
Bijapur	17	15	7

In these four districts, all of them largely in the very precarious tract, the chance of a good crop is only about 54 out of 100, and the chance of a "bad" year, meaning extensive crop failure is about 20 out of 100.

The precariousness revealed by these figures is very great indeed, and it is doubtful whether cultivation is carried on so extensively in such precarious conditions in many parts of the world. It is not that the *average* rainfall is low, but the *variability* is *extreme*.

In such a precarious tract, which, by the way, has an average population of 180 per square mile, the natural way to deal with the situation is by irrigation, whether by extensive schemes for the harnessing of rivers, or by stimulating the construction of local scheme of irrigation by wells or otherwise by the grant of *taccavi* loans or otherwise. Now irrigation by canals constructed by the State, if feasible may be considered as an absolute cure for the effects of drought, so far as they will command, and every effort should be made to exploit this method of dealing with famines. The glorious results of efforts in this direction in the Deccan are very visible in the splendid prosperity of a number of the Deccan valleys. But the possibility of this method is limited, even apart from any question of capital cost involved. In the Deccan and Karnatak the Indian Irrigation Commission estimated the maximum amount of land irrigable if all the rivers were harnessed to the maximum extent, as 500,000 acres. The present area is 224,000 acres. The area under wells is now 422,000 acres, and might possibly be doubled. The area under irrigation might, if all sources of irrigation water were exploited, be raised to 1,500,000 acres. But the actual net cropped area in 1925-26 was 21,179,000 acres. Thus the maximum area irrigable by exploitation of all the present methods is only 74 per cent. of the area actually under crop in 1925-26. Similar calculations for Gujarat give a possible figure for the maximum possible proportion of land irrigated not greater than 5½ per cent.

So that while I would urge the development of irrigation at the fastest possible rate, and while *so far as it extends*, I would consider it as a perfect method of dealing with the problem of uncertainty of rain, I would call attention to the fact that in the two main famine tracts of the Bombay Presidency between 90 and 95 per cent. of the area can *never* be protected by these means, and must depend on the rain, whatever it be. It is to *this* area, and country similar to it extends far beyond the bounds of the Bombay Presidency, that I want to call the attention of the Commission in the present note.

In the area discussed the character of the rainfall is peculiar in that in almost every year there is enough water to raise substantial crops. I hope to show the Commission graphs showing how even in some of the most famine years there was ample water for crop growth, and in most cases there were times when the water available was excessive. There are some famine years when the water was never sufficient but in all but one or two out of series of sixty years, there was enough.

In a region like this, therefore, there are three problems which must be faced if the situation is to be met. These are as follows:—

1. The most essential problem is the use of the water properly in all except one or two years out of sixty.
2. The next problem is that of finding some way of insurance against the occasional complete crop failure.
3. The third matter is to so arrange matters that the cultivators in these areas should not be solely dependent on agriculture, which cannot possibly fill in more than half a man's time.

The first of these problems then is the proper use of the rain water. During the last three or four years, particularly, attempts are being made in Bombay to approach this question from two angles. On the one hand every encouragement is given to the increase of wells, but beyond this a Superintending Engineer on special duty has been appointed to investigate and prepare plans for land improvement schemes of considerable size, which will then be carried out either by Government, or by co-operative organisations of villagers, the capital being largely found by Government under the *taccavi* rules. This matter is so far new, and has hardly got under way. For similar schemes in the same direction, to be carried out by individual landowners, the Agricultural Department is supplied now with three "bunding officers" who prepare plans for small works of value from Rs. 100 to Rs. 5,000 including terracing, field embankments, and the like. The problem of field erosion is so important and is so constant that this encouragement and planning of these small works is a matter of very great importance. The other angle is the attempt to increase the absorbing and holding power of the soil for water. Nearly all "dry-farming" experiment elsewhere has been done on deep alluvial soils. Many, if not, most of our famine areas, on the other hand, are composed of relatively shallow black cotton soil, with a very dry hungry subsoil. Up till recently our experiments with dry farming have been somewhat uncertain. But now, thanks to the appointment of a Soil Physicist, we are well on the way to devising a method for securing *rabi* crops even in fairly bad seasons by (1) the usual dry farming cultivation methods, (2) the burial of green matter during the *khari* season (this works when the rainfall after burial is substantial), and (3) trenching deeply in the lines of sowing of the crop. (This worked well even in the bad season of 1925-26.) This is only a beginning, but I think the possibilities are now very great, and I should like to see the investigations in this direction very much reinforced.

The next problem is to find some method of insurance. With things as they are, I certainly would not cultivate under the conditions of the Eastern Deccan without some form of insurance. Of course, a well is a first class insurance, but a one-shot well, which is all that one is likely to get even under favourable conditions, will only safeguard a very few acres (8 to 10). On the other hand, I have approached insurance companies both in London and here as to whether they would or could devise a scheme of insurance against crop failure, but the opinion seems definitely to be that the risk is not an insurable one. There are perhaps two things that can be done:— (1) to arrange that in these famine tracts the unit of time for co-operative loans should be a longer period than one year. I do not think this would help much, but it has been approved by the Bombay Provincial Co-operative Conference, (2) to organise the building up to a famine reserve in all co-operative societies in the famine areas. The whole question of this insurance, which I regard as in some form essential to make agriculture anything but a bad gamble in these precarious tracts, is still unsolved, and if the Commission could give a lead, I should, for one, be very grateful.

In these tracts, apart from irrigation, there can be usually only one crop a year, and hence there is a very large amount of spare time which hitherto has been quite unprofitable. Therefore, not only in famine areas but in all "one-crop" tracts the emphatic necessity of secondary occupations. Such

as used to exist, have largely disappeared. And, at present, the following are chiefly followed:—

- (a) Industrial work in Bombay and other industrial centres. The relief afforded by this is, I think, considerably exaggerated, as taking the whole male population of the six largest industrial centres it only forms a small per cent. of the total male population of the country.
- (b) Carting. This is the ideal secondary occupation for a cultivator, as it utilises not only his own but also his bullock's labour.
- (c) Local labouring work in the nearest town or for local public bodies, or in connection with land improvement.
- (d) Poultry keeping, among the depressed classes, Mahommedans, and Christians, but only with country fowls.

The field is, therefore, open, and much study has been made recently as to what supplementary occupations are feasible. It must be understood that such occupations are totally different from village industries, as such,—and, being supplementary occupations, must be simple and yet give a return in useful material, if not in actual money. Many of those suggested are local, and the only ones which afford widespread possibilities are apparently:—

- (a) Poultry keeping with improved fowls. The future of this is decidedly rosy, and it has proved itself so far particularly useful in the most precarious tracts. The demand for large sized eggs and good fowls is very great, and probably is capable of increase to almost any extent, especially if an export trade in dried eggs or frozen eggs could be developed. The most effective work in Bombay has been done by Mr. J. L. Goheen of Sangli.
- (b) Spinning. I attach copies of a leaflet* prepared, at my request, by the All-India Spinners' Association for the Presidency Agricultural Show which well states the position regarding this.
- (c) Simple weaving. We are trying to develop this as a secondary occupation for farmers by (1) having a school for simple weaving which is kept six or eight months in a village and then passes on, and (2) making simple weaving a subject for school boys in our vernacular agricultural schools.
- (d) Lac growing. This can be extended widely, I think, and recently it seems likely to be taken up by one or two large landowners on their estates.

Silk growing and bee-keeping have been suggested, but seem out of the question except in a few places in the Bombay Presidency. There are, of course, many small local occupations, like cane-making, broom-making, etc., which have persisted in some areas. There are perhaps more of these in the Konkan than anywhere else.

But on the whole the line of development in the famine tracts, where irrigation cannot be extended (and this amount to over 90 per cent. of the cropped area), seems to consist in (1) vigorous development of land improvement schemes, both large and small, with Government assistance in preparation of plans and in finance at a low rate of interest, (2) further investigation into methods of utilising the rain which actually falls, and hence the strengthening of the work of the Soil Physicist, (3) some method of insuring against crop failure below a certain amount, and (4) the development of secondary occupations for cultivators. I have tried to show what we are attempting in each of these directions.

* Not printed.

Oral Evidence.

2747. *The Chairman:* Dr. Mann, you are Director of Agriculture, Bombay Presidency?—Yes.

2748. You have put in a very interesting memorandum which my colleagues and myself have had an opportunity of reading. We are indebted to you for that. We are also indebted to you for a good deal that is in the original memorandum* presented by the Province?—Yes, a very large proportion of it.

2749. Taking first the printed memorandum which is before the Commission, I mean your note of evidence, would you like to make any statement amplifying your note, or would you like to proceed at once by way of question and answer?—I would like to proceed at once with question and answer.

2750. On page 1 of the document you talk about the Agricultural College in Poona where you have a corps of experts who conduct agricultural research and who are equally responsible for the teaching of degree students and for the training of post-graduate students and workers. Is it your experience that research has a valuable bearing upon teaching?—Most emphatically. I would not like to have a teaching institution unless associated with it there was a very large amount of research going on.

2751. You think the benefit is mutual?—I do. I think it is of very great benefit to the student to be in an atmosphere of research and I think it keeps a research worker practical to be in touch with the teaching of students.

2752. Research workers have occasionally complained that the duties of teaching interfere with their research work. Do you think it is a sound complaint?—I think it is quite true that a man who has to devote a good deal of time to teaching cannot do quite as much research as when he devotes his whole time to research. But I think the gain is greater than the loss.

2753. Now, as regards your post-graduate training, do you find that the post-graduate men who come up for training and who have taken degrees in Indian Universities reach the desired standard in the pure sciences?—I think they reach just about the same standard as we had when we passed the science degree in the English Universities. That is to say, from the research point of view they are beginners, just the same as I was when I got my degree.

2754. Do you think that the grounding in the basic sciences is sound?—I think it is sound. I think it probably is not quite as good as that of a graduate in an English University, but I think it is sound.

2755. It is very important, is it not, from the angle of teaching research workers capable of directing from the higher posts?—It is a very important matter, but my experience is that of the graduates whom we get here, a certain number of them are capable, or develop the capacity, to conduct research of a very high quality.

2756. I do not know whether you would wish to tell the Commission what you think may be the future of the higher posts in research in this country, and particularly in relation to the future recruitment, if any, of European research workers?—Our experience in the Bombay Presidency, I think, is that we can develop here a corps of experts as good as we can get from Europe. I will not say that there are not better men in Europe than any we produce, but these are unobtainable. I think therefore that we develop as good men as can be got from Europe.

2757. What is it you think which makes the highest posts here unattractive to the best research workers in Europe?—They prefer to stay in Europe where they can get other positions. A man who can get a first class position in England is not likely to come out to India. For India we get men who do not usually belong absolutely to the first class.

*Not printed: Memorandum by the Bombay Government for the Commission.

matter. I think to the best science research workers, the reputation gained
2758. It is a question of pay, is it not?—I think that is only part of the through being in Europe is much more than the extra pay. I do not think any amount of money will draw the best men out to India.

2759. You do not think that a successful stay of five or ten years in this country would add to the prestige, or forward the future, of a research worker?—You might get a few good men in that way. But I do not think you can rely on getting them.

2760. On page 2, there is a point which I would like you to develop. You say: "It would be an exceedingly satisfactory thing if a permanent fund could be created in the Presidency, from which researches could be financed, so that their continuance would not be subject to the fluctuations of provincial finance." I take it it is impossible to over-emphasise the importance of continuity in research?—I entirely agree. To feel that very valuable work might be closed down at any moment because provincial finance is in a bad position destroys the power to do the best work. In order to get the best result, I think you must have a definite period settled over which you know the thing can be carried on.

2761. In all important lines of research, results cannot in the nature of things be expected in a limited time?—I think in most of our research schemes we can never expect to get valuable results under five years.

2762. Then you say, "Such an extension of research work is very much needed now as in many parts of the Presidency the people are coming to look to us for a solution of their difficulties in a way which was inconceivable ten years ago." Is that not very significant?—It is one of the most interesting features I know of and one of the most satisfying for one who has been in touch with the work. There are areas where there are people who now confidently come to us and say "We have this or that new difficulty; show us how we can best meet it." Many of them are difficulties which demand very considerable investigation.

2763. I notice in the memorandum you express the fear that this demand may grow to such an extent that you may not be in a position to meet it?—I fear that, undoubtedly. I will just give an illustration. In Upper Sind we have been working on rice for three or four years particularly, and last year we had a special disease, which people call rust. It is not rust at all but nobody knows what it is. They say "you must help us to get rid of it." At the present moment it is a very mysterious thing which will certainly take several years to clear up.

2764. They look to you to do it?—Yes; they look to us. Every association I went to at the end of the last rice season wanted us to tackle this question and asked us to do what we could.

2765. Then you go on to consider the directions in which the Central Government could assist agricultural research in the Provinces, and you point to the Indian Central Cotton Committee as an example of the value of organisation crop by crop over all-India?—Yes. I think it has given us a line to follow which we had not before. I think its work promises to be exceedingly successful. And it is a central body which has been able to help work not merely in one Province but in all Provinces.

2766. You point out that under the Reforms, since 1919, the Provinces are responsible for the conduct of research and the administration of agricultural matters within their boundaries?—Yes.

2767. Accepting that, do you yourself think that the Government of India should take no interest in India's premier industry?—Never. I think that would be rather absurd. I think it would be a very great pity if the Central Government considered itself in no way responsible for the development of agriculture.

2768. After all, there are Provinces more backward than Bombay?—Yes. We think so.

2769. I thought you might probably think so. Would you desire to see a day when the Central Government will say "After all it is no longer our affair. If you cannot look after your own agricultural matters you must suffer." That would be a calamity?—I think it would be a calamity. If you look at page 7 of the memorandum I have given definitely a series of purposes which I think the Government of India might and should always fulfil.

2770. Yes. I have read that. I also notice on page 3 you rather suggest the idea of a central stimulus for research backed by financial assistance as the basis upon which the Central Government could take an active share in agricultural research?—I do suggest that, yes. One feeling I have is that any funds placed at the disposal of some central body like this should not be raised from provincial contributions. I mean what the Provinces have to spend on the matter should be spent by themselves. But if assistance can be given in somewhat this manner from the Central Government, independent of any special contributions, then I think a scheme like this might work well.

2771. That would give the Central Government an opportunity of satisfying themselves, through this Advisory Body that you suggest, that reasonable co-ordination between Province and Province was being attained?—Yes, and that, of course, is what we get in the Central Cotton Committee. We do know, those of us who are members of that, as we have never known before, what is being done in each Province, and how our work is related to what is being done in the Central Provinces or Madras, for instance.

2772. Under present conditions, the power for good which a research institution like that at Pusa possesses depends very largely upon the prestige of its workers, does it not?—I think you may say, at present, almost entirely. I do not think the fact that it is a Central Government institution carries much weight. But if they have the best men, it carries the weight of the men.

2773. I do not know whether you would like, either in public or in private, to tell the Commission your views about Pusa at the moment?—I would rather give my views in private.

2774. Proceeding with your note of evidence, I come to Agricultural Education. I should like to ask you whether in this Presidency agricultural education, or education in general for that matter, enjoys the patronage of leading and wealthy citizens and landlords in the way in which it undoubtedly enjoys in certain other countries?—I think in Bombay it enjoys that patronage to a very great extent indeed. As far as public men are concerned it is one of the things on which you can rouse enthusiasm, and not only rouse enthusiasm but gather a good deal of money.

2775. Quite apart from the value of the money subscribed, the patronage and support itself is of immense value?—Of enormous value. We are the home of educational societies which are one of the most valuable factors in the public life of India.

2776. How about the larger landowners in the rural areas? Have you many men of wealth in that position in the Presidency?—No. Our rural landowning classes are not very large in numbers and not very wealthy. In Sind the position is different, but I am not dealing with that now. In the Presidency we have not a very large landowning class apart from the peasant cultivators.

2777. Then you go on to give four purposes which, in your view, in a country like India agricultural and rural education should try to serve. I come to the first "to saturate ordinary primary rural education with the agricultural outlook, especially with boys from ten or eleven years upwards." I take it that you consider the primary object of education in relation to agriculture to be literacy?—I think that the primary purpose of education is literacy. Up to the fourth standard, up to the age of 10 or 11, I aim at nothing but literacy, and not any specialised education of any sort. But after that stage we might begin to think what the future purpose of the boy's life is.

2778. You want the boy to be taught the three R's in terms of physical things with which the boy is accustomed to deal in his own home in the

village?—I think that is very important. I published some years ago a little book on agricultural arithmetic in which all the problems given are those relating to agriculture and farming. I think efforts in that direction might be made. I think our early readers might be given more of an agricultural bias, but the primary aim of all education up to the tenth or eleventh year should be literacy.

2779. In dealing with the matter of literacy, do you agree that one of the reasons why a high percentage relapse to illiteracy is due to the fact that they have illiterate homes?—That has a very great deal to do with it.

2780. They have no reading matter in the villages?—Practically none.

2781. Do you think that any firm attempt to increase the amount of literacy should be accompanied by an equally firm endeavour to spread adult education?—I think it should, but I think we are up against an exceedingly difficult proposition, because I do not know, except in one case, of a really successful effort at adult education.

2782. I noticed at once you did not bring that forward in your memorandum to any great extent?—Simply because I am almost in despair about it. There was an attempt on the part of the Co-operative Institute, out of the funds given by Sir Vithaldas Thakersey, to bring about a large amount of adult education in villages which had co-operative societies. The success was only moderate and the attempt has now been given up because the fund came to an end. But the success was small.

2783. Can you account for it, at all?—No. I think it is very difficult to account for it. I do not think there is a feeling of the necessity of reading, writing and arithmetic in the villages. Take for example a village 18 miles away from Poona. The very best cultivator in that village is a man who cannot read and write. That is the man whom I look on as one of the best cultivators in that village. He says: "I want my boys to read and write, but I am not very particular about it myself. I can get on very well without it."

2784. A man of outstanding capacity who was very well able to take care of his interests might get on without reading and writing?—That is so.

2785. You would not argue from that that the cultivators in general would not benefit from education?—No. I do not think they realise the extent to which they would benefit.

2786. Do you not think that improved communications and greater opportunities for practice in reading and writing (in other words, a greater necessity for reading and writing) will make adult education more easy to popularise?—I think it will to a certain extent, but I am not very satisfied that the present generation will ever be very much altered.

2787. Then I come to No. (2), provision of specialised agricultural education in the vernacular. The type of school you refer to is at Loni. Has that type been a success in this Presidency?—It depends upon what you mean by "success." We have these schools. They are all full. In all of them we have a much bigger demand for places than there is room for, and hence we can make a selection. The Government policy is that we shall have one such school for every district, and many districts which have not a school are applying for it and are offering in many cases to lay down money for getting such a school.

2788. In a document which you have been good enough to send me in answer to a letter written by my direction asking for further information on various points brought out in the original draft memorandum you have been able to point to a very considerable demand for the extension of this type of school?—Yes. I think it is clear there is a very considerable demand for that.

2789. These schools are, I take it, very expensive?—They are expensive. I was working it out to-day. Of course we cannot get exact figures, but I find that the cost of a Loni school, on the basis of the 1924-25 figures, works out at Rs. 262 per boy per annum. That includes boarding and everything for

the boys. They take two years, and therefore the total cost for the period is Rs. 520 per boy.

2790. *Sir Ganga Ram*: How many such boys are there?—There are about 130 now. The figures are given in one of these papers.

2791. *The Chairman*: Now, is it your experience that many of the boys entering the Loni school change their mind about their future half way through the period of their training?—No, not many.

2792. If they do, then of course they are in some difficulty, are they not, at a vocational school?—They are in a difficulty, but if they have not been there more than one year, they simply go back to the other type of education. Of course we have always a certain amount of leakage in the first month. That is to say, the boys join the school and then in the first month there is 10 per cent leakage.

2793. The boys do not like to work?—We get them to work very hard at it, and they complain that that is not the sort of education they expected. Otherwise the schools would be absolutely full. At Loni we take about 50, but we are usually left with 40 or 45 at any time. The difference between that and 50 is due to the leakage.

2794. Did you meet with many cases of caste prejudice against this type of vocational schools?—No: not here.

2795. You probably know that another system is followed in the Punjab?—I do not think there is another system in the Punjab. The Punjab type is exactly like my type No. (1). No. (2) is an entirely different type, and I do not think that what we are attempting at these schools is being attempted anywhere else in this country.

2796. You think there is no alternative; if you are to have a vocational type of education this is the only way to achieve it?—We have not had any practical suggestions for any other method. We think there is room for both types, the agricultural bias schools corresponding to the Punjab middle school and the schools for specialised agricultural education.

2797. How much non-technical education is given to the boys in the Loni schools?—I suppose about one-third of the time is devoted to education of a general type, but that of course has all got the agricultural outlook. For instance, nature study forms part of that. Then you have arithmetic, but the arithmetic entirely deals with agricultural problems and so on.

2798. Do you think that the plan of educating boys for Government service in an agricultural college alongside of those who go to the college with a view to return to their "father's farm" is a good plan? Or do you find that contact with those who are going in for official life is apt to turn the minds of those who come to the school with a view to returning to the farm, towards an official life?—There has been an influence in both directions. Some of the students who come to the college with a view to taking up work on their "father's farm" are tempted away to Government service; on the other hand, there are some who come definitely with the idea of Government service and who decide afterwards to go in for farming on their own. Hence I do not see any very great disadvantage in keeping the two classes together.

2799. One of the difficulties of a boy who goes to the business of farming from an agricultural college is that he has not had any commercial experience?—It is an exceedingly great difficulty. I mean, the men who leave our college are not as a rule fit to undertake commercial agricultural work.

2800. They get a certain experience of farm management, I suppose?—Yes, but it is in regard to theory rather than as something which may affect their pockets. I certainly would not turn one of my graduates, however brilliant, at once into an estate manager before giving him further training first in the management side of the work.

2801. Have you any suggestions to make as to how this difficulty might be overcome?—Yes; we have three methods which are actually adopted for this end. One is that Government have given me a certain number of posts of

graduates under training. These are definitely allotted as far as we possibly can to students who have in view positions as managers of estates or at any rate outside positions. The second method is we are offering graduates an opportunity to come and study for a year on our most developed commercial farm, for definite training in farm management and come into contact with the whole business management of the farms. We offer them residence and accommodation. But this has not attracted many students; in fact, it has not tempted any so far but the scheme is there and is open and we are making every effort to push it in the near future.

2802. *Sir Chunilal Mehta*: Why has it not attracted students?—Because, I think, so many of the students have spent all the money they want to spend on education by the time they leave college and require at least a living wage if they are to come for training. Thirdly, there are numbers of private estates now where they like to get our men as assistant managers. Ultimately they can get training there and then go back to a farm of their own.

2803. *The Chairman*: I want to put certain questions to you with regard to your answers to the questions about demonstration and propaganda. I observe with interest that you lay great emphasis on the value of demonstration on the cultivators' own fields?—We have almost given up all other sorts of demonstration. Demonstration farms, as far as we are concerned, are done with. We do practically all our demonstrations now on the cultivators' own fields.

2804. There is always a suspicion that you top-dress your Government demonstration farm, is there not?—Something of that sort. At any rate, there is an idea that conditions there do not correspond to those under which the cultivator works.

2805. Have you been successful in your peripatetic demonstrations?—Most of the work is done in that fashion. We have a number of demonstration plots on cultivators' holdings. We have got officers who go to the cultivators' fields at critical times of agricultural operations in order to demonstrate the improved methods.

2806. You emphasise the value of the Taluka Development Associations established by Sir Chunilal Mehta and initiated according to the scheme drafted in part by yourself. I want to ask you a question about them. Are these associations dependent at all on outside driving force or stimulus or management or help or is the whole drive and personnel discovered within the Taluka?—I think most of them are dependent to a certain extent on outside drive. Certainly most of them are.

2807. You admit that is a very important point?—It is exceedingly important. I do not think you can carry on this Taluka Development Association scheme unless you have a certain amount of outside driving force.

2808. Do you not foresee a time when these societies will be in a position to carry on their work practically without outside help?—I do; in some cases in a very few years the societies will be so self-dependent that they will not want any outside drive but they will still want, probably, the subsidy they get. As far as actual push goes they will be able to furnish it themselves. One or two of our Khandesh Associations are approaching that stage now.

2809. Both from the educational angle and the agricultural development angle, I think it is to be desired that direction and stimulus should come from within the community itself?—Precisely; that we have got very much in view. In fact, I think they will be a failure if they continue to depend on outside drive to the extent they have done in the past.

2810. I think the figures you give on page 6 are very significant. The initial fund of the Taluka Association in Gujarat was Rs. 12,000?—That was only inaugurated a fortnight ago, and I went specially to Gujarat to inaugurate it. Out of that sum, Rs. 8,000 was contributed locally in the Taluka.

2811. I was going to ask you how much of the Rs. 12,000 was with you when you went?—Rs. 8,000 was contributed locally, and the balance by natives of the Taluka now living outside it.

2812. People who were anxious to give a helping hand to their old home?—Yes. For instance, Rs. 3,000 was contributed by a partner of Ambalal Sarabhai of Ahmedabad.

2813. On page 7 you speak of winning the confidence of the people and of keeping officials in the background. How do you do that?—I do not know how we do it, except that we push the non-official people forward as the originators of everything as far as we possibly can.

2814. Provided an official has established a reputation for being able to assist the cultivators, I suppose he is an asset, is he not?—Certainly he is. When I wrote this I meant officials *qua* officials; I did not mean to exclude a man who has made a reputation as an individual. In such a case he is a most valuable man, though an official unfortunately.

2815. You point to the need for legislation to compel a small and obstinate majority to conform in the interests of progress?—Yes; I think that is essential in a number of cases. There are two particular matters to which I think I have referred in this note. One is in connection with fencing against wild pigs. There you often find an obstinate minority whose land is right in the middle of the area and who consequently suffer little damage from the wild pigs, and who will not have anything to do with the scheme. I know cases where the matter has been held up for years on that account. Again, in connection with land improvement, terracing and planting, such powers are really necessary; often a single individual, or two or three at the most, may hold a scheme up. I hold it is not unfair, if the owners of 75 per cent of the land come into a scheme like this, that the others should be compelled to.

2816. 75 per cent. of the land, not 75 per cent. of the owners?—That has been discussed. I feel disposed to say the owners of 75 per cent. of the land.

2817. Do you think the adoption of that principle in a statute would be well received by the public?—Yes, on the whole I think it would.

2818. You think the time has arrived when it might be tried?—Yes.

2819. *Mr. Calvert*: Would you not have a proportion of the owners as well?—*Mr. Madan* drew up a scheme recently embodying both—60 per cent. of the owners and 75 per cent. of the land.

2820. *The Chairman*: Recent French legislation embodies that dual principle?—Yes.

2821. Then comes, on page 7, what we have already referred to, your fear that a time may come in the future when you will not be able to meet the demands of the people?—I think that time is coming very fast.

2822. I suppose the limiting factor will be financial?—I think it probably will. How far we shall be able to have our research work mature is an important point, and of course that depends on the amount of money we get. I think a point has now been reached when we have got the men to do the work; hence it is a matter of finance rather than a matter of men.

2823. I should like to ask you, under the heading of Administration, about one or two questions you do not touch on in your proof of evidence. I suppose you have considered the subject of how to solve the problem that will lie before you of choosing officers for the new superior Provincial Service which I take it is to take the place in this Presidency of the old established Imperial Agricultural Service?—Exactly.

2824. Do you think some special training institution will be required?—So far as the lines of work which we have already developed are concerned, I do not think we want any special institution. I think the training in our own existing departments is the very best that can be given.

2825. That is to say, at the agricultural college?—Yes, and as subordinates of the men who are now doing the work. For instance, if I want a

Cotton Breeder I would rather place a man under one of my Cotton Breeders for five years than send him to any institution.

2826. You think you will be able to man this new service without any very great difficulty?—Yes, except in certain directions where we are short of men. For instance, quite recently we wanted a good Mycologist and a good Plant Pathologist. We have waited a long time, and ultimately we have had to get a man trained in one of the American Universities. There have been some cases like that, but for most of our lines of work we are now producing men as rapidly as we are likely to need them.

2827. How about the Royal Institute of Science in Bombay? Is that institution capable of turning out workers of the necessary calibre?—I would prefer to take the best of my own men and give them post-graduate training.

2828. Do you think you will be able to recruit enough?—Yes, I think so.

2829. A word or two on communications. Do you think that in this Presidency you are getting the railway development, particularly in the matter of branch and feeder lines, that you deserve and require?—I think there are tremendous possibilities in the direction of branch and feeder lines. I am not speaking of it as a commercial proposition but as an agricultural need. In some of our areas the roads are good; in others they are bad, and always will be bad; and in those areas I think feeder railway lines would be a tremendous agricultural asset.

2830. You do not commit yourself to their being a commercial success so far as the railways are concerned?—I am not qualified to speak on that.

2831. The fact that you are of opinion they would be of tremendous help to the country suggests, at least, that a considerable amount of produce would travel over them?—Yes, and undoubtedly they would stimulate the growth of the more valuable materials in areas where they are not now grown.

2832. Do you ever as a department represent the need of railway development in any particular district?—We never have done so so far.

2833. Do you bring to the notice of the railway departments complaints with regard to freights or lack of facilities for the transport of produce?—Very commonly, and I must say that on the whole we have been received by the railway departments with sympathy. Quite recently I have approached the railway companies on two matters, one being the freight on artificial manures. There they have been good enough to reduce very considerably the freights that were previously charged. The other instance was with regard to the distribution of cattle manure from Bombay, and there again the freight has been brought down very considerably as a result of representations.

2834. With whom do you deal in this connection?—We generally write to the Agent of the railway in question.

2835. Have you ever taken a complaint before the Rates Advisory Committee?—Not direct.

2836. Is the Railway Advisory Council an active body in this Presidency?—I do not know very much about it. I see the reports published in the papers; that is all.

2837. Do you know anything about the representation of rural interests on that body?—No, I do not know anything about that.

2838. How about roads? Have you anything to say about roads?—On the whole, our main roads are good in most districts, though there are exceptions, such as Surat and so on. The second class roads are only moderate, and the village roads are just about as bad as they can possibly be.

2839. Have you anything to say about District Boards in their capacity as bodies responsible for these roads?—I do not like to say very much, but I certainly think since they took second class roads under their charge those roads have not improved.

2840. I hope you will say a great deal if you think you ought to; it is very important that the Commission should know?—I certainly think that

those roads which are no longer provincial but now come under the District Boards are tending to deteriorate.

2841. To the disadvantage of the cultivator?—Yes. He has to cart over them.

2842. Does the Irrigation Department maintain certain roads?—They maintain only their own service roads. Some of them are open to public use and some are not, but they do not form a big factor.

2843. Are they good where they do exist?—Where they exist they are.

2844. To what do you attribute the failure of District Boards even to maintain these roads at their existing measure of efficiency? Is it disinclination to raise local taxes?—I think it is competition between various needs for a limited amount of funds. I think the tendency is now to prefer other means of spending the money. If there is competition between education and roads it is probable nowadays that education will get the money.

2845. Of course, competition between various money spending activities is a common experience in all walks of life and in all directions of public experience, is it not? It cannot in itself be a sufficient argument, do you think?—No, but I am only stating the fact.

2846. From the agricultural angle you do regard communications as of paramount importance?—I do.

2847. Have you anything to say with regard to the policy of extending Postal Services to rural parts?—I certainly feel that if it is possible we ought to extend them. But I know they have been gradually improving since I have been in the Bombay Presidency. Still they have got a long way to go.

2848. Extension of Postal Service is closely connected with the removal of illiteracy?—It is vital.

2849. Do you envisage the future of broadcasting in the vernacular with any enthusiasm in this country?—I think it is still a long way off.

2850. Still, I suppose the remarkable Agricultural Show which may be seen in this district at this moment seemed a long way off 24 months ago, did it not?—Yes. I think there are possibilities in broadcasting, but I do not envisage it as an immediate possibility.

2851. I notice that both in your note of evidence and in the provincial memorandum which was provided for this Commission at an earlier stage, very little is said about the provision of long-term credit. Do you regard that as a very important matter?—I think it is an exceedingly important matter, because I look on land improvement in a very large part of our area as being vital to any big agricultural improvement.

2852. And substantial measures of land improvement depend upon long-term credit?—They do.

2853. Have you any ideas as to how long-term credit might be provided?—The present arrangements are that it is provided by Government through co-operative societies as a rule.

2854. But you have no suggestions for the improvement or amendment of the present facilities?—No, except this, that I think most agricultural improvements will not pay the interest which is now charged on such long-term credit, and I think Government will have to recognise that they have an interest in the improvements, and an interest which ought to lead to a definite reduction in interest charges.

2855. I sometimes see words such as, "the need for adapting existing credit facilities to meet the demands of to-day," and phrases of that sort; do you know at all what these phrases mean?—No, I do not; most of them do not have any meaning at all.

2856. You have heard them used yourself?—I have heard them used.

2857. Of course, the present credit facilities represent a certain amount of credit or liquid capital, and in any credit organisation such as the deve-

lopment of credit banks, no doubt a certain amount of that credit or capital would find its way through such organisations into agricultural improvements?—It certainly would.

2858. And to that extent the phrase I have used has some meaning?—Yes, but it is often very difficult, in the way in which it is used, to make out what it does mean. There is only that one point I want to make on this matter, and that is that any permanent agricultural improvement is not merely an improvement made on behalf of the owner of the land, but the Government have a part of it; the Government get a substantial amount out of that improvement by way of insurance, if in no other way; hence the Government ought to take a definite financial responsibility and pay definitely for it.

2859. It is, for instance, a very important insurance against famine?—That, of course, is one of the points.

2860. Turning to the question of fragmentation of holdings, am I right in thinking that certain draft Bills are in the offing?—There is a draft Bill actually prepared. I do not think it has yet been actually approved by the Bombay Government, but I hope to-morrow to be able to lay that before the Commission.

2861. We had better leave that till to-morrow, but I will ask you this question, because you may wish to deal with it to-morrow. You have supplied us with these tables which merely suggest that there is some natural limit to the extent of fragmentation. Do you think that the population of the village might have an important bearing on fragmentation?—Yes, I think it might. But, except in the irrigation tracts, our village population is very constant or slightly declining. Most of our areas are not in the position of very rapidly developing country; but, as soon as you get a rapidly developing country for any reason whatever, then fragmentation will increase, and this condition of stability will cease.

2862. You mention that in your view there is some evidence of consolidation taking place as well as further sub-division; that consolidation being due, I take it, partly to sale and purchase?—Yes.

2863. And partly, perhaps, to peasants owning land dying without direct heirs?—Both, but it is mostly due to sale.

2864. Now on the question of Irrigation, do you think the relations between the Irrigation Department and your own department are sufficiently close, and, if I may say so, sensitive?—I wish they could be closer.

2865. Because, after all, it is really one problem, is it not?—The problem is one, except that the angle of approach is inevitably very different. I do not blame anybody: the angle of approach of the Irrigation Department is, and I think must be, a question of making 5 or 6 per cent. on the capital invested; that is the angle of approach and that is the dominant consideration. In our department, of course, the angle of approach is that of making the cultivators under the irrigation scheme as prosperous as we possibly can. I do not think anything can alter the difference in the angle of approach; I do not think any further machinery can alter that attitude, but I think we ought to be in as close touch as possible.

2866. You have no constructive proposals to put forward?—No, because I think it is very largely a matter of personality. I think if you get an irrigation officer who at the back of his mind has a very large view as to the prosperity of the people, and if you get an agricultural officer who does recognise the necessity of the scheme paying, then we can get on even as it is without any further machinery. Of course, there is one possibility, and that is that the same Minister should deal with both departments that would bring us together at once. I think that would be a very very good thing.

2867. *Professor Gangulee*: Do you think it would change the angle of vision?—It might to a certain extent; but, even then, the irrigation people would necessarily feel that they had got to make 5 per cent. on their capital. But it would be a great advantage if we could have the same Minister dealing with both.

2868. *The Chairman*: On the question of soils, do you advocate a thorough soil survey of the Presidency?—In the Presidency, no, in Sind, yes. In the Presidency, no, because, except in a few areas, we have no large areas of uniform soil. It would be such a vast task, and the value you would get out of it would not be worth it.

2869. I suppose it would be expensive?—It would be tremendously expensive. For instance, in the Deccan the actual crops which you can get from the land are very much more determined by the depth than by the nature of the soil. We have got data for every survey number in the Deccan of the depth of the soil, and that is very much more important than anything you can get out of an actual soil survey. On the other hand, in Sind, it would be a very great advantage.

2870. *Sir Henry Lawrence*: A soil survey of some character does exist as regards depth?—A soil survey does exist and has existed for many years as regards depth. The whole of the soils of the Presidency are classified into groups of so many inches of soil—2 inches, 3 inches, 6 inches, 12 inches, 18 inches. The whole of our revenue system is based on that.

2871. *Mr. Calvert*: At what depth do you stop?—Two feet, I think.

2872. *The Chairman*: As regards agricultural implements, do you think local initiative is coming forward to supply these wants in the way that it should?—I think it is.

2873. You are satisfied?—I am satisfied at the present moment. If there is a demand for any implement, it can be made here. When I first came to this Presidency we had not, I suppose, more than a dozen iron ploughs in use. Now, it is a question of hundred thousand, two hundred thousand, or something like that. At first, they were entirely supplied by English and American firms. Then Mr. Kirloskar started his workshop, at first in Dharwar and then in Belgaum. He manufactured ploughs, which were of the same pattern. Now, he has got very large works, which I hope the Commission will visit, and similar works have been started in Satara. They are working in close co-operation with me, and they are prepared now to make any implement I like to give them, provided I order 6.

2874. Do you know whether these firms are meeting with any particular difficulties in the manufacture or distribution of their wares?—Kirloskar complains very bitterly about import duties and railway freights.

2875. Does he not manufacture the implements in this country?—Yes, but he complains that implements which are imported from other countries come in free.

2876. That is absence of import duties?—Yes, absence of import duties.

2877. But surely, these people should be able to compete successfully with any imported implements?—They can compete. They have practically captured the market, but they have captured it, because they are very considerably cheaper; but, on the other hand, they are not so good.

2878. Is there a large import of agricultural implements to this Presidency from over-seas to-day?—Not a very important one, except in matters of big machinery like engines, pumps, tractors, and things like that; the smaller implements, no.

2879. Probably, the demand for agricultural implements of an improved kind will increase?—Yes, it is increasing very fast.

2880. And the natural ambition of India must be to manufacture implements to meet that demand in India?—I think so. I will give you an illustration. We have introduced ridge cultivation in lower Gujarat which, as a result of this year's working, is going ahead very fast, and I anticipate there will be 100,000 acres of such cultivation in five years. That requires certain kinds of implements, which we are now getting from the International Agricultural Implements Company, of which Messrs. Macbeth Brothers are the Agents. Those implements might very well be made here in five years.

2881. How about the relation between the Veterinary Department and your own department in the matter of research and administration?—In the matter of administration, formerly the Veterinary Department was under the Director of Agriculture. About 7 years ago, it was made independent. That did not matter so much, but, when the Reforms came on, it was not only made independent, but it was put under a different Minister. That, I think, has been fatal. I do not think there is any objection to its being separate; in fact, I think there is a great deal to be said for its being separate, but I think it ought to be under the same Minister.

2882. I see there are three departments, the Veterinary Department, the Agricultural Department pure and simple, and there is a branch, namely, the Animal Improvements Section?—The Veterinary Department simply deals with the investigation and checking of disease and with horse-breeding.

2883. So, there is a close link between the Veterinary Department and the Agricultural Department?—A very close link, which ought to be represented by a very close relationship between the two.

2884. Does that exist?—Not to the extent that it ought to. I am in close relationship with the Civil Veterinary Department, but the relationship is not so close as it ought to be.

2885. How about the relations between the Veterinary Department and Muktesar? Is that close?—Yes, it is close. Muktesar is the Research Department of all the Veterinary Departments in India. Practically no research is done in the Bombay Presidency.

2886. Does the prestige of Muktesar stand high in the Presidency?—Yes, it does.

2887. I do not know whether you would care to say anything with regard to what the Government of India might do in the veterinary line?—I have not thought the thing out sufficiently closely.

2888. Do you know anything about the co-ordination of veterinary work as between this Province and other Provinces, and particularly contiguous Provinces?—No, I do not know. At least, my knowledge is not special.

2889. I suppose veterinary education does not touch your immediate responsibility?—It does not. I have always wished that the Veterinary College and our Agricultural College should be much more closely related. What we want primarily is that the two departments should be under the same Minister; then I think we should get closer relationship between the two departments.

2890. There is a good deal to be said for the Veterinary Department being a separate and independent department as such?—Yes, I think so; I am not at all anxious that it should come under my control.

2891. You do not feel any avidity in that direction?—No.

2892. As regards marketing, the question, which I am afraid was not quite clear to you when you read the Questionnaire, was intended to apply to the physical market itself: whether the market arrangements and provision of the markets were satisfactory?—I see.

2893. I think you have answered the question fairly fully. A good deal of your answer to the question about marketing appears to me to apply to the produce which is destined for export abroad?—At any rate, it is destined for the world market in some form or another.

2894. Could you tell me whether there is any important stream of produce from any producing area in this Province to any consuming area within the bounds of the Presidency or outside?—There is a tremendous stream of material of all sorts which goes from the districts to Bombay. That, of course, is a very constant and a very regular stream. That is more or less on the same footing as the over-seas marketing.

2895. Is there any stream running in the other direction eastwards?—There is nothing on which I could speak.

2896. You would probably agree with me that it is just as important that the producer should receive a fair share of the ultimate price when you are

dealing with produce consumed within the borders of India as it is important that he should receive a fair share of the price for produce exported abroad?—Yes.

2897. The internal market is a very important question?—Yes, in regard, for instance, to the cottons that are utilised in India. Of the Kumpta cotton, none goes abroad. In fact, Bombay is the worst market in India for Kumpta cotton.

2898. I have read through your reply to the question on Marketing, and I have read through the report of the Mango Marketing Committee which reported in 1925. I should judge from the two that it is your view that the data which must be collected before an accurate analysis of the marketing system could be achieved, have not yet been collected?—They have not. I would not have been so sure of it a year ago, but, since I carried out my investigation in regard to the marketing of cotton in Khandesh for the Central Cotton Committee I have been convinced that even in regard to the products about which we know most, we know very little with regard to the finance and marketing of the produce from the time it leaves the hands of the man who grows it till it enters into the stream of wholesale commerce. ✓

2899. You agree that an examination and publication of those details is very important?—I think it is very important; in fact, so important that I have actually now before Government definite proposals for such an investigation in connection with two products in the coming year.

2900. Do you propose to utilise the services of your Agricultural Economist in that direction?—Yes; he will conduct the enquiry.

2901. I take it that in this country, as in Great Britain, where I am more familiar with it, public opinion is the ultimate tribunal to which you must refer?—Of course.

2902. So that it is very important that your results should be made public as soon as possible?—I entirely agree.

2903. Do you think any statutory regulation of marketing practices would be practicable in this country?—I think it would certainly be practicable. In fact, I drafted a Bill for the Government some time ago for the control of district markets, in connection with cotton, which is still before the Government, and may be introduced for aught I know within a reasonable time.

2904. How long has it been before Government?—It finally passed out of my hands about two years ago.

2905. Do you recommend for instance, statutory standardisation of weights and measures in the Presidency?—I am very strongly convinced that that must be done before we can get anything satisfactory.

2906. I find it hard enough to understand these matters when a pound is a pound on both sides of the table; it must be almost impossible to understand them when a pound is not a pound on the other side of the table?—It is impossible at the present time. If you look to page 102 of the memorandum* which I have submitted, you will find the number of seers per maund of cotton in the various markets in Khandesh. Without going outside Khandesh there you see the various values. Then when you leave that and you come to a market like Poona, if I am a cultivator I have to provide 256 lbs. per maund as a seller, and if I am buyer, I get only 240 lbs.

2907. I recall reading about some work done by Mr. Simcox in connection with standardising these measures. Do you know whether any of his work stands to-day?—I think it has gone, though I cannot speak for certain.

2908. He achieved a certain measure of success in the area in which he worked?—Yes, for the time being.

2909. *Mr. Calvert*: Is standardisation a practical proposition?—Most of the committees that sat on it have been very doubtful about it, but I cannot see why it should be an impossible proposition.

* Not printed: Memorandum by the Bombay Government for the Commission.

2910. *The Chairman*: It must come sooner or later you think?—I think it is certain to come sooner or later.

2911. The question is whether the time has come or not?—Yes. I think with regard to many products it has come.

2912. I do not quite follow the logic of the latter part of your reply in sub-section (4) on page 13. You say "Thus with potatoes in Poona, all the stuff must pass through the hands of five *adtis*." How is that?—A cultivator brings his produce to the market; as he comes into the market, he is met by the representative of one of the five *adtis*. The *adti* asks the man; 'Will you let me sell this for you?' If the cultivator says 'No,' and does not make a bargain with that *adti* or one of the others, he cannot sell his stuff. If he makes a bargain, the *adti* goes to the *dalal* for the buyer, settles rates, and also settles that no other *dalal* will deal with the cultivator. That means two middlemen.

2913. So that, these five people work the whole potato market in Poona?—Yes. When we tried to introduce a sixth in connection with co-operative potato marketing, they boycotted the whole thing and killed the society.

2914. I should have thought 5 were probably ample. I do not quite understand you?—None of these *adtis* would come in on the terms which we wanted as a co-operative society, so we tried to introduce a sixth man on behalf of the society, but they said no.

2915. How about these charitable and other deductions? What percentage do they amount to?—You will find on pages 99-100 of the memorandum* a statement of the actual amounts in various cotton markets in the Southern Division, which are fairly representative. I could not give you the actual percentages; they could be worked out.

2916. Do you think the cultivator willingly pays the charity cess?—I have never heard any serious objection to it.

2917. Is it an important amount?—Not very important. I have never heard very much objection to it. I do not think people very seriously object to it.

2918. It is not sufficiently heavy?—It is not sufficiently heavy. What they did object to in Khandesh was the other evils, which have nothing to do with charity. They objected to disputes as to the change in the rates after weighment had begun, and things like that.

2919. Have you any control of cotton markets in this Presidency?—No, we have not. They have in the Central Provinces and it was the purpose of the Bill which I drew up to bring that in force.

2920. *Dr. Hyder*: What is the quantity per *dokara* taken for sample?—It is 2 lbs. per *dokara*. That is, the man who brings the cotton is supposed to supply 2 lbs. of cotton out of every *dokara* to the man who is buying, without payment. It is taken as a sample for the person who buys. I do not know where it goes; it is taken out by the *dalal*; it does not go back to the cultivator.

2921. *The Chairman*: I take it that one of the main purposes of regulating the producer's output so as to aggregate an important volume of a particular grade of produce, is to secure value for quality?—That is the idea.

2922. Do you think that is a very important service which Government have been able to render?—I think it is exceedingly important, and I think both in Gujarat and in the Southern Mahratta country, the whole success of our improved cotton has been due to the fact that Government has undertaken that responsibility.

2923. It is not of much use your research workers researching or your demonstrators demonstrating unless the cultivator is going to get the better price for improved quality?—No.

2924. Which he will not do unless he sells his produce along with other similar produce so as to get a sufficient bulk to claim the best market price?—No.

*. Not printed.

2925. I notice there is an indication that experiments as to better containers for mangoes might be carried out. Do you think containers for horticultural produce as a whole are satisfactory in this country?—I do not think they are at all, especially for perishable produce.

2926. An extension of markets very often depends in great measure on better packing and better containers?—Precisely, and really we are now investigating the question of the best container for mangoes. I look upon that as the first step towards producing better containers for other perishable goods.

2927. If this work can be carried out, will it not be a very important service to the cultivator?—Yes, it is an exceedingly important service. To give an example, there is a very large number of eggs coming into Bombay from the Deccan. It is estimated that the average amount of loss is nearly 20 per cent. before they reach Bombay. That of course is purely a matter of proper containers.

2928. In marketing, do you think that bad communications tend to bind a cultivator down to a particular dealer and to limit his choice of markets?—I think very much so.

2929. Is it often the case in this Presidency that cultivators are bound to local markets rather than to more distant markets, through lack of pack animals?—I do not think lack of transport animals is a very big factor in the Presidency proper; in Sind it is. There we have pack animals rather than animals drawing wheeled vehicles. That is in Lower Sind, it is not so much so in Upper Sind. For the rest of the Presidency, I doubt whether it is a very big factor.

2930. In the matter of the welfare of the rural population, the Commission is interested in the proposal you have put forward. I understand your idea to be to remove help from outside as soon as the infant can walk by itself?—Exactly. I mean that, unless we can get an organisation or a group of villages feeling self-conscious and appreciating the necessity of an improvement, I do not think we are really out of the wood. But I think we have got a long way to go before we can get to that stage.

2931. Are you looking forward to any detailed economic surveys of villages? Is that likely to be done by your Agricultural Economist?—Yes, I think it is. These economic surveys of villages are very difficult things to do. They are not things you can take up wholesale, and they are not things that can be taken up by everybody. I reckon that the economic survey of a village takes me a year, that is to say, it takes so long to get into the confidence of the people so that you are sure that you are getting correct information. Unless you gave me a year, I would not undertake to give you correct data.

2932. Does your experience suggest that even having got that data you should be extremely wary of applying a particular instance to the generality of things?—I would be extremely wary. For instance, the first village that I studied in close detail was Pimpal Soudagar, which is a few miles from Poona. I am convinced now that that is not a type. I did not realise it at the time, but I am convinced that it is not the type for a very large number. On the other hand, I investigated a second village east of Poona and after 10 years I am convinced that that is probably a type of 100,000 villages.

2933. *Professor Gangulee*: What do you mean by type?—It is a type of the dry, semi-arid famine areas of the Eastern Deccan.

2934. *The Chairman*: In the memorandum* which you have submitted, you give some very interesting diagrams dealing with the relations between prices and wages?—Yes, I got those out at the request of my Government about three or four weeks ago. I should like to hear what the Commission has to ask about them.

2935. I take it from what you have said in these papers that it is your view that the rise in agricultural wages has been due in the main not to a

* Not printed.

rise in the cost of living, but to an increasing shortage of agricultural labour?—I am more and more convinced, the more I study it, that it is due to a shortage of agricultural labour.

2936. Does that shortage show any signs up to this moment, of encouraging the use of labour saving machinery?—I cannot say there is any very marked change in that direction. Possibly, in Lower Gujarat one sees signs of it in the development in the last couple of years of tractor cultivation, but that is the only case I can think of where there has been any very material change.

2937. Sooner or later that must be the tendency, must it not?—If there is an increasing shortage of agricultural labour, and I think there is, that will certainly be the only solution.

2938. This shortage really represents a raising of the standard of living, does it not?—Not necessarily.

2939. You yourself attribute it to two causes, firstly, the fact that more and more labourers are returning to the cultivation of their own small holdings, and secondly, to the fact that they are being attracted, I suppose by higher wages, to the towns?—Yes.

2940. In so far as they are being attracted to the towns by higher wages, presumably their standard of living is rising?—So far, that is so.

2941. So far as the first cause is concerned, why are they turning from labour which, on your own showing, is paying a higher wage, to the cultivation of these small and presumably uneconomic plots?—I think the desire for the possession and cultivation of land, the land hunger feeling, is very, very strong. (The man would really rather get Rs. 10 a month by cultivating his own plot, than get Rs. 15 a month and work for somebody else. I was particularly struck by something that Sardar Jogendra Singh said to me when I was last in Simla. He has a good many people on his large estate in the Punjab. He said that if he treated them as tenants, he was sure they could not make more than half as much as they could if he paid them wages, and yet they preferred it, and it gave him very much more.

2942. I do not quite see why this desire to own land in preference to earning a better living should have grown lately?—No, nor do I. But the fact did come out in the last census. I have not yet been able to trace the cause of it, but it did come out clearly in the last census.

2943. It may be due to the boom which existed before the fall in prices of the last few years?—That may have something to do with it because the last census was taken at a time when cotton had been exceedingly prosperous for the preceding 5 years.

2944. That may be the explanation of the whole thing, may it not?—It may quite easily.

2945. Do you wish to say anything about rural sanitation and hygiene? Would you like to say anything as to the dwelling houses in which the cultivator exists and rears his family?—The cultivator's dwelling-house, as it is at present, is certainly very cheap, but I do not think it is bad, on the whole. I am not one of those who condemn in every way the conditions under which the people live in the villages. They are not nearly so bad as people make them out to be, especially when you realise that the greater part of their time is spent out of doors. The house is not to the people here anything like what the house is to the people in England. You must remember in the Deccan, for instance even in Poona, we have got no fireplaces whatever in our bungalows. We could, with very little trouble, live outside. I could live outside in a tent, without the slightest feeling of chill all through the year.

2946. Probably the provision of a pure water-supply in all the villages would be the greater contribution?—That would be the greatest contribution towards sanitation you could make. But there is one point in connection with this, it seems to me you have got to look on sanitation and public health as one of the development activities. We call these taluka associations of ours not taluka agricultural associations, but Taluka Development Associa-

tions; that is to say, our idea was that they would look at the problem not merely as an agricultural problem, or a co-operative problem, but as a problem of the development of 100 or so villages in that taluka, and I look upon rural health as being a thing which is bound to come into that development scheme sooner or later.

2947. We all agree that by concentrating the administrative and financial resources on any one point, sanitation, education, or cultivation, it might be possible to obtain great results, but your view is that advance on the whole front of rural economy and rural life is what is required?—That is absolutely and very strongly my opinion. I feel that we must somehow get out of the idea of looking upon ourselves as agricultural men, or as co-operators, or as sanitarians or educationists. We must look at the thing from the point of view of rural reconstruction as a whole.

2948. Do you feel that the relations between your department and the Forest Department in this Province are sufficiently sympathetic?—No, I think, again, we are practically in the same position as we are in our relations with the Irrigation Department. In the Forest Department, I have no complaints on that score, they look upon forests as a proposition which they have got to make pay as well as they can. We, on the other hand, look at it from a different angle. I think it is impossible to alter that fact; there are these two angles. But, at the same time, even apart from that, I think we ought to get closer together than we have been, and I think we are getting closer together. There was a time in Kanara, for instance, when the position between the two departments was very considerably acute but I think we are working much more closely together now.

2949. In the matter of *kumri* cultivation and things of that sort, it is hardly reasonable to expect the rural population, where the cause and effect are so remote, to restrain themselves?—I think they ought to be restrained. I think the whole of the propaganda influence of the Agricultural Department ought to be spent in bringing to the knowledge of the people the necessity for this.

2950. Do you agree that forest officers might well be attached to your department for a short time to see things from the agriculturist and animal husbandry point of view?—I should very much like that to happen.

2951. *Sir Henry Lawrence*: I would like to ask you hundreds of questions, but I will confine myself to a dozen or so. In the first place, do you wish to improve your Poona college? Have you any scheme for enlarging or improving your present college there?—There has been a very important scheme recently devised by a committee appointed by Government for a very extensive enlargement of the Poona college.

2952. You have at present something like 184 students there?—About that.

2953. How many do you wish to provide for?—250.

2954. What would be the cost in broad figures?—I will bring that figure with me to-morrow, if you will allow me. I can work it out.

2955. If you enlarge your college to 250 students you will want to increase your staff very considerably?—Very considerably, of course.

2956. So there will be both an initial expenditure on laboratories and hostel accommodation and a further and recurring expenditure for staff?—Certainly.

2957. Have you any prospect of getting the money for that?—We have asked our Minister to provide us with a lakh of rupees in the budget as a first step to that.

2958. The college has done good work on the whole?—I think the college has done excellent work. Perhaps I am partial to it, because I was the first Principal; I was Principal there for nearly 12 years. On the whole, however, I am not disappointed with the work it has done.

2959. The character of that work has been recognised by other Governments, who have sent their students to you?—Very much so. We have become almost cosmopolitan.

2960. From what quarters outside Bombay have you drawn students?—We have had a very large number from Burma, a number from Ceylon, and we have even had students from Persia and East Africa. We have had a considerable number from the Central Provinces and a lot from Mysore, as well as a few from other parts of India.

2961. Have you had any from the Punjab?—We have had a few Punjabis, but not to any great extent. As a matter of fact, our standard of admission is higher than that of any other college in India.

2962. I think I heard you had a student from Brazil: is that correct?—We had one.

2963. *Dr. Hyder*: A Brazilian?—Yes, a Brazilian.

2964. *Sir Henry Lawrence*: I am not quite clear as to your view on the policy that should be adopted with regard to the future recruitment of Europeans. Do you wish to close that down altogether?—No, I do not, but I do not want to recruit Europeans as Europeans. There are positions in my department (and will be for a long time to come) for which I do not think we can get satisfactory men in India. For these I would certainly recruit men wherever I can get the best people; but for most sections I think we can recruit in India.

2965. You mentioned the fact you had drawn up a primer for use in schools. Was that adopted?—What I said was that we had drawn up an agricultural arithmetic. It was a primer in arithmetic.

2966. I did not catch that. Was it adopted?—It has not been adopted generally by the Education Department, but it is being adopted in the agricultural bias schools.

2967. Under your control?—No; they are under the control of the Education Department; but they have adopted it for use in those schools.

2968. You said there was not much interest taken in agricultural improvement by rural landholders, but I gathered you did not consider there were enough of such men to matter: is that correct?—I think that is the case. There is a large number of rural landowners who do take a good deal of interest, but the majority do not. After all, however, except in Sind they are a very minor factor in the rural problem here.

2969. A considerable amount of land, at any rate in the Deccan, is held by *Inamdars*?—Yes.

2970. Can you say what proportion that bears to the rest?—I cannot say off-hand.

2971. Can you find out the figure?—Yes, I think so, I will do that.

2972. Do such men take an interest in the improvement of their estates?—Only a very few of them.

2973. *Mr. Kamat*: Is there any incentive for them to do any work? Are they not entitled to take only a certain income from the villages and nothing more?—Yes. Most of them have a right to a certain proportion of the Government assessment.

2974. And there is no further incentive for them?—Not as a rule.

2975. *Sir Henry Lawrence*: On page 13 of your Annual Report* you state that you are greatly indebted to the Indian Central Cotton Committee and the Sir Sassoon David Trustees for financial assistance?—Yes.

2976. Approximately what sums do you receive from those bodies, compared with the grant from your own Government?—The Indian Central Cotton Committee now provides Rs. 65,000 a year for investigations, and they have promised another Rs. 20,000 for certain special investigations in Sind, so they are prepared to subsidise us at present at the rate of Rs. 85,000 a year. In addition to that we have had Rs. 10,000 in the last year for special economic inquiries; that is to say, in the last year Rs. 95,000 has been available.

2977. And the Sassoon David Trustees?—They give us between Rs. 20,000 and Rs. 30,000 a year.

* Annual Report of the Department of Agriculture, Bombay, for 1924-25.

2978. That is something less than 1½ lakhs, taken together, while your annual budget is something like 15 lakhs?—Between 15 and 16 lakhs.

2979. So the amount of extra work you undertake is not very great in comparison with the work you do which is financed from your own Government funds?—Except that the whole of this is definitely earmarked for research. We use Government offices to superintend the research and engage special assistants for the purpose of actually carrying it out.

2980. One criticism one sometimes hears made in regard to your operations is that you are spending a good deal of time and money over minor interests as compared with that given to the major interests of the country?—Yes.

2981. I suppose you would regard *juar* and *bajri* as two crops of the greatest agricultural importance in Bombay?—Yes.

2982. They represent half the total area cultivated?—12,000,000 acres in the Bombay Presidency are under these two crops.

2983. 12 millions out of 24?—Yes.

2984. How much time is given to the study of what improvements can be made in these two primary crops?—The proportion of time given to these has been increasing in recent years, but I must say until about 5 years ago they were somewhat neglected. They were neglected because of the insistent demand from the market crops like cotton, tobacco and so on. We are giving more and more time to them now. For instance, I have got 3 *juar* breeding investigations on now, one in Dharwar, one in Surat and one in Sind. Both in Dharwar and in Surat we have now types which give us nearly 20 per cent. increase in the yield.

2985. Have you the money and the men with which to spread this work?—No. We put up to Government in 1924 a scheme for largely increasing the staff in these directions, but at that time Government had not the money to provide.

2986. Very important work is being done in other parts of India with regard to rice and wheat?—Yes.

2987. Are you in close touch with the improvements they are introducing there?—Yes; we are in close touch with all the materials they publish. You will find the varieties they have worked out have all been tested with us, some of them with success and some not. For instance, the *indrasail* paddy which has been successful in Bengal has also given good results in Upper Sind.

2988. There is no overlapping of experiments between you and Imperial officers in these matters?—I do not think there is any very serious overlapping.

2989. You are fully informed of what they are working at?—I think so.

2990. And they are fully informed of what you are working at?—I think so.

2991. It has been suggested to us that there is a lack of cohesion between the different departments?—I think I may say we have always welcomed co-operation with Imperial officers. At the present time Dr. Shaw, of Pusa, is co-operating with us very closely in our tobacco station in Gujarat. We are co-operating with Dr. Warth at Bangalore in regard to his nutrition experiments and supplying him with material for his nutrition investigations on grasses. When we were considering cattle-breeding work in Sind we got the Agricultural Adviser to the Government of India and their Imperial Cattle Expert to come down and co-operate with us and advise us what to do. That is the sort of thing which is always going on.

2992. In regard to cattle, do you regard the improvement of the milk supply as an important problem before you?—A very important problem, but not the primary problem.

2993. Do you wish to improve cattle from the point of view of ploughing rather than from the point of view of milk?—I think we want both, but I think also the primary need is for good cattle for ploughing, and that is certainly the cultivator's point of view. I made a desperate effort in the

Belgaum district some years ago to get the people interested in purely milk cattle, and I absolutely failed. They said "We do not want breeding animals to produce milk; we want them to produce bullocks."

2994. In regard to cities, the milk supply is important?—Very important.

2995. I understand you had some scheme with regard to Ahmedabad; is that progressing?—No, that is not progressing at present; at least, I do not think so. The Bombay scheme, in which I was particularly interested, is being held up on account of legal difficulties. The scheme, that is, which the Bombay Municipality had sanctioned has now been held by the legal authorities to be outside its powers, and they say it would take 2 years to get the law amended.

2996. Could you give us some information as to what sort of difficulties were encountered?—This was the point. I reported for the Bombay Municipality some years ago on the future of the Bombay milk supply, and my report was accepted in principle. I said the future of the milk supply of Bombay must lie in dairy farms at some distance from the city, the cattle being kept where they could live under natural conditions and the milk being brought in by train in a pasteurised condition. This was accepted, and the Bombay Corporation put forward a scheme whereby they took shares in companies which were established in suitable districts for the purpose of supplying milk to Bombay. Two such companies were either floated or at the point of floatation. To one of them, in which I was particularly interested, the Bombay Municipality was prepared to grant 1 lakh of capital; to the other, rather more.

2997. It might be worth while for the Government to remove this legal difficulty?—I think it is essential, if you are to get the Bombay milk supply on a satisfactory basis.

2998. *The Chairman*: How was the law tested? Did some ratepayer protest?—I do not quite know how it happened, but the legal advisers of the Bombay Municipality came in at the last moment and said "You cannot do this."

2999. *Mr. Calvert*: The point was it was spending money outside its own area?—That is the point.

3000. *Sir Henry Lawrence*: Do you think enough is being done to improve, by selection and cross-breeding, the milk capacity of those herds which are under your control?—I think as much as we can do is being done, and in connection with two breeds we have been very successful. In the case of the Kankrej breed, the most beautiful, I think, in India, but which is not a milk breed, we took the matter up 15 years or more ago at Surat. The result is that now we have by gradual elimination been able to raise the standard of milk production to an extent no one would have believed possible 15 years ago.

3001. I notice on page 83 of your Annual Report* it is stated, with regard to Surat, that the majority of cows in the Gopi family yield more than 3,000 lbs. a year. We were told in Simla recently that within a very few years the Military dairies were able to raise the average of their cows' outturn to between 4,000 and 5,000 lbs.?—In the first place, that includes the cross-bred animals, and in the second, it includes animals which are bred only for milk. We cannot use cross-breds and we cannot breed only for milk. We cannot use cross-breds because we dare not. If I was a large landowner trying to run my own estate in which I could keep my cattle in a ring fence I would use cross-breds, but I dare not when I have to distribute animals all over the country.

3002. Why? Rinderpest?—Rinderpest and foot and mouth disease.

3003. *Professor Gangulee*: They are very susceptible to these diseases?—They are.

3004. *Sir Henry Lawrence*: Does not the Muktesar simultaneous inoculation help you?—It is too risky at present; we cannot recommend it on a large scale.

* Annual Report of the Department of Agriculture, Bombay, for 1924-25.

3005. *The Chairman*: Is that the view of your Veterinary Department?—That I am not quite sure, but at any rate there have been accidents and we dare not do it.

3006. *Sir Ganga Ram*: Have you ever taken borings from the soil?—We have done a large and extensive series in every part of the Presidency.

3007. Up to what limit?—Usually 200 feet.

3008. You have not gone beyond that?—No.

3009. Up to 200 feet have you never met any water-bearing sand?—Yes, we have in many places, and particularly in Upper Gujarat.

3010. Up to what depth?—They vary 100 feet or 120 feet.

3011. That is just the soil for putting tube wells in?—Yes, and tube wells have been put in very largely in that area.

3012. Do you put in an ordinary pump on each well?—Yes, there are centrifugal pumps on all these wells.

3013. Does it pay?—In certain cases; generally speaking it does pay in Upper Gujarat.

3014. What do you reckon the cost per acre at for pumping, supposing it is 20 feet depth?—I cannot tell you that off-hand.

3015. Have you any system by which you can co-ordinate the pumping of different wells?—Yes, to a certain extent.

3016. We were shown at the Agricultural Show here that it was possible to bring water up several wells into one sump: is that right?—That is so, provided the wells are very close together.

3017. But not if they are far apart?—Not if they are far apart, as you can easily realise.

3018. What do you mean by "close together": within 20 feet?—Yes, within 20 feet you could do it.

3019. But not 1,000 feet?—Of course not.

3020. Have you considered the use of compressed air to send power to 1,000 or 2,000 feet?—No, I have not considered that.

3021. You know it is done in America?—I know it is done in America and I know we can do it in Sind, but I do not think the underground supply of water in the areas of Gujarat to which I am referring is sufficient to make it worth while.

3022. You say there is a 100 feet supply?—No; what I said was that we hit the water-bearing strata at 100 feet from the surface.

3023. What is the thickness of the water-bearing sand?—That varies exceedingly; sometimes 10 feet and sometimes 15 feet.

3024. Not more?—It is not very thick, but if you go to 200 feet you can often reach 3 or 4 separate water-bearing strata.

3025. You referred to the funds given you by the Indian Central Cotton Committee. Do you know how much they charge per bale? What are their funds derived from?—From a cess which was originally 4 annas a bale, but which has now been reduced.

3026. Have you ever thought out any scheme by which you could, by putting a small cess on produce or on exported produce, get some money in the same way?—We have often thought about it, but it has never come to the stage of a practical proposal.

3027. What had you in mind? Do you export any cereals overseas?—A certain amount of rice.

3028. Have you any returns showing the exports and imports of cereals from Bombay?—I can give you exact figures for that to-morrow so far as wheat and rice are concerned.

3029. *Dr. Hyder*: Showing the exports from the Bombay Presidency which are the produce of that Presidency?—I think I can arrange to eliminate those exports which are first imported into the Bombay Presidency from outside.

3030. *Sir Ganga Ram*: Is it not true, so far as primary education is concerned, that boys are apt to forget everything they have learned two years after leaving school?—Large numbers of boys who go through the lower standards of primary schools afterwards lose their literacy.

3031. Altogether?—Almost.

3032. Your budget is 16 lakhs. What is the budget for primary education?—Something over a crore.

3033. Your Loni school costs Rs. 520 per student for the whole course?—Yes, taking the 2 years together.

3034. That means, if you have 50 boys, Rs. 26,000?—Yes, for the two years; it costs about Rs. 13,000 a year.

3035. Who gives this money; is it a provincial grant?—It is a provincial grant.

3036. Not given by the District Boards?—No, though a number of the District Boards give small grants towards it.

3037. What departments do the District Boards finance?—The District Boards maintain the whole of the education under the Education Department.

3038. And the hospitals?—I think so, but I am not an authority on what the District Boards do.

3039. Is there any percentage laid down for them, as there is in the Punjab, so much for one thing and so much for another?—I had rather you asked a revenue officer about that. It is outside my province.

3040. Have you ever considered the question of tramways or light railways of, say, 2 feet gauge?—We have considered it, and considered doing it on a very large scale. In many parts of the Presidency we have already got such light railways.

3041. Ordinary tramways where the trucks are drawn by ponies?—No.

3042. Nothing of that sort?—Nothing of that sort.

3043. Do you know a pony on a line like that can draw 150 maunds?—I know it can take very much more than it can on a road.

3044. 125 times as much?—I will take your word for that.

3045. Could you not grow wheat in your *rabi juar* area?—Only to a very small extent.

3046. Do you know that *juar* takes more water to mature than wheat?—Perhaps, but we can put it in 2 months earlier than wheat.

3047. That makes no difference, does it?—It makes a great deal of difference.

3048. How?—At the time you put in the *rabi juar* the soil is well supplied with water.

3049. That goes a long way towards wheat, you know. We put wheat in in October?—Yes. We cannot put wheat in until the end of October.

3050. Why?—We can put *rabi juar* in in the second-half of September and that makes a great deal of difference.

3051. Have you a list of the data of water required to mature each crop?—Yes, I can give you that.

3052. For each crop?—For each crop, or at any rate for each important crop.

3053. Do you think if a small cess was levied, as the Cotton Committee has levied it, and the proceeds were earmarked for all your researches, that would meet your needs?—That is a very general economic problem as to whether a product will stand a cess or not.

3054. Say a very small cess?—Some products would not stand it. They are already subject to very highly competitive conditions.

3055. I think you said the tendency nowadays was to consolidate holdings in order to sell them?—No, I did not quite say that. I said that in our

villages the tendency towards fragmentation and the tendency towards consolidation were almost equal, and a stable position had been reached.

3056. Is not there a tendency with the people here not to sell to brothers or cousins but largely to sell to outsiders?—I do not think there is any tendency in that direction.

3057. Under a law of pre-emption relatives would have the right to buy first?—There is no law of pre-emption like that.

3058. You said you were employing post-graduates in research work?—Yes.

3059. Do you pay them anything?—I usually take on these men under the scheme for post-graduates in training under which Government gives them Rs. 100 a month pending appointment either in the department or outside.

3060. Can you absorb all your product like that?—Not all.

3061. In one year you say you turned out 50, and out of those only 5 got appointments. Have you ever ascertained what became of the other 45?—We generally get information about 80 per cent. of the men we turn out. The other 20 per cent. we lose sight of.

3062. Do you know what became of those others who did not get employment?—As a matter of fact those men who are referred to in this list (which is an old one, as you know) got employment later on.

3063. On page 4 of your memorandum you refer to teachers being drawn by preference from the agricultural classes. What do you mean by "agricultural classes," agricultural by caste or avocation or what?—The agricultural classes are those whose main occupation is something in connection with agriculture.

3064. Irrespective of caste?—Irrespective of caste.

3065. Who own some land?—Some landowners decidedly belong to the agricultural classes, while some do not. Some landowners simply enjoy the revenue from the land and live in a city; others, who live on the land and definitely carry out the duties of a landowner, belong to the agricultural classes.

3066. Do you ever induce your graduates to take land on lease and try their hand on it?—A number of my graduates have gone in for that, but I do not recommend it immediately they leave college.

3067. There are no Government lands here you could set apart for that?—There is some land which might be so used, but I think at the present time there is land available for men who are fit to take it.

3068. You know the Punjab Government have recently allotted 2,000 acres for that purpose, and a boy who passes out of the Agricultural College can get about 80 acres for 3 years. He is not allowed to employ tenants on the *bafai* or cash system; he must work the land himself and pay wages. Can that system be introduced here?—I am proposing that system in connection with the Barrage in Sind.

3069. Have you any Crown land there?—There is a lot of Crown land there, but in the rest of the Presidency the amount of Crown land is small. We are pushing this sort of thing, but not with raw fresh students.

3070. Have you ever thought of using your students to take on lease a whole village at say 10 per cent. more than it is fetching now?—That is all on the supposition that you have got villages as a whole: in other words, that you have got a zamindari system; we have not got such a thing; there is no such thing as taking a whole village, except in Sind. The whole of the Bombay Presidency is ryotwari with the exception of Sind.

3071. That is to say, the land belongs to the Government?—The land is held direct from Government by the peasant who cultivates it; at least, that is the principle on which we are going.

3072. Have you ever given any consideration to any indigenous deposits here which you could turn into manure; for instance, have you ever observed that there is a great export of bones and blood?—There is a very large export of bones from the Bombay Presidency.

3073. But it comes from other Provinces I suppose?—I am talking about the bones from the Bombay Presidency itself, and there is a very large amount of bones produced here and crushed here. Now we have tested and tried those bones in the cultivation of almost all our crops, and they have been very ineffective, except in the case of rice.

3074. Certainly they would be ineffective unless you converted them into super-phosphates. If you treat them with sulphur they will be effective?—As a matter of fact, super-phosphates have done us generally no better than the raw bones, and in fact in many areas ground raw phosphate and ground bones have given us better results than super-phosphates.

3075. What do you say about the export of blood?—The export of blood does take place to a very considerable extent, but there are very considerable caste prejudices against the use of it, and while we have other fairly concentrated manures which are also exported, we prefer to push those.

3076. Do you know that animals are buried under the roots of grape vines?—That is also the policy here, and in the Nasik district I may tell you it has been the custom until quite recently to bury a man in a grape vine garden when it is being established, the man being of one of the lowest castes.

3077. Supposing you put a duty on the export of blood and such things, that would be a duty which people would not care to protest against; how much would that bring you in money?—I do not quite follow you.

3078. The people might take objection to an export duty of cereals on the ground that it would fall on the zamindar, but no objection could be taken to an export duty on blood and bones and that sort of thing, which are really useful to agriculture?—Speaking of my own Presidency, bones are of no use except for one or two products.

3079. What I mean is supposing you put an export duty on those two articles and appropriated the proceeds of the duty for your own purposes, that would not be objected to by the people?—That is an economic question which has more far-reaching considerations than one can think of on the spur of the moment.

3080. I lent you a book to read; do you accept the statement in that book that every acre of wheat taken from the soil deprives it of 180 lbs. of nitrogen?—That is approximately the amount. You sent me the book and I looked the matter up; it is approximately the case, provided the crop is large. At any rate, it is near enough for argument's sake.

3081. So that if you do not put manure in the soil, by what process is that lost nitrogen replenished in the soil?—As the result of investigations done both in the Punjab and in Bombay we find there is a natural recuperation of nitrogen which is much larger than was thought.

3082. By what process?—By a process of fixation in the soil.

3083. Is it not brought about by constant ploughing of the land?—Not necessarily.

3084. You wrote to me that it was, but that there was a limit to it?—There is a limit.

3085. What is the limit?—Nobody knows, but there is a limit. For instance, if we take black soil here which has been exposed to the sun during the hot weather and moisten it, we find there is a fixation of nitrogen. Then if we allow it to dry and again moisten it, we again get fixation of nitrogen; but there is a limit.

3086. Constant hoeing does not extract more nitrogen from the air?—There is no evidence that it does.

3087. We have strong evidence of that in the Punjab?—No, you have not, if you will pardon me.

3088. By ploughing 20 times I gain 25 times the nitrogen?—Precisely, that is quite easy to explain, but that does not show you that the whole of that is fixed from the atmosphere; you are utilising what is already in the soil.

3089. But you cannot go on utilising what is in the soil from year to year?—And you will not be able to utilise it for very long.

3090. Well, we have been utilising it for the last 20 years. You very kindly gave me the analysis of what each crop takes away from the soil?—I gave you figures indicating what 100 lbs. of each crop takes away.

3091. You did not give it me for *bajri* and *juar*?—Because these figures do not exist.

3092. Will you make some research as to them?—Yes, I will. Since I got your enquiry that matter has been in my mind and in a year's time I shall be able to give you some figures.

3093. What fodder crops do you grow?—I think we grow almost all the fodder crops available. The area under *berseem* is growing very fast. The area under *berseem* is growing as fast as we can do it.

3094. Our fodder crop in the Punjab is *bajri*; we cut it before it is fully grown?—I was going to mention to you *juar*: it is a very large fodder crop and particularly in Gujarat it is grown for the purposes of fodder. In other parts of the Presidency it is grown primarily for grain, but also for fodder.

3095. Do you know of any tree which will not cast an injurious shade on the crops if it is sown on the edge of the fields?—Yes, we have several; there are several trees which are not injurious to the plants round about them.

3096. What are they?—If you will leave that till to-morrow I will give you the names.*

3097. Very good. Can you suggest any industries which can be started from the raw material of these trees?—We are trying to push the lac industry to a very considerable extent.

3098. Are you pursuing the lac industry here in this Presidency?—In Sind very largely; there on the *babul* tree there is a very large production of lac; here in the Presidency we are trying to push it not so much on *babul* as on *palas* and on *ber*.

3099. Can you give me any idea of how many cattle and how many sheep and goats should be kept per acre in order that the farmyard manure alone may replace the lost chemical properties in the soil?—I cannot give you these figures at the moment, but I will tell you to-morrow.

3100. Will you take a note of that?—Yes; but I think I may say at once that it is impossible to keep more than one-fifth of the stock which would be required adequately to manure the land.

3101. We understand that agricultural implements are imported and that the duty on them is the same as the duty on any steel or iron imported?—Agricultural implements are imported free.

3102. Does the railway give you any concession in respect of the carriage of agricultural implements or do they make the same charge as for any other iron or steel?—I forget now, but there is a regular rate for agricultural implements which I can look up.

3103. A complaint has reached me from your own Presidency that the railways give no concession for the carriage of agricultural implements?—They do not give any concession beyond the classification which is given in the regular code, and I can find out exactly what stage of classification they come into.

3104. Is *taccavi* given for sinking additional wells here?—*Taccavi* is given more frequently for well-sinking than for almost anything else.

3105. Then, after a man has sunk a well, does he get any guarantee of exemption from increased assessment for a certain number of years?—He gets absolute immunity from increased taxation for ever in the Bombay Presidency; in the Bombay Presidency, Government have guaranteed that landholders' improvements should never be a cause for increased assessment.

3106. It appears that you produce much more oil-seeds than you require for your own needs?—Yes, we have a very large export of oil-seeds.

*Vide Appendix A, page 271.

3107. Do you export the oil?—We export both seeds and oil; we export a large quantity of seeds.

3108. Overseas or inter-provincially?—Both.

3109. Do you not think it would be better to adopt some process of hydrogenation and keep the cake here?—An attempt has been made to hydrogenise ground-nut oil in Bombay in connection with the preparation of vegetable *ghi*; it was made by one of the biggest firms in Western India, but it has not been a success though they spent a great deal of money on it.

3110. Do you know the cause of failure?—In the case of ground-nut oil they could not get rid of a certain objectionable acrid taste.

3111. I had in mind all this grease which has to be imported from foreign countries for railway axle boxes; could not vegetable oil be thickened so as to take the place of that imported grease?—As a matter of fact, a very large proportion of some of our oils which are suitable for that purpose are used; for instance, the B. B. & C. I. Railway have their own castor oil mill and produce practically the whole of the castor oil they require for lubrication at their own mill.

3112. For axle-boxes?—Yes.

3113. It is required to be much thicker, is not it?—It is used for the purposes for which castor oil is used. I am not enough of an engineer to know exactly where it comes in.

3114. *Sir Thomas Middleton*: How long is the course at the college?—3 years, but the students who come must have passed a year in an Arts College after Matriculation before they come.

3115. In most colleges in India now I think the course is 4 years?—Yes, ours is 4 years after Matriculation.

3116. You mean that in no other case does the college exact the same entrance standard as in Bombay?—That is precisely the case.

3117. About what number of graduates are there each year?—Between 40 and 50 now.

3118. In a 3-years period about how many men would you expect to have the qualifications that would be desirable in one of your research workers?—I should say that out of those 40 or 50 there may be two or three who will become really first-class research men.

3119. Two or three per annum?—Two or three per annum.

3120. Your system is to take them on as assistants and train them here?—Yes.

3121. Have you ever thought of giving them a post-graduate training elsewhere, so that after finishing a course at Bombay they might have an opportunity of seeing what is being done in other Universities?—We have not only thought about it, but we have done it in two ways: we have taken our graduates immediately after graduation and sent them abroad, and we have taken graduates who have some years experience with us and then sent them abroad.

3122. Have you a practice of sending a certain number each year or in each period of 3 years?—No, not a regular system, but as a rule, we have one of our men abroad almost all the time.

3123. How many research stations are there altogether in the Presidency now?—Altogether about 20; I am speaking from memory.

3124. What is the number of the technical staff at each station?—It varies very much; it varies from one to ten.

3125. Could you give me the approximate size of the whole research staff that you are employing at the present time?—It is in Appendix 2 of the original memorandum submitted by the Bombay Government.

3126. You have quite a considerable staff: how many do you require to recruit each year?—To the department as a whole we recruit anything from 6 to 12 graduates each year.

3127. I think in answer to one of the Chairman's questions you indicated that you would approve of the Central Government offering you grants for research work?—Yes, certainly.

3128. Was it not in your mind that the Presidency itself might also put up a proportion of the sum required?—I think it certainly would, and in fact we are spending in the Bombay Presidency here a very large amount on research work already. In the case of the Cotton Committee the reason why we have got bigger grants than any other Province I think has been because we were already spending more ourselves on cotton research than anybody else.

3129. From your evidence I gathered that you entirely approved of the system which is being adopted by the Cotton Committee?—On the whole, yes.

3130. Would you say that the two matters in which central assistance would be of especial value would be: (1) the provision of funds, and (2) ensuring continuity?—Yes, and (3) that the Central Cotton Committee enabled us to be in closer touch with other work that is going on elsewhere.

3131. Incidentally you mentioned that you had quite given up demonstration farms but now have demonstration plots?—We have entirely given up demonstration farms, and we have plots on cultivators' holdings.

3132. Are these plots very numerous?—Very numerous.

3133. Do they run into many hundreds?—Yes, many hundreds; for instance, at the present time in connection with the Sassoon David Fund grant I am trying to popularise sulphate of ammonia as a manure for cotton in Khandesh. In connection with that alone we are running between 40 and 50 plots.

3134. But are you not still using Surat for demonstration purposes?—Yes, Surat farm is useful for demonstration, but that is not its primary purpose; it incidentally serves for demonstration but it is definitely a research station, and its first purpose is that of a research station.

3135. You have in mind a greatly extended programme in the same direction to be put into operation as soon as circumstances are favourable and you are able to get the men and the money?—Certainly.

3136. Has that programme been drafted and laid before the Government?—In the year 1924 we were asked by Government to give them a programme for 5 years. That programme was laid before Government and is now before Government. We are gradually working towards it, I am afraid not nearly as fast as I should like at the moment.

3137. And no doubt it will be available for our information?—Yes, I could give you that.

3138. You advocate the provision of agricultural education, in special secondary English schools or ordinary English schools?—Yes.

3139. You have got no such type of institution in the Bombay Presidency?—We have nothing of that sort in the Bombay Presidency and the general tendency of opinion has been rather against it.

3140. Do you yourself think that that type of education is likely to prove satisfactory?—I do want the men who come to the Agricultural College to have more information; I want agriculture to have been more in their minds before they come.

3141. I see your object, but do you recognise that before these men get through the Matriculation and the Intermediate and have got up the necessary amount of English and science, they have a very heavy course of study?—Precisely.

3142. Do you think it would be wise to expect these men also to study agriculture as a University subject?—It is much more in my mind the idea that they should not get entirely out of touch with it. You see the position is that even village boys who ultimately go to the Agricultural College now practically leave their home and agriculture and go to a city at the age of 10 or 12. Then until they reach the age of 18 they have no further connection, so far as education is concerned, with agriculture whatever.

3143. I quite appreciate the point, but I doubt whether requiring them to pass an examination of a University type in the subject is the way to keep up their interest in agriculture?—I realise your objection and I fully sympathise with it.

3144. I have examined Bombay students for the School Final, and I did not think the type of agricultural education they got at that stage was of much use to them?—Of course you are basing your opinion on something which has actually existed, but which has been abandoned. My idea is not merely to have agriculture as a school subject; I am thinking of something rather different from what has existed in the past. I could not explain it in detail here, but what I do want is to retain in some measure contact with agriculture during those 6 or 7 years.

The Commission then adjourned till noon on Saturday, the 23rd October, 1926.

Saturday, October 23rd, 1926.

POONA.

PRESENT :

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

SIR HENRY STAVELEY LAWRENCE,
K.C.S.I., I.C.S.

SIR THOMAS MIDDLETON, K.B.E.,
C.B.

Rai Bahadur Sir GANGA RAM, Kt.,
C.I.E., M.V.O.

SIR JAMES MACKENNA, Kt., C.I.E.,
I.C.S.

Mr. H. CALVERT, C.I.E., I.C.S.

Raja Sri KRISHNA CHANDRA
GAJAPATI NARAYANA DEO, of Parla-
kimedi.

Professor N. GANGULEE.

Dr. L. K. HYDER.

Mr. B. S. KAMAT.

The Hon'ble Sir CHUNLAL V. MEHTA. } (*Co-opted Members.*)
Dewan Bahadur A. U. MALJI.

Mr. J. A. MADAN, I.C.S. } (*Joint Secretaries.*)
Mr. F. W. H. SMITH.

Dr. HAROLD H. MANN.

Further Oral Evidence.

3145. *Dr. Hyder*: I wish to deal with a few points of detail before I proceed to the general questions. May I ask you whether you are of opinion that local centres of research are necessary apart from the Central Institute at Pusa? In every case you have variations of climate, soil and other factors, and that being so you must have in your Province local centres of research. You cannot absolutely depend upon Pusa?—It is entirely out of the question. Not only should there be local centres of research but we must have many separate local centres within our own Province.

3146. I find from this note that there is a diminution of subsoil water in Gujarat and the eastern parts of the Deccan. Has any investigation been carried out in connection with this matter?—To determine why?

3147. Yes?—I do not think there has been any. We have simply noted the fact. We do know, of course, that in Gujarat the rainfall has been diminishing and hence that might account for part of it. But there has been no definite investigation why there has been such a large lowering of the subsoil water.

3148. With regard to the rains which begin after September in your famine-stricken districts (Ahmednagar, Sholapur and Bijapur), has any work been done in collaboration with the Meteorological Department to find out the currents of air, etc.?—No, I cannot say there has.

3149. Would you like to have it done?—Yes.

3150. There might be a sub-station of the Meteorological Department, just as we have at Agra, to find out whether these currents show normality or otherwise?—I should welcome such a station, especially in famine tracts, because it is really one belt of country starting from about ten miles east of Poona, which forms the most famine-stricken area in India.

3151. I am interested in the matter of irrigation. I find in your Government canals in the Deccan you have got this question of aquatic weeds. May I know what department does the investigation? Is it yours?—We do the investigation and the Irrigation Department carry out the methods which we suggest. My colleague Dr. Burns has made a great many investigations into the weed trouble in the Deccan canals, and attempts have been made to use the results of his investigation in the canals by the Irrigation Department.

3152. Have you large areas of Usar or alkali lands here?—Not very large areas. In one case there was a large development of water-logging amounting to 20 per cent. of the irrigated area within 15 years of starting the canal.

3153. Do you think that the experiment of reclaiming such lands by means of co-operative societies has got a future?—I do not think there is much scope for reclaiming such lands once they have developed salt.

3154. You do not think so?—If it is merely a case of water-logging, then it can be reclaimed at low cost.

3155. If it is a matter of efflorescence?—If it is development of salt in the soil, it has never been a really practicable proposition. It ought to be a matter of prevention and not a matter of cure.

3156. I was wondering whether your department was closely associated with the Irrigation Department. You are, I understand, carrying on certain experiments in the neighbourhood of Poona with regard to the utilisation of city sewage. Is there close association between your department and the Irrigation Department in this matter?—I cannot say the association is very close, but it is there.

3157. Then I come to another point of detail. I am very interested in your schools of a vocational type. I was wondering whether you could tell us whether these schools could exist if the State ceased to provide free tuition and free lodging?—It is a very difficult question to answer. At the present moment I should say they would exist but on a very much smaller scale. We should have to build up a new clientele again for the schools on a paying basis. I think we should get it, but not at once and probably we would get a different type of boy.

3158. With regard to graduates and under-graduates of your Agricultural College, I wonder what you do with them in the long vacation? Do you think it might be useful to draft these boys into the different talukas of your districts so that they may pass the long vacation with the farmers and give them some theoretical instruction and get some practical training themselves. Probably they might act as a leaven for the whole inert mass of our agricultural population?—You are speaking more particularly of the graduates. The graduates, of course, naturally get jobs under Government or elsewhere, and they would not be available.

3159. But so far as the under-graduates are concerned?—I think it would be an exceedingly good thing if that could be done. I have already done that, for instance, in connection with our economic enquiries, I have nearly always utilised a number of college students to work under one of my workers in the districts in the long vacation.

3160. I understood you to say yesterday that you would not entrust your graduates with the management of a small estate or farm as a business proposition. This scheme of giving such practical experience to the student in his college career might be of help to him when he goes out?—I think it would be of advantage, but I do not think it would make him fit to take charge of an estate immediately he left the college.

3161. I was wondering whether you were giving your under-graduates any training in rent and revenue matters?—We do to a limited extent in the final year. And in the course which has recently been sanctioned by the University we are emphasising that much more than now.

3162. I was wondering whether your department had worked out the economic side of agricultural matters; I mean, cost of production, yield, and net profits?—We have done that for a number of crops, particularly in the case of sugarcane, but not as completely as we should like to do. But since we have appointed a Professor of Agricultural Economics, the two questions of cost of production and marketing form two special subjects of study.

3163. We know enough in India: we do not require more knowledge. Our problem is how to embody our existing knowledge in practical agriculture. I was wondering whether you would be able to suggest some agencies by means of which we could carry the results of the laboratories to the fields?—

That is the whole aim of my section on demonstration and propaganda. Its work is to organise the carrying of the results of the laboratories to the fields. And we have devoted more attention and more time and more money, almost, to this than to any other purpose.

3164. Then with regard to agricultural finance, we have this co-operative movement. I was wondering whether you knew that in this country we had the ancient rule of *dandopat*, that is to say the interest should in no case exceed the principal sum lent. Do you think it is desirable to embody in some sort of legislation this ancient rule for the welfare of the agriculturists?—That takes us into a very wide matter. The whole question of the State regulation of interest is a matter on which I hardly dare embark at present. We have had some legislation for the relief of agriculturists, the Deccan Agriculturists' Relief Act, which was an attempt by the State to regulate interest. There is a good deal to say on both sides, but it is a very big matter.

3165. I was very interested in your remarks on rural development (Question 25, page 15) in which you say: "At present in the Bombay Presidency the village population has rather been left in a back-water, but the time has come to look at the rural problems as a whole, and to see whether definite progress cannot be made not merely in the technical improvement of agriculture, or the organisation of village finance, or in pushing village sanitation, or in increasing the number of villages with schools, but in taking all these things as part of one end, the recreation of the villages as self-conscious units, with the idea of progress and of improvement." I was wondering whether you could give this Commission your view about this central problem: how far the problem of Indian agriculture is technical and how far it is psychological. I was wondering what your view on this psychological part of the problem is?—I feel it is very largely psychological: it is more psychological than people have imagined. If you can get the idea of progress into the minds of the people more than at present, I think there are enormous possibilities.

3166. Through what agencies?—I have suggested a line under this very head from which you have just now quoted. It is a matter for missionary agency and not for Government agency.

3167. You utilise your Taluka Associations. Would you utilise educational agencies? Would you enlist non-official sympathy to enable these results of the laboratory to be carried to the fields? I was wondering whether the agriculturists would not look askance at the results. They might think thus: We have certain resources at our disposal. If we consider the cost of cultivation and the total value of the yield, then the net profit does not excite our enthusiasm?—I have not found any feeling of that sort among the people. Almost everywhere I have found that if you could convince the people that what you want them to do will give them the results you promise, then they are only too ready to take it in hand.

3168. Do these Taluka Associations consist of actual cultivators?—Yes, actual cultivators.

3169. Or do they consist only of those who are always in the forefront, the headman and men of his type?—Many of these Taluka Associations have a membership of 200 or 300, including certain co-operative societies. There are a few leaders among them, but a considerable number of them, about nine-tenths, are actual cultivators from the villages.

3170. Given better farming and better business, do you think it would make people more inclined to adopt progressive methods?—It certainly would.

3171. I would like you to tell me (you have been long enough in India) whether you have observed any change for the better?—I do not think that there has been. I am speaking now about the Deccan villages which I know best: I do not know Gujarat or other areas so well as I know the Deccan. I do not think the conditions of living in the Deccan villages have materially improved or materially changed. A certain number of luxuries are in use now which were not in use when I first knew the Deccan, but in the Deccan generally I do not think the standard of life is materially higher than it was 20 years ago. I came here 19 years ago next month.

3172. Taking this criterion of economic progress, I have been very interested in your study of the changes which have taken place in the rural population. You think there are certain areas of economic decay in the Bombay Presidency?—There are certain regions of decay. There have been certain regions in which there has been a distinct going back. I think the last census showed two or three areas in which society was almost breaking up. One was on the edge of the Kanara forests. There is a big area which is on the mend now, but at the last census (1921) its condition was extremely deplorable. Then the other one, the most depressing area which I have ever seen, is the talukdari area of Dhandhuka in Ahmedabad district. That is an area on the edge of Kathiawar. That was one of the most depressing areas I ever visited.

3173. What is your explanation of this shortage of agricultural labour? Is it due to the fact that the land cannot support so large a population, the methods of cultivation being what they are and quality of the land being what it is, so that the population is too much for the land to bear, and therefore a portion of the population is thrown off into the industrial areas? Does this give us any explanation of the shortage of agricultural labour?—I think it does, but only to a limited extent. I do not think you can say that the passage of cultivators into industrial life accounts completely for the shortage of agricultural labour. I think you have also to take into account the tendency I spoke of yesterday for the people to prefer to cultivate their own land even if it means their income is reduced.

3174. Have you noticed any marked change in the double-cropped areas? That would be a good thing to note. The people in the areas now get two crops instead of one?—You will notice in the report that I have utilised that as a method for determining agricultural advance, and I could not find on that basis any very material change between 1911 and 1922.

3175. You think that the possibilities of extending irrigation are limited in the Bombay Presidency proper?—I think there is no doubt whatever about that. In the Deccan we have got 3.6 per cent. of the crop area under irrigation now, and if we utilise every source available that I can think of, and every source which the Irrigation Commission have marked out, we shall have 7.25 per cent. of that area under irrigation. In other words we shall always have more than 90 per cent. of our crop area dry. In Gujarat the proportion will be higher.

3176. Coming to the last criterion, No. 8,* with regard to changes in the purchasing power of the population, I was wondering whether there were not too many assumptions made to make it a good index?—I entirely agree with you. But this chapter was put forward in an extremely tentative manner. You will see I have mentioned that. But it represents what I was really after. I wanted to find out whether the people had the power to purchase more or not. I made a number of assumptions, and I think there is urgent need for an economic inquiry to find out how far these assumptions should be modified in accordance with facts. They were the best assumptions I could think of at the time. They were merely an attempt to formulate a method of finding the changes in the purchasing power.

3177. You have made a reference to a committee about the Marketing of Mangoes. I am wondering whether it is not time for the Presidency to cry a halt, and carry out the recommendations of the different committees which have already reported, because we have already a stock of knowledge, and what we have to achieve is to embody that knowledge in practice?—In every one of these committees we are carrying out a considerable proportion of what has been recommended. For instance, we had a committee about the Damage by Wild Animals. The whole of their recommendations have been very carefully gone into by Government. Government have said they can have nothing to do with certain of the recommendations, but as to certain other recommendations they have given us money to carry them out, and we are now

* The reference is to pages 37 to 45 of "The Economic Progress of the Rural Area of the Bombay Presidency, 1911—1922," by Dr. Mann, published by the Bombay Government Press for official use only.

progressing well in the direction of protecting the crops against wild animals. We have spent a good deal in certain cases recommended by that Committee, e.g., on shooting parties. Government have also agreed to give gun licenses very much more widely than before, but I can say a very large increase has taken place in the issue of gun licenses. I do not think we have let things stay in the stage of report; we are attempting to carry out a considerable number of the recommendations.

3178. *Sir Chunilal Mehta*: Would you mind telling us how many research officers are working under you, or have worked under you for the last five years?—I cannot tell you about the previous years, but at page 60 of the memorandum presented to the Commission you will find a list of the men in the Imperial and Provincial Services who are working in the department. About half of these are distinctly research workers and about half are propaganda officers.

3179. Many of these officers in the research branch are Indian officers?—Most of them, yes.

3180. In fact you have very few European officers who are working in the research branch?—Yes. Dr. Burns, when this was written, was definitely in research work, and to a certain extent Mr. Bruen, also. Others are Indian officers.

3181. You have been associated with these gentlemen for a number of years; they have been working under your general direction: have you had any reason to feel that these research officers were not satisfactory, or that they could not do even higher kind of research work if they get the opportunity?—I do not think there is any reason to suppose that many of these men who have been working here could not do almost any class of research that we asked them to do. I have had one or two fine examples lately. The Central Cotton Committee gave me money three years ago to do a very complicated physiological problem on the shedding of cotton bolls. I put one of my Indian officers in charge, and he has done exceedingly good work. I reckon he has done as good physiological work as is being done in India at the present moment.

3182. You say they can do any kind of research work that you put them to. Do you suggest they cannot initiate research?—No, I want to make myself perfectly clear. There are two questions involved. I get a man to do certain work. Then when I have got him to do that work, I get him to initiate within those limits the line of work he thinks most suitable. Whether I get a European or an Indian officer or any officer, I have got to tell him in the wider sense what I want him to do. I definitely initiate the work to be done and our officers, Indian or European, are told definitely the lines along which they should work. That I think is one of the functions of the head of the department, to indicate the general lines of inquiry. But within that limit, our officers, European and Indian, are allowed to choose their own lines of investigation.

3183. Research work has been going on in the Surat farm for a number of years. It was almost entirely manned by Indian officers?—Yes: it has been. But until recently they worked under the general direction of a European Deputy Director.

3184. Mr. Himbury, who I believe was the representative of the British Cotton-growing Association, pays an annual visit I think?—He has paid two visits lately, one in 1922 and one last year.

3185. He paid a visit in 1922 and I believe he had some encouraging things to say about the work of the officers in the Surat farm?—He commended it very highly: he said it was one of the best stations he had ever seen.

3186. He was not taken round either by you or any other high officers of the department; in fact he said that the work that was done there could compare favourably with work done in America?—Yes.

3187. Do you think that in the matter of agriculture, research has got to be accommodated to local conditions and resources of the people, and more than in any other department you require local knowledge and sympathy with

the people?—I do entirely; I feel that any research we undertake should be initiated in the fields of the cultivator, that is to say, before I can say what I am going to spend my time on, I want to know what are the problems which are actually required to be solved by the people who are cultivating.

3188. It is not essential that all these officers should come from the cultivating classes; as a matter of fact these officers you have mentioned do not all belong to the cultivating classes?—No, I do not think in any sense it is necessary. On the other hand, provided I can get a man of equal scientific training, I would prefer he belonged to the cultivating class. But it is more essential that he should be a scientific man than that he should belong to any particular class.

3189. Government have up to now owing to financial reasons no definite plan of giving endowments for scholars to go to Europe for training in research, but if a system could be devised by which a certain number of officers after they have been at work for some years in the department could be sent to Western countries or to America for further studies, that would give the broad outlook that you require in the head of a research department?—I should welcome any systematic training of the men in that way very much indeed.

3190. Will you tell me whether you require co-ordination between the work of the Provincial Departments of Agriculture and the Central Department of Agriculture? In the first place, is there any real overlapping of research or of experiments in the Central Institute at Pusa and in your own department here?—I have never found any serious overlapping between the two.

3191. Would you consider that the local conditions of each Province require their own methods of investigation and that even in one Province conditions differ so much from time to time even in one division, that you require special studies of particular tracts?—Yes.

3192. Therefore local research is essential?—It is essential. I do not see how you can get on without it.

3193. What is the association that you would like between the Provinces and the Government of India?—First I think there is a certain amount of research work which can be done better by a central body than we can do it here, and that work ought to be done by a central body; that is to say, work which is of a general character and which would apply everywhere. If that could be done by a central body we ought to welcome that, but that of course will be a relatively small amount of the total. I suppose nine-tenths of the research work must be done locally and must be locally organised. Now, with regard to the relationship, I have put forward the idea of a Central Board which would have a supply of money and which could, like the Central Cotton Committee, hand money out for local investigations. I think in principle that is right, provided, as I said yesterday, such a Central Board was not based on local contributions but had funds of its own independent of local contributions. I think there is room for such a board which might hand out a portion of its funds to local experiments and local research. I think it would on the whole be better for this money to be allotted to provincial and local departments without conditions; that is to say, if here we are spending 15 lakhs, the Central Board might give us 10 lakhs and say: "Spend this on research. Give us a programme, but in any case here is 10 lakhs which the Central Government will hand over to you for research." I think we could spend it; I think it would enable us to go ahead much faster than we at present do. I think the determination of what should be done with that ten lakhs should be left to the local department, in other words, the Provincial Government.

3194. If the Central Government lay down the programme, is not that one of the conditions?—Only in this sense. The 10 lakhs would be allotted to the Bombay Government for this year or for the next three years. That being done, a programme will be laid before the Central Government by the Provincial Government, saying "This is how we propose to spend it, and we are prepared to receive suggestions as to how that programme might be modified."

3195. *Sir James MacKenna*: You do not desire then that any programmes should be specified by the Central Board before the money is allotted?—That is a point on which in my own mind I am not entirely clear. I have always felt that unless the Central Board is a body composed of the representatives of the Provinces it cannot really understand what is the relative importance of problems in any particular area. Hence I should like the discretion as to how that money should be spent to be entirely with the Local Government. The Central Board may give anything in the nature of suggestions but not directions.

3196. *Sir Chunilal Mehta*: If you had had, as you mention, 5 lakhs or 10 lakhs more than Government had been able to supply you with during the last 5 years, you would have been able to use it to the greatest advantage. You know exactly where you want to spend it, but you simply have not got the money?—Certainly, I could spend very profitably a much larger amount at present, on research schemes.

3197. You do not really require any direction as to how profitably to utilise that money?—I do not think so. I would be quite prepared to put forward a programme every item of which I believe would have valuable results.

3198. You mentioned that the Central Cotton Committee placed at your disposal Rs. 65,000. In their report does that Committee mention how much they collected and how much they distributed?—In the Annual Report which I was looking at this morning they are curiously silent about the amount of money they collect and what they have done with it.

3199. But you know how much money they have collected?—Yes. I do know they have collected during the past 10 years 10 lakhs of rupees approximately each year. They have now put aside nearly 20 lakhs of rupees.

3200. The legitimate share of Bombay would be very much larger than what she got and it would be of very great value to you?—It would be exceedingly so, but I think there is something to be said for the Central Cotton Committee, because they have merely capitalised this in order to spread their work on the present scale over a long period.

3201. How?—They have had researches amounting to 10 or 12 lakhs during the last few years. At present it only amounts to 6 lakhs. They have already research schemes on hand which will cost 8 to 10 lakhs a year, and they are going to use up that capital in order to finance the schemes which they have in hand.

3202. Ministers are somewhat sensitive as to approaching other bodies for finance or for directions as to how they are to spend it, and obviously you will have to consider very carefully because the Minister will have to obtain the advice of the Director of Agriculture on any such scheme of association that may be put forward?—Certainly.

3203. You will have to consider matters in detail, particularly as to the amount of money that should be given to the Provinces and the amount that should be left to the Central Board?—The actual amount to be given to each Province might be left to the Central Board, but the allocation to purposes within the Province I think ought to be left to the Province itself, subject to suggestion and advice which any Central Board may like to make.

3204. To pass on to your suggestions about propaganda, Dr. Hyder was perfectly correct in suggesting that that is really what we want to give our attention to now?—I agree.

3205. There are certain things ascertained by research which we want to propagate widely among the people?—Yes.

3206. In this Province we have conceived the idea of Taluka Development Association for the purpose and they have worked well?—Yes.

3207. They happen to deal only with two activities of the village: one is agriculture and the second is co-operation. As you said, about 200 to 300 is the membership of each association. That is almost entirely composed of cultivators?—Yes.

3208. What outside stimulus or direction do the Taluka Development Associations get now?—They get stimulus from, I think you may say, three

sources. In the first place, in each district we have got the District Agricultural Overseers one of whose duties it is to pay regular visits to all these associations and give stimulus to them. Secondly, they are stimulated by the District and Taluka Local Boards who give them a subsidy as a result of which they are kept up to the mark to a certain extent. Thirdly, they must make regular reports to Divisional Boards, which again acts as a stimulus.

3209. Do you say that there is sufficient internal stimulus in the associations given by the agriculturists themselves and that they will be able to stand on their own feet in a short time?—Yes, the internal stimulus in the better Taluka Development Associations is very strong.

3210. At any rate in this Province you have only two officers of the Agricultural Department doing propaganda work in each district under the Deputy Director of Agriculture?—Only two graduate officers, though we have subordinates.

3211. They are paid about Rs. 150?—They are paid on an average from Rs. 140 to Rs. 150. These people must have some association with whom they must deal. It is impossible for these officers to approach individual cultivators. There must be some kind of organisation with whom they must deal?—Yes.

3212. That was the genesis of the Taluka Development Associations?—Yes.

3213. They are getting at present a maximum of Rs. 1,000 a year from Government. If they were provided with a larger amount, say Rs. 5,000, they would be able to do much greater work?—They would be able to do a tremendous lot of more work if they were given Rs. 5,000 instead of Rs. 1,000 and they would be able to employ better men.

3214. We have got at present a Provincial Board, Divisional Boards and Taluka Associations. Do you feel that you require bodies smaller than the last in order to get at the local problems of the people in the villages?—If we had a group of twenty villages instead of two hundred villages we could certainly go ahead much faster and get very much more local interest than we can at present.

3215. There ought to be some stimulus for these smaller bodies?—This stimulus will be provided by the Taluka Development Associations.

3216. But under that directing body you want some paid executive officer who is a really capable, and sound man, to guide these smaller bodies?—Quite so, that is what I should like.

3217. You consider that the most beneficent results can be obtained by sending out a man with real missionary spirit who is prepared to spend practically the whole of his life in the village?—That is the idea.

3218. You have noticed that educated men, the brains of the village, do not like to remain in the village for any long time?—That is the case.

3219. Therefore some men of self-sacrifice who make it their life mission to work for the uplift of the rural people and live in the villages whose example and advice will be followed because they have no axe to grind and who will not be accused of taking sides in the village factions which exist everywhere are needed to do this work?—That is really what we need.

3220. The central body you are thinking of may be entrusted with the function of finding out such men and it would be better if they were non-officials?—It is only non-official men that can do this.

3221. Do you lay much stress upon this method of propaganda which in your opinion is likely to envisage the problem of agriculturists as a whole both as men and as agriculturists?—Yes, I do. That is the sort of men who can make the village a self-constituted unit not only in one direction but in all directions.

3222. Have you considered carrying out your wishes by any alternative method?—After much thought and after being in close touch with a good many villages I cannot conceive of any other method which will deal with the question.

3223. *The Raja of Parlakimedi*: Where would you start agricultural education in the ordinary course of study?—We have got agricultural bias schools and we have got the point at which education in agriculture can profitably be introduced, namely, as soon as the boy becomes literate, and that I take it is about the end of the 4th standard. I would not do it before that except to create an atmosphere for agricultural education. But at the age of 10 or 11 you can give a distinct agricultural bias.

3224. For practical study you will have to have a garden?—Yes, certainly; that is one of the conditions.

3225. As regards research how would you like to have it spread throughout the whole Presidency?—I have tried to describe the method which we have adopted, in the note before you. We have research officers in connection with every problem that is of importance. This work is under the direct control of the Director subject to a periodical examination of the results and progress by a committee of experts. I think I have described that on the first page of this memorandum.

3226. I want you to tell us how you will make the results of the research reach the ryots generally?—In this Province, and I think rightly, we have two Government officers in each district. In each district we try to form Taluka Development Associations consisting of groups of 100 to 200 villages. Each of these Taluka Associations has to submit a programme each year as to what it intends to do. The programme is usually inspired by the officers of the Agricultural Department and then they employ their own man who spends his time in pushing this programme and carrying these items of improvement to the people.

3227. Is there any status specified for membership to these associations?—No, nothing. The minimum subscription is Re. 1 per annum. If that is paid everybody has a right to membership in the association. But we have got a variety of members. We have got patrons, permanent life members, or special life members, ordinary life associates and so on.

3228. Are you carrying on research work on all crops, such as sugarcane, paddy and other food crops?—We are doing research work on a considerable number of crops. We are doing experiments in *jowari*, for example, and we are trying to breed types of *jowari* better than we have now; we have succeeded in increasing the yield of one of the main varieties by about 20 per cent. Several experiments have been carried on with *bajri* but it has proved a very difficult proposition. We have got five special stations for research in rice. We have got two special stations for research in sugarcane and a number of places where we are doing special research in cotton. We have carried on a greater amount of research work in cotton than in anything else. We have done a certain amount of work on oil-seeds and other problems; we have got two special stations for fruit and so on.

3229. In carrying on research work do you pay attention to yield?—We consider three questions: one is the question of yield, which is most important; secondly the quality; and thirdly disease.

3230. What are the common diseases by which paddy is attacked in these parts?—Paddy is wonderfully free from disease. There are numbers of insects which attack it, however.

3231. Have you got grasshopper?—Yes; some time ago the rice crop was practically ruined in Belgaum, but we have got rid of that trouble now. Rats are bad in some areas.

3232. Have you got the netting system for grasshoppers?—We have not only got it but used it in Belgaum and cleared the insect out of the neighbourhood by using it.

3233. Have you got stem-borers?—That is a problem of very great importance in rice. We have not the one they are talking about in South India, but we have a stem-borer.

3234. As regards manure necessary for sugarcane, have you carried out experiments to prove comparatively which is more efficacious?—We have done more extensive experiments on manures and sugarcane than on anything else.

It was started by Mr. Morrison 30 years ago. We have had an extraordinarily complete series of manurial tests for sugarcane.

3235. Which manure do you prefer: gingelly or ground-nut cakes?—Gingelly is good manure but it does not give materially better results than the other. The value of the manure depends upon the proportion of nitrogen it contains. Ground-nut also contains 6 per cent. of nitrogen and both give about the same result.

3236. I think it depends on the soil?—Yes, it does.

3237. To a question by the Chairman you said that some boys after a time drop out and leave the Loni school. What is the percentage of students who thus leave the school?—About 10 per cent.

3238. What do you attribute it to?—We require a certain standard of work in these schools. We expect them to go out early in the morning and work three or four hours at least on the farm and then do half a day's class work as well. They prefer to go to the ordinary day school where nothing like that standard is required. Some of the boys get homesick and so on, but it is generally due to the fact that they do not like the way in which the work is carried on.

3239. Can you not make the method of work easier in order that students might stick on?—I do not think I particularly want them to. I am not anxious to keep those students who want to leave the school. We get more applications for admission than our accommodation will permit us to accept.

3240. Do landlords take an interest in the study of agriculture in this part of India?—A very large number of boys at school and also students at the University are sons of landlords. Most of our landlords are small landlords, not big ones, but a very considerable number of students at the Agricultural College, for instance, are the sons of landlords.

3241. As regards Fragmentation, what extent would you fix as a limit for the economic cultivation of paddy?—That is an exceedingly difficult question, because the answer to it might be different, for instance, in an area using sown paddy from the answer in an area using transplanted paddy.

3242. Do you think that one acre of land can be fixed as a comfortable limit?—An acre of land? No. An acre of land means with us produce worth Rs. 100 in case of rice.

3243. In Madras it is like that?—Even if a man has no rent to pay that is not enough. That of course is not a living wage. If a man is to depend entirely on his paddy he must have at least 3 acres.

3244. Some holdings are very much smaller than an acre; would it not be better to fix it at one acre?—An acre would be a much better unit than many of them have now. There is one point in connection with that I would like to make, and that is I am not quite sure whether the attempt to get an economic holding (by which I mean a holding on which a man can completely support himself) is a practicable or desirable end. The tendency in the villages now is for people to be partially cultivators and partially labourers; some of the best cultivators I know are people who maintain themselves partly on their land and partly by their labour. I do not think there is anything against that.

3245. You can have rotation of crops, paddy and pulse, and so on. Altogether a man might be able to make Rs. 200 an acre?—The second crop with us does not give anything like the yield of the paddy. The paddy may give Rs. 100, but the second crop would give only Rs. 20 to Rs. 25, so that even with a second crop the total produce of an acre of land would not be worth more than Rs. 125.

3246. As regards cattle problems, are they under your supervision?—Yes, except diseases of cattle.

3247. Has your attention been drawn to the fact that cattle suffer a great deal while they are being transported from place to place in railway carriages? Are you aware that there are no proper arrangements for that?—The arrangements at present are very unsatisfactory. They are put into some

of these railway wagons covered with iron sheets, which must be as hot as a furnace.

3248. Is there no proper ventilation?—They generally keep the side doors open, but the animals are tortured in the hot weather in the course of long journeys.

3249. Have you approached the railway authorities on the question of improving the conditions?—I have never personally approached them on this question.

3250. As regards marketing, you mentioned yesterday that a sort of clique of five persons exists in the market, and each seller must go to them?—That is to say, to one or the other of them.

3251. Have they a sort of monopoly of the market, or taken a lease?—They occupy no official position. It is simply an arrangement of the *dalals* who represent the sellers. The buyers say: "We will only accept produce through one of these five men."

3252. How can these men keep the producers out of access to the public? Do they not allow the producer to go to the market?—He goes to the market, but unless he approaches the buyer through one of these *advis*, he cannot get a buyer. He may stand with his cart of potatoes in the market, but nobody will approach him to buy during the whole of the day.

3253. *Sir James MacKenna*: I want to go into the question of the Central Research Board a little. Did I gather rightly from your answer to Sir Chumilal Mehta that you would regard this as a central board of agricultural finance rather than a central board of agricultural research?—I have taken up that position from the beginning. I do not think that research can be directed by any central body. I have taken up that position very clearly in this note.

3254. Then, what is your attitude towards the Indian Central Cotton Committee, which is a centralised organisation dealing with a particular crop?—I am prepared to consider an *ad hoc* committee dealing with particular subjects, as in the case of the Central Cotton Committee, but I do not think it would be at all possible to have any central board directing research.

3255. Let me put a hypothetical scheme before you, which has been suggested. A scheme for research and investigation in a particular crop originates in a Province; such scheme would be presented and recommended by the Local Government to a central body controlling finance. If the central board accepted this scheme, having reference to what was being done in other Provinces, a portion of the finance, say 20 per cent., would be guaranteed for a period of five or ten years, the details and all the rest being left to the Provincial Government. What do you think of that?—I am afraid that would not work. That is an entirely different thing from even the Central Cotton Committee system, because that would give the central body a controlling and directing power in connection with research which, I am sure, the Provinces would never tolerate.

3256. Are you quite correct? I understood that was practically the procedure with the Central Cotton Committee. You put up a scheme to them and they said "carry on"?—The Central Cotton Committee will take up schemes and finance them, but they will not give 20 per cent. of the finance of anything. If a scheme is taken up by the Central Cotton Committee, it is taken up altogether, that is to say, it is either a Central Cotton scheme or it is a Government of Bombay scheme.

3257. You admit the possibility of having research done by a Central body in any particular crop?—In the case of an individual subject or individual crop a system of that sort would be possible.

3258. You have no objection to a central organisation investigating a definite crop like cotton or rice?—No; I have no objection. I have been thinking about it carefully since yesterday, and I think it would be still better if your central board of agricultural finance would place a certain amount of money for the investigation of any particular crop at the disposal of the Provincial Government.

3258. Without any consideration of the details of the scheme or anything else?—Yes.

3260. Simply financing?—Yes.

3261. *Professor Gangulee*: Would they not be entitled to make any suggestions as regards methods of investigations?—They might very well make suggestions, and when the schemes were finally decided upon, they might very well suggest modifications.

3262. *Sir James MacKenna*: We have the analogy of other countries, where you have got local and centralised research side by side working harmoniously? Do you see any objection to that in India beyond provincial jealousies?—No, I do not think there is any objection and I think it would work here. I think you are referring to the United States in particular?

3263. Yes?—I think it would work here, provided the initiation of the work was provincial. In other words, provided we shall not be, as we have so often been in the past, investigating things which have no interest to the people who are actually cultivating the land.

3264. You are not very far away from the scheme I put before you?—I think I am a good long way, because I do not think any question of paying 20 per cent. towards the cost of a particular piece of research would be admissible under any circumstances.

3265. 100 per cent. makes a difference, then?—If the Local Government were to go to the central body and say "We want a lakh of rupees for this particular work; will you give it to us?" and the central body agreed, I think it would be possible. But I, as Director of Agriculture, could not admit for one moment that in connection with any research which I am conducting, say for cotton breeding at Surat, a central body should come to me and say "We will pay 20 per cent. of the expense, provided we get a voice in the direction." I do not think that would be admissible.

3266. That was not the intention. After the scheme has been accepted in principle by the central body and financed, the details would be the care of the Province. It will be practically a partnership between the Local and Central Government?—As soon as you get the 20 per cent., it gives control.

3267. The fact of the matter is, you are a hard-hearted decentraliser! But you admit the Central Cotton Committee has been a very strong factor in the co-ordination and development of cotton research?—I do; I think the Central Cotton Committee has done exceedingly good work. I am a member of that Committee, but we have had a very big fight on that Committee on this very point. There were proposals in the early days of the Committee to centralise cotton work, which I resisted as a member of the Committee all the time.

3268. Do you get any information from the Central Cotton Committee (you being a member of it) as to what is being done for cotton in other Provinces which is not available in their reports?—I do not get it as a member of the Committee, but as a member of the research sub-committee I do. By chance, I happen to be a member of the research sub-committee, and I come to know what is being done in various Provinces in connection with all their research schemes.

3269. What are your best improved varieties of cotton grown in the largest areas?—We have three. We have the so-called 1027 Surat. That was originally selected by a man called Kulkarni. It was kept going by mass selection only until 1918. Then we went in for single plant selection from single selfed plants. Since we did that it has really become popular.

3270. Was not that one of Professor Gammie's cottons?—I do not think so.

3271. Are there any others?—Another one is Dharwar No. 1, which is improved Kumpta, which was selected by Mr. Kotur, who is my Cotton Breeder. Then there is the Gadag No. 1, which is Upland American. Each of these is now grown on half a million acres.

3272. *Sir James MacKenna*: How do you arrange for the training of your teachers in the agricultural bias schools?—We train about 5 or 6 at each of our three vocational agricultural schools. At Loni, we train 6, for the Marathi-speaking areas. At Devihosur in the Southern Division, we train 4 for the Kanarese areas, and so on.

3273. What about readers for these agricultural bias schools? Have you much difficulty about suitable readers?—Yes, we have. We are now using the ordinary reader, and we are using Dr. Clouston's *Lessons on Indian Agriculture*, translated into Marathi. As far as Gujarati and Kanarese are concerned, the translations are only manuscript at present.

3274. When was the school at Loni opened?—The school was originally opened in 1911 in Kirkee. Then we transferred it to Loni in 1914.

3275. The progress and development have been very slow?—It has been slow.

3276. Is it expensive?—It is expensive, and the progress has been slow.

3277. The fact that you are able to train teachers for these agricultural bias schools is an important factor?—Of course it is. If we had not these schools, I do not know how we should have trained the teachers.

3278. How do you account for that type of school being a failure in Madras and Bengal?—I think, perhaps, there was not enough enthusiasm behind it, and secondly, because the boys are admitted to Government service, for minor appointments in the Agricultural Department and elsewhere. I made it an absolute rule, when we started the school at Loni, that no boy from that school should be admitted to Government service.

3279. *Professor Gangulee*: What sort of appointment could they get in Government service?—The boys who attend the schools are from 15 to 16 years of age, and they leave the school when they are about 18, and then they may be appointed as *Kamgars*, non-graduate fieldmen, and so on. I set my face against it at Loni from the beginning, with the result that we get a different class of boys altogether. Most of our boys are now sons of substantial village *patels* and cultivators.

3280. *Sir James MacKenna*: I was interested in your statement to the Chairman, when you gave it as your opinion that the product of your college is quite comparable with similar products of an English Agricultural College. Is that due to the fact that the preliminary science teaching in the schools of the Bombay Presidency is fairly good?—I think it is fairly good. I do not think it is as good as the school training given at home; but I think it is fairly good.

3281. You have had a great deal of experience of students from Burma?—Yes.

3282. Would you apply the same terms of appreciation to them?—They were a rather variable lot. The best of them were very good: in fact I think the best of them were rather better than most of our men. They stood quite as high as the best of our men.

3283. As to the training of Indians for the higher grades of the service, what would you do with them after they take a degree in agriculture?—I would prefer putting them into our ordinary graduate service.

3284. The Provincial Service?—Not Provincial, but into the Subordinate Service. Then they would distinguish themselves or they would not. If they distinguish themselves I should send them abroad for a couple of years' training in the special line in which they are going to work. I would then bring them back and put them into the Provincial Service.

3285. Is it not rather a slow process?—Yes, it is but I would make sure. I think the best way of training a man is by bringing him into real contact with the hard facts.

3286. That, of course, would mean that in most cases a man would be nearly 30 before he got into the upper grades of the service?—I agree, and I think

that is what ought to be. Of course, it is a very different thing when we are dealing with Indians who belong to the country and Englishmen. In England, I never expected to get to a top position or a position of superiority until I was over 30.

3287. They all want to start at the top of the tree out here, I gather?—My men on the whole are very content to adopt that sort of policy and to join the department in the ordinary subordinate grade. I would much prefer that a man joins the department in the ordinary subordinate grades. Then they would work for 4 or 5 years, and then if they distinguish themselves, they would demand or at any rate want to get a chance. They would be sent abroad to England or America, for study in a special subject.

3288. Of course in that matter of training the personal link between pupil and teacher is very important?—It is of very great importance.

3289. You are not I take it in favour of teaching facilities for higher grades of Agricultural Service, a Central College specifically for this purpose?—I think my experience of men who have merely had college training, whether it be in India or in England, has been that they are very much less effective. I have had men who have been here, and who have gone to Europe straight away and then come back after two years with an additional English degree, but I have generally seen that they are not nearly as valuable to me as the men who have been trained under the more effective system I have had, and have been 10 years with me, perhaps, after graduation from my own college.

3290. Do you think Pusa could develop post-graduate training for that purpose?—I do not think for that purpose except in special subjects. In some matters I would send a man on to Pusa, instead of abroad, where Pusa was particularly well developed. For instance, when Mr. Howard was at Pusa, I would certainly have sent a man there who wanted to do plant breeding, quite as readily to Pusa as to any other place in the world.

3291. You do not think that is the line of development that should be pursued for post-graduate courses?—I do not think so.

3292. You would rather have the training you suggest completed by a selective course in England or America?—In England or America or India, if you can find anything of sufficiently high quality.

3293. You gave it as your opinion rather emphatically that we do not get first class men for the Agricultural Department over here. You have been in the Agricultural Department for as long as I have been. How do you reconcile your statement with the fact that so many of our old officers are now holding the most important posts in Europe in agricultural science?—I think I was quite right yesterday. We have had some good men in the Indian Agricultural Department. We have also had some extremely inferior men selected by the same people at home. I think we have had two or three men who would have obtained, if they had never come to India, the very highest positions in Europe; but I do not think we have had more and at the same time we have had a considerable number of very second rate men. It is rather a delicate matter and rather difficult to speak about, but I think that is the position.

3294. Would it be more correct to say that it has been possible to attract the best type of men, but not to keep them?—You and I know of about 8, as a rough figure; men of first class ability who have come to India but have gone back to Europe. I think we have got them by chance.

3295. For which many thanks?—Yes; but we have also got by the same method of recruitment, some men who are very inferior.

3296. *Professor Gangulee*: So many important points have been raised both in the memorandum presented before us and also in your replies that I feel tempted to go over some of the questions which have already been replied to. First, let me ask you whether for the purpose of agricultural research you have now adequate facilities at Poona?—I think, I can say we have.

We could do with a good deal more but I think for the lines which we have undertaken as being our special lines of research, we have fairly adequate means.

3297. Both in laboratories and farms?—I think so, I want to be perfectly understood; I am not one of those who go in for very high class facilities and equipment, I think there are many cases in which a man is ruined by his laboratory: I mean he gets far too good facilities, and hence he is never able to work under anything but the best conditions.

3298. Can you go on for ten years more without adding to the existing facilities?—I think we must gradually increase them, but I do not think I can say to you that the existing facilities are inadequate or unsatisfactory.

3299. And you have a corps of experts in these laboratories?—Yes, we have.

3300. You agree that with this combination of research work with teaching facilities, it has been possible for you to develop this corps of experts?—These are the conditions under which they have been developed.

3301. Under this arrangement you have been able to develop this post-graduate teaching?—Otherwise we could not have done it.

3302. Can we say that you have developed a sort of research atmosphere in the Agricultural College?—That was one of my chief aims. Ever since Sir Henry Lawrence brought me to Poona, I have tried to develop in the college a research atmosphere. Every man who was teaching in the college was expected to be engaged also in some research.

3303. Without any interference with his teaching work?—I have always said that the teaching work must be his primary duty. But teaching work in no institution I know takes up the whole time of a man. I expected that every man who was on the teaching staff should also do some research work.

3304. Can you tell me of any particular line of research which is important for this Presidency which you have not been able to start?—A good many.

3305. Any line which would at once benefit agriculture from the cultivator's point of view?—For instance, I have felt very often the need of a better Plant Physiologist, than I have got. This is a line which has recently come to the front, but there is a large number of problems which can be dealt with by a Plant Physiologist.

3306. For instance the study of the water requirements of plant?—That is one side. Then the question of the shedding of cotton bolls which we are now studying is completely a physiological question.

3307. So you want a Plant Physiologist. Have you developed in all other important lines of research?—There are yet a number of lines in which we have not developed.

3308. Plant pathological investigations?—That has not been developed as yet as much as I should like. We have got men but I am not satisfied with their quality.

3309. You have made a reference to the proposed All-India Research Board. In connection with that Board you say: "Our research work is hardly dependent in any way on that at Pusa, nor would it be possible, I think, without general injury to the work, to have it in any way directed from the Central Government, either by an All-India Research Board or otherwise." Can you explain to us the nature of the general injury you are afraid of?—The feeling I have is that we must have independence in regard to research in our own Province. If we are to be directed from outside we shall suffer and the work will suffer.

3310. Perhaps the crux of the whole trouble lies in the word "direction." What do you actually mean by "direction"?—They cannot dictate the nature of your problem. A Central Board can say "We want you to carry on work on these lines." They can merely make suggestions.

3311. In scientific work, are not suggestions welcome? Suppose you are carrying on plant pathological investigation. Certainly you would like to

have some suggestions from Mr. Shaw, who is working at Pusa?—We value that very much.

3312. That is not direction?—That is not the point. The point arises this way: if anybody comes to us and says “I will give you a lakh, but you will have to investigate this problem.”

3313. And you fear that problem may not exist in a great extent in your Presidency?—It may be of importance, but it may not be of primary importance. I should say “I want that lakh of rupees, but to us it would be far more important to investigate something else.” I want to have the right to say that is the thing to be done and not the other thing, which is relatively a minor matter.

3314. That is what you mean by direction?—Yes.

3315. As the situation is at present, do you find any difficulty in exchanging your experience with scientific workers in different parts of India and also with Pusa? Is there co-ordination?—The exchange of experience is not so close as I should like.

3316. Why is it so? Has it got worse since the Reforms?—I do not think it has got worse; I do not think it ever was very close. I have always felt that the Indian Board of Agriculture should be very much less an administrative board and very much more a board of consultation on work. I feel there should be an annual or biennial consultation between all workers in particular fields.

3317. But I believe you admit you have had a great deal of co-operation from Pusa?—We have had a good deal of help from Pusa.

3318. As regards administration, you criticise the Central Board idea and you suggest the formation of *ad hoc* committees for co-ordination. Do you not consider that such numerous committees under a Central Board would lead to a complicated organisation?—I do not think there is very much complication about it. The men who are now working on cotton have such a committee. I would like to have such a committee. I would like to have a committee of workers on tobacco, and so on.

3319. You will have a committee for each crop?—I do not want to have a committee for each crop. I would not classify them by crops, but groups of crops. I should like to have a committee for each important group.

3320. As regards your suggestion as to what the Government of India might undertake, do you not think that the Imperial Institute at Pusa, as it is now organised, can undertake items (1), (2), (4) and (5)?—I think it can undertake all these. No. (3) is the only thing about which there is any controversy.

3321. I have therefore left out No. (3). These items could be undertaken by the Government of India under the existing organisation?—That is perfectly true.

3322. Let me turn back to the research work of the Province. In answer to a question by Sir Henry Lawrence you have admitted the importance of research in *juar* and *bajra* which form the staple food crops of the Presidency. Has the production of these crops increased considerably during the last ten years?—I do not think I can say it has.

3323. Is there any prospect of increase?—I think there is a very great prospect. We have evolved a type of *juar* in Surat which gives 20 per cent. increase in yield over an area of at least 250,000 acres.

3324. The limiting factor in *juar* is the quality of seed?—That is one of the limiting factors, and there is the water-logging of the land. We have definitely found a method of meeting that, which, as far as my experiments indicate, will give an increase in yield again of 25 per cent. It has only been just begun. Come back after ten years and I venture to say that I will show you an increase of 30 per cent.

3325. For the last ten years has there been an appreciable increase?—No. increase that I can put down in percentages.

3326. Is the occurrence of smut in *juar* universal?—Absolutely universal. I should say it takes about one anna from the rupee in the crop all over.

3327. It is a tremendous loss?—Yes.

3328. Has there been any special enquiry into this epidemic?—Yes, very exhaustive. There are several types of the epidemic, and we have been able to deal with all but one, and that a minor one.

3329. Have you enquired whether this particular epidemic has come from other Provinces?—I think this particular disease is universal wherever *juar* is grown.

3330. Have you made any attempt to control it?—Yes, we are now distributing sulphate of copper. Last year we distributed enough to cover 650,000 acres. It costs about 1 anna per acre.

3331. Have you been able to breed any resisting varieties?—No, because in that particular case it can be dealt with so easily by the other method, but in certain cases we are working very hard to breed resisting varieties, e.g., in the case of wheat in the Deccan.

3332. What proportion of the total expenditure do you allot to research and what proportion to demonstration and propaganda work?—I was asked this question the other day by my own Government. It is very difficult to divide it, but I should say about one-third of the whole expenditure goes to research. Do not take that as accurate, it is simply a guess.

3333. Could you give us an idea of what ought to be the proportion?—I should say that is probably the right proportion.

3334. Coming to the very important question of demonstration and propaganda you say "The essential difference between the Agricultural Departments in the East and in the West is that the latter have arisen to meet the spontaneous demands of the cultivators of the soil." Is that your experience of Western countries?—I think the work of the Board of Agriculture in England has risen out of the people themselves. The first work of this sort in England was done by the Royal Agricultural Society which was founded in the forties by the people themselves.

3335. Did not the initiative come from the landowners?—But the people were interested in agriculture. Out of that gradually the Board of Agriculture has developed. That is my reading of the history of things in England.

3336. In answer to Sir Thomas Middleton you said that you carry out demonstration work on the cultivators' own land?—Yes; we do.

3337. Could you give us further details of the arrangements which you make with the cultivator, and the procedure you employ for the conduct of demonstration?—As a rule the demonstrations depend on one single factor of improvement. Let me, for instance, take the simple case of potato cultivators in the northern part of the Poona district. We found that one disease was ruining the *kharij* crop. We found that all that was necessary was to dust the crop with a mixture of lime and sulphur. We arranged with the people that as soon as this disease began they should send a message to us and we could take our duster and dust these crops. We also have a man of our own belonging to the Taluka Development Association working in the same tract and if he saw this disease in any field he would ask the owner whether he would like the plants to be treated. By that means in two or three years we dusted 30 or 40 acres in various parts of that tract. Now we have got over the trouble: the people come to us as soon as the disease appears, and the dusters and material are in the hands of the Taluka Development Association.

3338. You have cited a case of an epidemic, but, supposing you have a better variety of seed, and you want to demonstrate the efficacy of that seed to the cultivators, how would you proceed? You come to me as a farmer. You say "Here is a better seed: will you try this on your land?" What conditions would you impose on me and what sort of arrangement would you have with me?—Generally, in the first instance, the arrangement is mutual.

If the man agrees to grow our seed we guarantee him against loss; that is to say, we say that if the seed fails we will reimburse him to the extent of what he would have got if he had used his own seed.

3339. Have you had to reimburse him ever in that way?—Only once in my experience.

3340. All the demonstrations have been so successful?—Yes. There has never, except on one occasion, been any demand on us to pay for a loss. On the other hand we tell the man that if the experiment is found successful he has to sell us the produce back again taking only what he wants for his own seed, so that we have conditions on both sides.

3341. The agricultural operations are carried on by the cultivator himself?—Yes; by himself and by his own methods.

3342. Under the supervision of your department?—We definitely and deliberately concentrate on one point; we only insist that he should use our seed. The agricultural operations are carried on by himself.

3343. During the harvest season, in order to bring out the difference between the selected seed and the non-selected seed, do you make arrangements to show the improvement to the farmers of the neighbourhood?—Yes. We generally have the crop cut in the presence of our demonstrator and a determination of the relative yield of the improvement and the ordinary seeds is made.

3344. What I am trying to find out is, before whom do you give the demonstrations? Before the individual cultivator on whose land the demonstrations were carried on?—Wherever we have a plot like that we have a special day set apart and bring the people in the neighbourhood round to see it.

3345. Do you have any system of keeping accurate cost accounts of these demonstrations?—We do not have any accurate cost accounts because as a rule it is not needed. We are not comparing the whole system of cultivation here and the whole system of cultivation there; we are simply comparing the investment of Rs. 5 in our seed with the investment of the same amount in another seed. Hence we get a simple relationship by taking the weight of the crop.

3346. No cost accounts are taken?—No, of course, there are other cases when we are comparing methods of cultivation where we have to and do keep cost accounts.

3347. Do you agree with me that the improvement of agriculture and the application of scientific methods to farming depend on the interest shown by the landowners? Is there any indication of such interest evinced by landowners in this Province in your demonstration work and experiments?—I think the larger peasants are much more helpful than the landlords. This applies not merely here but also in Sind. It is the larger peasants who are our mainstay.)

3348. In Bengal, cultivators are prejudiced against *sirkar's* experiments. Do you have any change of attitude in that respect among the cultivators here?—I do not think very much change is required, because I do not believe the cultivators here are very much prejudiced. If a man sees a good thing he is on to it. But he must be thoroughly convinced it is good. If he is, it does not matter who brings it before him.

3349. The peasant complains that the *sirkar's* methods are expensive and so he is prejudiced against them? As the Chairman said, he suspects a top-dressing of rupees: that is what I am getting at?—That applies in Government demonstration farms and that is why in demonstration plots I devote myself to one point only; I do not take the method of cultivation as a whole but only the particular improvement I am trying to bring about.

3350. If considerable interest among farmers is aroused by these demonstrations and propaganda, it must reflect itself in their attitude towards agricultural education of their children?—Yes.

3351. Is there any definite indication in that direction? Do they take more interest in the agricultural bias schools than they used to?—I cannot say that. Those schools are too new to make such comparisons. They have only been going three years.

3352. You cannot say definitely that as a result of this demonstration work and propaganda we have been able to create a demand for agricultural education?—I cannot say that, but the boys who fill the Loni and other vocational schools are the sons of men who have come into contact with our demonstration work.

3353. With regard to the introduction of better methods, you refer in your memorandum to the attempts by an Indian State (Rajpipla). There has been an official order to the cultivators prohibiting the use of any other seed than that recommended, and you say the result has been marvellous. Do you think the Provincial Governments might exercise compulsion in that way?—I am very doubtful whether I should recommend the Bombay Government to do it, but if I had a large private estate (and I look on the Chief of such a State as Rajpipla as running his private estate) I should insist on it.

3354. But you do not think the time has come for the Bombay Government to do so?—It has not come yet. Whether it will come in the future is a doubtful matter.

3355. Judging from the experience gained in our rural bias schools, are you of opinion there is likely to be a sound basis for a comprehensive structure of rural education?—I think it is very probable they will do what they were intended to do, namely, make agricultural and rural life the centre of their thoughts. They are intended to saturate ordinary primary rural education with the agricultural outlook and keep the boys thinking on rural lines. That provides a sound basis.

3356. Are you satisfied with the teachers you have got for that work?—No, I will not say I am satisfied. Some have done exceedingly well and some have done badly. On the whole I think quite half of them are doing well.

3357. In the event of these schools becoming more popular you will require more teachers?—Yes.

3358. Have you any facilities for training them?—We are at the present time training 20 teachers a year. It is hoped to open 20 additional schools a year. That is a very small number, and both the Director of Public Instruction and myself are in perfect agreement that the next step we have to take is to provide a training college for rural teachers. That is a matter which he will put up, not I.

3359. You lay very great stress on non-official efforts in these directions?—Quite.

3360. Are there any agricultural bias schools organised by voluntary, non-official organisations?—All these schools which have been converted to this type, or nearly all of them, are Local Board schools. We have not any private rural education.

3361. Who controls these schools?—The education committee of the Local Board.

3362. That is chiefly a non-official body?—Yes.

3363. What is the attitude of the Education Department towards these schools?—They are enthusiastic.

3364. Do you find they are willing to co-operate with you?—Very much so. In fact, they are being run by the Education Department and not by me; they are definitely Education Department schools. I am there as adviser, and I have in my department an Inspector of Agricultural Schools who reports to me; I send those reports on, with my comments, to the Education Department.

3365. Does that sort of co-operation exist also, in regard to schools of the Loni type?—The Loni type are under my control, but I work them in consultation with the Education Department.

3366. In answer to a question put to you by the Chairman, you said you were in despair about adult education. Can you explain the method of adult education that has been tried?—It has nearly always been in the nature of a night school for elementary reading, writing and arithmetic, leavened by interesting subjects like co-operation.

3367. Were definite courses given, or was the effort spasmodic?—It was a definite course. I would rather, however, you asked the Director of Public Instruction about this.

3368. The reason I emphasise the need of adult education is this, Lord Reay's Committee's Report says that before the children of the agricultural classes can be induced to go to the schools, the adults must be convinced that the instructors have information worth securing?—Quite.

3369. Therefore, in order to feed your agricultural bias schools or to make the Loni type a success you ought to have a scheme for adult education in operation?—So far as the agricultural bias schools are concerned, I do not think the remark you have quoted applies. So far as the Loni type goes I think it is absolutely true, but I think the people have got evidence that the teachers in the Loni schools have something to tell them.

3370. I notice that in dealing with the question of the welfare of the rural population you emphasise, and rightly, that the problem of rural development is the main object of our investigations?—Yes.

3371. And you refer to the Taluka Development Associations?—Yes.

3372. Do you consider that the taluka might be taken as a unit of organisation?—I think, for two reasons, it is the best unit of organisation we have. In the first place, I think so because I want the unit of organisation to be as small as possible.

3373. How many villages does the taluka cover?—100 to 200. I want it to be as small as possible consistent with getting enough good men to run the association. The taluka is the smallest unit I can find which contains enough driving power to run such an organisation.

3374. You, I think, organised a number of Agricultural Associations, but they failed; did not they?—Most of them have not been successful.

3375. Why did they fail?—Very largely, I think, because there was not enough outside stimulus.

3376. Is outside stimulus provided for the Taluka Development Associations?—There you get very much more than before, because we get the Government subsidy.

3377. Do you get more non-official support in the Taluka Development Associations?—That is increasing. Another reason for their success is that they have been utilised not merely for technical agricultural improvement but also for co-operative propaganda.

3378. Do you not think that one of the fundamental causes of the failure of organisations of this sort is lack of rural leadership?—I do, most emphatically. The biggest thing the co-operative movement has done in our Presidency has been to create a certain amount of rural leadership.

3379. You have very rightly pointed out the necessity for looking at rural problems as a whole. Do you emphasise this in the training of your students at the Agricultural College?—It is one of those matters you cannot introduce in the curriculum. It depends on the atmosphere of the college, which either reflects this or does not. In my time I always tried to make the atmosphere of the college reflect the idea of an improved rural life.

3380. Have subjects like rural sociology and rural economics any place in your curricula?—Rural economics is one of our most important subjects. I do not know how you are to teach rural sociology; it is an indefinite subject which it is extraordinarily difficult to teach. At present I think it is more a matter of atmosphere than of a definite curriculum.

3381. Can we then look to your Agricultural College for the training of rural leaders?—I think we ought to.

3382. Do you know of any voluntary organisation that is working for this training of rural leaders in this Province?—Yes, I do. I think the Bombay Central Co-operative Institute is doing something in that direction. I think that the Servants of India Society has led to that to a certain extent.

3383. Training men to look on the problem as a whole, in all its aspects?—Yes. One of the leading members of the Servants of India Society, Mr. Thakar, has been exceedingly successful in the Bhil districts of the Panch Mahals.

3384. Do you think that there is some immediate prospect of organising such societies in rural India as you propose in your note?—I most certainly think that it is a possibility. Of course, it is not going to be done without a great deal of labour, but I think it is quite possible. It may come in a form somewhat different from the one which I have indicated.

3385. Without any impetus from officials?—I do not think we want very much official stimulus. I think all that we shall want from the official side will be a Government subsidy towards the work, but I think that the organisation must be non-official.

3386. In answer to a question by the Chairman, you said that the roads have deteriorated under the management of District Boards?—Yes, I said that was my opinion.

3387. On page 31 of the memorandum you say the various Local Boards have now undertaken a vigorous policy of road construction and improvement. Am I to understand then that there has been a change of heart on the subject?—What I have said there, which, by the way, is not my own, applies to certain of the District Local Boards.

3388. Do you think that the organisations brought into existence by the Local Self-Government Act, such as our District Boards, Local Boards, Village Unions, and so on, are sufficiently organised and equipped for the purpose of giving effect to a definite policy of rural reconstruction?—I think they can help and can give effect to it very largely. One of our District Local Boards has definitely come forward with an offer to take all the Taluka Development Associations under its wing and to give in one district Rs. 5,000 a year towards Taluka Development Associations. To my mind that is a sign of progress.

3389. You have made a reference to the different angles from which Departments such as Irrigation, Veterinary, Forestry and in some cases, Educational, in the same Province look at this problem. Have you any suggestion for remedying this lack of co-ordination? I am not referring to the different sections of the Agricultural Department?—As I said yesterday, to my mind the first step to be taken is to put all these departments under one Minister. Then when they have been put under one Minister, if I were in charge of one of them, I should suggest to that Minister that he should call the heads of these departments together periodically in order to discuss any matters which may have arisen between them.

3390. You propose here a Central Agricultural Board merely for research work, but, as opposed to that idea, do you not think that a Central Rural Development Board might bring about the necessary organisation for giving effect to a comprehensive plan for rural reconstruction, linking up the agricultural, veterinary, forestry and other branches?—I fancy as far as that is concerned that the differences are very much greater in this matter than they are even in matters of research, and it would be extraordinarily difficult to attempt to work rural development in India through any Central Board. I should be delighted to get a Central Board of Finance for Rural Development, but I do not think it could organise rural development in the Provinces; it is decidedly a very local matter.

3391. You do not think that would be a method of overcoming the difficulties arising from the different angles of vision of which you spoke?—I am not very confident of progress in that direction.

3392. On the whole, you are rather afraid of over-centralisation, are you not?—Yes, I certainly am. Agricultural and rural development is, after all, essentially a local matter, and we have got to look at it primarily from the local point of view.

3393. But if you are to have a comprehensive plan, do you not think that some sort of centralisation might be necessary for direction and guidance?—Let us have what we have had in the past, a biennial Board of Agriculture or a biennial Board meeting in which men can discuss their problems together and get ideas one from the other. In the earlier days of the department we used to have at these boards, as Sir James MacKenna knows very well, a perpetual committee on methods of getting into contact with cultivators. I was chairman of that committee at several Board meetings, and four reports were published by it. They are the result of consultation between men who are actually doing the work; I do not think you can centralise more than that.

3394. Supposing we formulate a definite comprehensive policy for the whole of India; do you not think that if you go in for excessive de-centralisation you may miss the aim?—I do not quite understand what you mean by a definite rural policy for the whole of India.

3395. I mean a policy laid down on broad lines with regard to irrigation, rural health, rural education and so on. Supposing we adopt a systematic plan, in order to give effect to that system, do you not think that a central organisation might be more effective than excessive de-centralisation?—I should like to have central consultation, but I do not think you can do more. I know Sind and I know the Deccan, and I cannot conceive of any board that could apply one and the same system to Sind and the Deccan. I think the two things are so different that only a man who is intimately acquainted with them can devise a system suitable to them.

3396. The system, of course, would have to be modified according to the special needs of each Province, but cannot the broad outlines be charted out for the whole of India?—I do not think you want a board for that.

3397. To give effect to a policy of rural reconstruction?—I do not know what you mean by giving effect to it. Giving effect to it is a matter which must rest with the Local Government. What I think you can get is a consultation of people who are in touch with the problems arranged for by the Central Government.

3398. *Mr. Calvert*: I do not quite understand the organisation of the Taluka Development Association. Are the members appointed by anyone?—The members of the association consist of everybody who is prepared to pay the subscription, including any societies or bodies who will pay the subscription. Then, just as in a co-operative society, you have a general meeting which appoints the committee, and that committee reports to the general meeting which takes place twice a year. I mean the organisation is precisely similar to that of a co-operative society.

3399. Are these Taluka Development Associations registered?—We do not compel registration, but all except two I think are registered as co-operative societies.

3400. You say you do not usually recommend any improvement unless you are confident it will give an increased net return of 15 or 20 per cent?—Yes.

3401. Is not that less than the margin of outturn of good and bad seasons?—Very much so; the difference of margin in even our most certain crops is bigger than 15 to 20 per cent; but we can always compare one year with another and one plot with another in the same year.

3402. It is really over a series of years you see the advantage?—We never recommend anything unless we have got the results for two or three years.

3403. In discussing marketing you say that practically all your marketable produce has no real trouble in finding a market?—Yes.

3404. By that I suppose you really mean that supply has not yet outrun demand?—That is practically what I do mean.

3405. But it might happen, if you pushed some special product such as fruit, that you might have difficulty in finding a market for it?—I can quite foresee that might easily happen. There are two or three cases in which it does happen at present; there are times when there is a glut of mangoes or a glut of figs; prices go down to nil or the material is unsaleable; but those are only seasonal products, and that sort of thing does not happen to any great extent.

3406. That is one big factor practically determining expansion in certain directions: you might experience a slowly increasing market for fruit or something of that kind, but you are not likely to find a rapidly increasing market?—No, I agree with you there.

3407. What exactly is the effect of Bombay on the cultivation of the hinterland; does it lead to intensive cultivation?—There you have an extremely peculiar state of things which I have found not merely in Bombay but round other big towns as well. This is a matter I have never spoken about in public, but I think it is so. Immediately round the big towns you have market-gardening; that is intensive cultivation. Then beyond that you have an area of depression from 30 to 50 miles wide which suffers agriculturally as the result of the development of the big town. Then beyond that you get into the normal country.

3408. If you had improved marketing communications, such as light tramways and that sort of thing, would not that extend the area of intensive cultivation?—I certainly think so; it would extend the intensive cultivation of the market-garden area.

3409. One would suppose that by extending the marketing facilities of Bombay you would get better cultivation over a wider area?—Yes, and as a matter of fact that has happened and is happening. The B. B. and C. I. Railway, for instance, is a line which brings in from 50 miles away produce which elsewhere would not go for more than 10 miles.

3410. Actually conditions of transport are fairly good?—On the whole, yes. I mean I complained yesterday of certain classes of roads, especially village roads; but the facilities for traffic are on the whole not very bad.

3411. Round the big towns?—Round the big towns.

3412. I should like to know what is being done for the improvement of grasslands. About half India is under grass of sorts?—The problem of grasslands, particularly in the trap area, is one of the biggest problems which is before us, and up to the present practically nobody has thought anything about it. Under a grant from the Sassoon David Trustees we have had now for the last 5 years definite investigations into the improvement of this range land which occurs in the Deccan, and the results are very promising. I have now three research men on that subject. The line of development which seems most promising is that of either partial enclosure or rotational grassing. That so far has tended to give us nearly 50 per cent. increase of fodder from the same area.

3413. That is on the present grasses?—That is on the present grasses.

3414. Are you trying to introduce any new grasses from overseas?—We have tried to introduce new grasses and some of them have been successful; for instance that grass which you saw at the College the other day where you have deep soils has been an improvement wherever you see it; the re-seeding of a large scale of this range area has not been a very promising line of work.

The Commission then adjourned till 10 a.m., on Monday, the 25th October, 1926.

Monday, October 25th, 1926.

POONA.

PRESENT:

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

Sir HENRY STAVELEY LAWRENCE, K.C.S.I., I.C.S.	Mr. H. CALVERT, C.I.E., I.C.S.
Sir THOMAS MIDDLETON, K.B.E., C.B.	Raja Sri KRISHNA CHANDRA GAJAJAZI NARAYANA DEO of Parlakimedi.
Rai Bahadur Sir GANGA RAM, Kt., C.I.E., M.V.O.	Professor N. GANGULEE.
Sir JAMES MACKENNA, Kt., C.I.E., I.C.S.	Dr. L. K. HYDER.
	Mr. B. S. KAMAT.

The Hon'ble Sir CHUNLAL V. MEHTA. } (*Co-opted Members.*)
Dewan Bahadur A. U. MALJI.

Mr. J. A. MADAN, I.C.S. } (*Joint Secretaries.*)
Mr. F. W. H. SMITH.

Dr. HAROLD H. MANN.

Further Oral Evidence.

3415. *Mr. Calvert*: You have not explained what you are doing for your grasslands. Have you any funds given to you?—We have got some funds given by the Sir Sassoon David Trustees for the investigation of the improvement of grasslands. As a result of that, the matter was placed in the hands of our Economic Botanist. As a result of five years' work, we have come to certain clear-cut conclusions. The first of these is that the grasslands of the Deccan could produce probably 50 per cent more than they are producing at present.

3416. Is that the ordinary waste land?—Yes. Two methods have been very successful. One is the method of temporary enclosure and the other is the method of rotational grazing, and we are trying now, in one or two of the test villages, to find out how far we can get the people to adopt one or the other of these systems.

3417. May I know whether you are trying to introduce any exotic grasses?—Most of these exotic grasses are suited for irrigation areas only. The Rhodes grass we have tried with considerable success. We have had good results also with Napier Fodder grass; South African Elephant grass has done exceedingly well. Guinea grass is being very well grown, and among others Lucerne is extending everywhere.

3418. Is it irrigated Lucerne?—Almost entirely. We have just introduced dry Lucerne into the southern part of the Presidency, which is about the only suitable place for it.

3419. *The Chairman*: Have you tried wild white clover at all?—No, we have not. We have tried Egyptian clover, *berseem*, which has done very well as a winter crop, but there the trouble is the question of seed. So far we have not succeeded in getting our own seed, and it has become almost impossible to import seed on a large scale.

3420. *Sir Henry Lawrence*: Have you had any difficulty in getting *berseem* seed from Egypt?—No difficulty, except that of cost.

3421. There is no prohibition or unwillingness on the part of the Egyptian authorities to let you have it?—No, not so far.

3422. *Mr. Calvert*: There is tremendous scope for the improvement of grass on the so-called waste?—There are tremendous possibilities.

3423. The next point is with regard to the phrase "shortage of labour" which occurs in your written statement. Elsewhere you have stated that there is an enormous amount of spare time for the workers, who are compelled to remain in the villages?—Yes; and the two things appear inconsistent at first sight. They are not actually inconsistent. There is an enormous amount of spare time, but at certain seasons of the year there is a shortage of labour.

3424. So it is a seasonal shortage?—Yes, not a general shortage.

3425. To what extent is even that seasonal shortage due to shortage of labourers, and to what extent to shortage of labour power owing to inefficiency, to ill-health and to disease? How far is it an actual shortage of numbers?—I think it is probably due most largely to what you call shortage of labour power, not to a shortage of individuals.

3426. Due to inefficiency?—Inefficiency due very largely to ill-health, as well as the tendency to work only a limited number of hours.

3427. You think things like disease and diet have something to do with the seasonal shortage of labour power?—Very much to do with it, especially in certain tracts. In the Konkan, for instance, when I was investigating a village there, I was mystified, and I am to a certain extent mystified still, as to the reason why in an area where crops are absolutely certain the people are more miserable than even in the famine tracts. I have come to the conclusion that it is to a very considerable extent a matter of unhealthiness. I found, for instance, a spleen rate of 42 per cent among the children. A spleen rate like that means that malaria is a very big factor in the labour power of villages down there. Of course, there are other factors, but that is one.

3428. Then "shortage of labour" is really a very loose phrase, which obviously requires defining?—I agree with you; it requires defining more closely.

3429. With regard to propaganda, might I ask your opinion on the comparative advantages of concentration as against dispersion in propaganda, by which I mean concentration on a few whole villages to adopt your advice as against trying to induce scattered individuals over a large area to follow it?—I have always advocated concentration; not concentration to the extent you mention, of getting whole villages to adopt improved methods, but by concentrating on limited areas rather than spreading effort thinly over large areas. That has been one of the reasons why we adopted the taluka development system. It really means, for the time at any rate, we want to concentrate on a limited area.

3430. You have not tried here any co-operative better-farming societies?—No.

3431. In your Annual Report you mention that it is your recognised policy to organise the rural community on co-operative lines?—Yes. We are only just at the beginning. In the village which I want you to go and see next Sunday, we have got a scheme to try to organise the whole village on co-operative lines. It is only in its infancy yet, and I feel that one has got to win the confidence of the people in the village before you can do that.

3432. Can you give me any rough idea of the percentage areas of crops under your new and improved seeds or methods?—I can give you that in one or two cases. Of course, our biggest is cotton, and I think, leaving out Sind, in the Presidency alone, we have about a million and a half acres under improved cotton. That does not mean to say that we are distributing seed for that area each year, but it means that the natural spread of our seed has covered at least one and a half million acres.

3433. *Sir Henry Lawrence*: Will it be about 30 per cent?—About 30 per cent, yes.

3434. *Mr. Calvert*: It is $1\frac{1}{2}$ millions out of 5 millions. What about other crops like millets?—We are in a much earlier stage with millets. We have only taken up their improvement within the last five or six years, and there the proportion is very small as yet. Of course, the extension of those crops is very rapid. Once you get the stuff, you can extend it rapidly.

3435. Practically, taking the Presidency proper as a whole, you are affecting 30 per cent or 40 per cent of the crop area?—Possibly something like that. In the case of ground-nut, of course, our improved seed is practically all over the area. The old Indian seed has gone; you only find it as a curiosity.

3436. Ground-nut, I suppose, is only 1.5 per cent of the total?—It is over half a million acres this year. I suppose there is about 500,000 acres under improved seed.

3437. You think that further progress depends on increased staff?—Increased investigation first and multiplication of that material.

3438. And propaganda?—Yes. In the case of rice in the North Konkan, of which we have made a speciality, we are now providing new seed for 10,000 acres each year, and that is enough in the following year to extend to 100,000 acres.

3439. You stated that the cultivator's own plot is the best basis for propaganda. What exactly is the method?—Take the case of East Khandesh. I am trying to push a moderate amount of artificial manure there, concentrated manure, as fertiliser for cotton. Hitherto it has not been used. Now we are using oil-cake, sulphate of ammonia or a mixture of the two. I have got this year a special man on that job in East Khandesh, who has arranged about 60 different plots. The people cultivate the cotton exactly as they were doing before, with the single exception that our man is there and applies the quantity of manure required.

3440. Using the cultivator's own bullocks and his own plough?—Yes, and his own men to do the work.

3441. It is just general direction?—Yes, and the supply of the one material which represents the subject matter for demonstration in that area.

3442. Could you give us any idea as to the best method of ensuring a supply of pure seed, adequate to supply the demand? Your department cannot cover the whole ground?—We cannot cover the whole ground. There are two cases in that respect. There is one case, where if you give out seed it remains pure, and it will spread itself. Such a case is wheat. The amount of cross-fertilisation and deterioration in wheat is so small that, supposing we can give out seed for 10,000 acres a year more or less, the job is finished. In the case of cotton, on the other hand, you have got a material which cross-fertilises to the extent of 6 per cent and it means that unless we can replace fresh seeds every 5 years in an area, it very quickly deteriorates. Now, for the future, in each of our big areas we have definitely taken as our limit 100,000 acres a year for each type; i.e., something between one-fifth and one-tenth of the total area. We supply by depôts all over these areas seed for that amount at the market rate. What we supply we guarantee. We leave the ordinary commercial channels to go beyond that. We get that seed for the 100,000 acres from actual selling of plants on our farm each year. We grow that for the next two years on our farm. By that time we have got enough to plant out 500 acres. We plant out between 500 and 1,000 acres in one selected group of villages, which we rogue with extreme care. Then we buy the whole of the seed from that and plant it out in a number of groups of villages, which we rogue with less care, and for easy marketing we arrange either to buy the seed or get co-operative societies to buy.

3443. Do you think it will be quite sufficient to maintain your new type of seed pure?—Not entirely, but it is all that I have been able to do at present. In the south of the Presidency, Dharwar, where our seed has earned a great

name, people are urging me all the time to increase the reserve seed area, and I have just consented, in the case of Gadag No. 1, Upland American, to increase the area from 5,000 acres to 7,500 acres, provided the people will pay for an extra man for roguing.

3444. Do you get any help from the big landlords in the matter of supplying seed to their tenants?—Not to a great extent. Big landlords, however, are not a big factor with us.

3445. About keeping this seed in the villages free from deterioration due to weather, what is the best method?—We have not attempted very much more than the ordinary cultivator's methods. Most of their methods are good. The great difficulty is deterioration due to weather, weevils, rats and insects.

3446. You are apt to put the weevil inside the bin?—We tested the loss through insects in one part of Gujarat. The loss through insects in the case of grain in Gujarat is anything between 5 and 10 per cent., but we have not done very much in that direction up to the present.

3447. Have you worked out at all your germination percentages?—Yes, in a number of cases with ordinary village seed. I have supplied the Commission with copies of several bulletins which give an examination of the results of seed supply to two or three typical districts.

3448. Is it surprisingly low?—Sometimes it is low. Ordinary cereals are fairly high. Other crops are very low. But I was, on the whole, very pleased with the germination percentages, which were higher than I anticipated. With cereals it was 75 to 80 per cent.; with leguminous plants it was very much lower, 40 to 50 per cent.

3449. Sometimes with cultivators' seed you only get 25 per cent.—I have never come across cases like that. They are quite exceptional.

3450. They get back six grains from one with wheat on shallow soils sometimes?—I cannot remember just now, but I am certain that with wheat we have got very few cases like that.

3451. What is the lower outturn of wheat on these shallow soils? Will it be 4 maunds?—4 to 6 maunds, grown dry.

3452. Will the seed be 30 seers to a maund?—30 seers to a maund. The people, as a rule use a high seed rate.

3453. That is a very low return, practically nothing at all?—Yes; it is very small, but I do not think it is the fault of the seed. It is the fault of our dry weather conditions. If you see our wheat crops in the *rabi* season, sometimes they are extremely poor. I think it is a climatic matter rather than due to the seed.

3454. In the case of your agricultural shows, do you get whatever concessions you require from the railway companies?—The railway companies hitherto, on this matter, have been fairly liberal. For instance, for this year's show at Poona, their concessions have been very liberal, and they have allowed all the things to be returned free. So far as passengers are concerned, they have given a concession rate of $1\frac{1}{4}$ or $1\frac{1}{2}$ single fare for the return journey.

3455. Are they giving any concessions for the smaller district shows?—We have not very many district shows. We rather go in for very small shows, which only attract people who have not to perform any long railway journeys. We have not taken the trouble to approach the railway companies in that connection.

3456. You are not in favour of Government using pressure to bring about the adoption of your advice?—I do not think it is possible. We use moral suasion and whatever influence we have. We get the influence of the Revenue Department, and of all the departments we can. I think the time has not yet arrived when we can do anything more than use moral suasion.

3457. Are not there two Indian States in which force is used?—Yes, and it has been extremely successful. In the Rajpipla State the cotton was absolutely rubbish 7 or 8 years ago. It is now as good as any Gujarat cotton,

and that is entirely due to compulsion. I think the Chota Udaipur State is introducing it this year, and the Baroda State is thinking about it for certain areas.

3458. It is not altogether impossible?—No, it is merely a question of expediency.

3459. *Sir Henry Lawrence*: To what is the improvement in Rajpipla due?—To the introduction of improved seed. There was a definite State Order there that nobody was to plant any seed except that obtained from the State, and the State purchased from us wholesale, and then insisted that that seed only should be sown.

3460. What was done to the man who did plant the old seed?—I do not know exactly whether the man was hauled up and prosecuted. Perhaps the Hon'ble Sir Chunilal knows.

Dewan Bahadur A. Malji: There was, I know, a threat of prosecution. They held a general meeting of all the leading cultivators, over which the Dewan of the State presided. It was promulgated there that His Highness wished that only the Surat farm seed should be sown, and if people caused any other seeds to be sown they would be liable to prosecution. So far I have not heard of any case where there was any actual prosecution.

3461. *Mr. Calvert*: The experiment is worth watching?—Yes.

3462. Is it your experience that the knowledge which is demonstrated to the larger owner actually filters down to the smaller man?—I do not think so, to a very large extent. I think among at any rate the ryotwari cultivators, there is not much which filters from the top downwards. I think it is spread from outwards, but I do not think it spreads from the larger to the smaller very much.

3463. With regard to subsidiary industries, do you advocate that Government should pioneer with factories for utilising agricultural products such as cotton seed for taking off the second lint for felt, for crushing it, and extracting oil and so on?—I think it is worth considering. Especially in the case of some of these new things, where you have got products which are not used, and which we know can be used profitably, I am in favour of Government pioneering efforts. Cotton seed is certainly one which might very well be considered.

3464. We import from Europe straw boards?—Yes, which might be made here from our own materials.

3465. Would you say that Government should pioneer that in default of private enterprise?—I would rather Government subsidised private enterprise.

3466. *Sir Chunilal Mehta*: By subsidiary industries, what is it that you mean? Do you consider a factory, for instance, for pressing of cotton seed or similar factories a subsidiary industry, or is your idea of a subsidiary industry one which will occupy the spare time of the cultivator during the day at home? You know he sometimes spends only half the day on the field, and sometimes he has some two or three months without agricultural work?—I am glad you have raised the point, because it seems to me there is a good deal of confusion of thought on this. There are two entirely distinct things before us. There is on the one hand a subsidiary occupation for the farmer; that is to say, something to occupy his spare time. For instance, within that definition come in the adoption of the spinning wheel, family weaving, and other things which can be done easily or with comparative ease by a person who is not a professional at any particular job. In the Agricultural Show at Poona you have got a definite number of such subsidiary occupations to occupy the spare time of the cultivator. Then there is the other conception, of an actual capitalistic industry, if I may use the term, which is to utilise agricultural products. Now, this, as a rule, must be considered entirely independently of the other; and the cultivators, if they come into it, will come in as labourers and not otherwise? When I talk about subsidiary occupations, I mean the first. *Mr. Calvert* is referring to the second. There is room for both, but the ideas must be kept quite separate.

3467. *Mr. Calvert* : A large number of the workers in industrial concerns work so many months in them and so many on their own land?—Many, in fact, most; but they work in industrial concerns as labourers. A man who works in Bombay at spinning and weaving could not go back and do spinning as a spare time occupation on his own holding. He is a labourer, so far as the industry is concerned, and he is a cultivator so far as his farm is concerned.

3468. *Dr. Hyder* : Seeing that there is seasonal unemployment of agricultural labour from time to time, would you not prefer that the cultivators should take up some cottage industry, at which they could work in their houses?—I should have preferred it if it was possible. To my mind, it is only possible with a limited number of simple classes of work. The actual cottage industry is a thing which requires an apprenticeship, and it is a thing for the expert worker and not for the man who is 80 per cent. a cultivator.

3469. *Professor Gangulee* : Do you recommend that the Government should subsidise such spare time occupations?—I do not think there is any necessity for a Government subsidy for spare time work. Mr. Calvert was referring to local industries for the utilisation of agricultural produce, naturally with the same labour, but they would come in there to work in the industry as labourers.

3470. *Mr. Calvert* : Employing agricultural labour?—Yes, but working in the industry as labourers.

3471. I would not stress the distinction so much. You know that toy-making in Germany is a subsidiary occupation of the actual cultivator?—Yes, and hence in the Agricultural Show, in the section for which I am responsible, toy-making has been one of those things which I have included as a subsidiary occupation, and I think it is sufficiently simple for a man to do in his spare time. Weaving is my best example, simple weaving like weaving of tapes, the same thing which we have at the Agricultural Show. We can teach a boy in our schools to do it within six months; but the complicated weaving which the professional weaver is expected to do is entirely beyond the possibility of the cultivator and cannot be made a cottage industry.

3472. *Dr. Hyder* : With regard to toy-making, in the Black Forest area, you do not have cultivators. The forest element predominates there?—The Black Forest and the Bavarian Alps are the great toy-making regions.

3473. *Sir Chunilal Mehta* : When you talk about Government subsidy or assistance, take this question of weaving these tapes. With regard to Government assistance for the kinds of subsidiary industries that you mention, take the case of the Government Peripatetic Weaving Schools, of which we have 9 in this Presidency. They teach the cultivator and they also teach the professional weaver?—Yes, but those of them that I have come in contact with are teaching simple weaving which can be taught to the cultivator within six months.

3474. That is one portion of the 9 schools; the other portion is teaching the higher kind of weaving to the professionals. So that you would not rule out Government assistance or Government subsidy for either of these kinds of industry?—Not in the least. But the point I understood Mr. Calvert to make was rather to put up the necessary capital for the establishment of some of these industries.

3475. *Mr. Calvert* : The great thing is that you have got to find out some means of occupying the family labour all the year round?—Certainly.

3476. I am trying to prove possible methods of getting that labour occupied. If private enterprise will not take the matter up, would you advocate a Government subsidy?—Yes.

3477. Take the simple case, which I think the cultivator can make, of *papier mache* and rice paper. They both are done by the actual cultivator. Would you advocate Government financial help to introduce those?—Yes.

3478. If private enterprise was lacking the Government should step in and give the thing a start?—Yes.

3479. Then there is a very important question pertaining to riparian lands. There you have large areas of this land lying useless for agriculture. Would you advocate that the reclamation of that land should be undertaken even at a loss? By a loss, I mean if it failed to pay 6 per cent.?—Most certainly I would, and that for two reasons. It seems to me that this sort of thing is necessary in order to protect the existing land from getting worse. Where erosion has taken place it nearly always extends unless you stop it. We have not the big areas which you have at the foot of the Himalayas in Northern India, but we have it on the banks of most of our big rivers like the Krishna. All that eroded area is lying absolutely useless.

3480. And that area is enormous?—It is enormous, and extends every year.

3481. Which is the department in charge of it at present? Does it fall in between them?—At present it falls in between the Forest Department and the Revenue Department. The Forest Department are not doing anything with it and the Revenue Department have no interest in afforesting it.

3482. Could you suggest any department which should undertake their reclamation?—It is difficult to suggest. But it ought to be somebody's duty.

3483. It is of sufficient importance to be someone's job?—It is.

3484. *Dr. Hyder*: I suppose you refer to the Eastern Deccan through which the Krishna and other rivers flow. May I ask you whether it is possible to afforest these areas considering the geological formation of their banks? Are they not hard rock?—No. As a rule there are little patches of hard rock, but here and there we get quite soft soil going down to 18 or 20 feet. On the line between Hotgi and Bijapur, which crosses the Krishna, there is a lot of land 18 to 20 feet deep.

3485. I was wondering whether you have land similar to what we have in the United Provinces along the course of the Jumna and the Ganges. We have got vast areas of which we can make no use. Have you similar areas here?—We have areas of a similar character, but they are not of course of anything like the same extent as in the United Provinces.

3486. *Mr. Calvert*: Now, some questions about education. To what extent does demand for child labour influence the parent in not sending or keeping boys at school?—To a considerable extent. They look upon the ordinary primary education we have in the villages in many cases as nothing more than a creche, that is to say, a place where the women send their small children to get them out of the way for a certain part of the day. When the boy or even the girl gets to the age of eight they are taken away from the school and sent to herd sheep or cattle.

3487. We have been told that the Education Department consider they have surmounted that difficulty by putting the holidays in the busy season?—They may have surmounted it to a limited extent, but it is only to a very limited extent.

3488. We are also told that very few children are required for herding animals?—A good many go out and do it.

3489. Are you in favour of the Education Department recruiting District Inspectors from your Agricultural College?—I think it would be a very good idea if they did so. It seems to me it is a field in which a man who has got the rural outlook during his education would be able to see the real problems of his area better than a man who is simply a townsman trained in an arts college.

3490. As far as mental discipline is concerned you regard your degree as being as good as any B.A.?—I feel that very strongly. I feel in mental training it is not a matter of the subject, but of the method.

3491. As regards the question of school gardens, is it your experience that these school gardens are successful in outlying areas?—So far as the agricultural bias schools are concerned on the whole they are successful. I mean, the boys do take an interest in them.

3492. And the teachers?—And the teachers too, sometimes. I do not want to draw too rosy a picture, because a certain section of the agricultural bias teachers and schools are not very successful, but in the good ones both boys and teachers do take an interest. I was at a place fifty miles north of Poona the other day where there was a great gathering of the boys' parents, who were very interested in what the boys were doing.

3493. Do you think the boys' parents take any interest in school gardens?—Where the teacher is a good man they do.

3494. That is what you want to encourage?—Yes, most certainly.

3495. *Sir Chunilal Mehta*: Do the boys at the agricultural bias schools pay higher fees than other boys?—No.

3496. *Mr. Calvert*: In order to get the rural teachers interested in rural problems, would you advocate that during the vacations they should go to schools of rural economy and be taught about land tenure and agricultural method and so on?—We have never tried anything of that sort. If you had an inspiring teacher it would be very valuable and interesting.

3497. So many teachers are completely ignorant even of the crops grown in their villages?—I know they are. These village teachers have so often been taken from people who do not know the difference between a *juar* plant and *bajri* plant. That is one of our major problems.

3498. About the question of staff, do you think there is sufficient encouragement for your staff to study abroad?—I do not think there is. I think we have been a little too chary in sending men abroad.

3499. Would you advise Government to be a little more generous in their terms to encourage men to study outside India?—I certainly think so. We have generally, as I said before, sent one man abroad each year. I think we might have more, and I think Government might encourage it. We might look upon it as a regular thing to have a regular percentage of our staff on study leave abroad.

✓ 3500. Then, there are two statements in the memorandum which I find it difficult to reconcile. It is stated in the memorandum that there is a shortage of capital for agriculture; and at the same time in the memorandum we have been told that the people are in debt. Does not that mean that they have got the available capital but they misuse it? They have got the credit?—The people have had a very large amount of credit, but it has been used to a very considerable extent in directions which were not beneficial.

✓ 3501. On what did they spend more, on ceremonies or land improvements?—In the past certainly, on ceremonies.

✓ 3502. It is not so much shortage of capital as misdirection of capital?—It has been that in the past, but at the present time most of our agriculturists are involved to the full extent of their credit or nearly so. That is to say, there is shortage of capital because more capital cannot be got. What capital they had credit to get is already absorbed and absorbed in directions which have not been of any agricultural value. In most of the areas the only thing which can increase the amount of capital in those areas is some change which increases the credit of the cultivator.

✓ 3503. Credit for productive purposes?—Credit for any purpose. For instance, the advent of co-operation in the Deccan dry tracts increased the credit, and hence increased the indebtedness, and in that case we are sorry it did, because we have not had a corresponding increase in the credit worthiness of the country. On the other hand, in the irrigation tracts the advent of irrigation increased their credit value immensely and in many cases to good account.

3504. I should like to take you now to your special investigations on the economic side for which I myself am very much indebted to you. We have been given some figures in this memorandum* which I have been trying to understand. I gather that you have about 2 million holdings. About the net cropped area I am quite unable to understand the facts, because on page 8 it is given as 27 millions, but on page 11 it is given as 22 millions?—One of these is obviously a misprint. The actual net cropped area for 1924-25 in the Presidency was 27 millions.

3505. Now, taking out the figures from page 10, the percentages of holdings work out at 48 per cent. under 5 acres, 40 per cent. under 25 acres, 11 per cent. under 100 and 1 per cent. under 500 and less than 1 per cent. over 500 acres?—That is about it.

3506. Now, distributing the 27 million acres among those holdings, we get 2.4 per cent. of the land held in holdings under 5 acres, 11 per cent. of the land in holdings under 25 acres, 12 per cent. of the land in holdings under 100 acres, 60 per cent. of the land in holdings up to 500 acres and 13.8 per cent. in holdings over 500 acres. That is roughly correct?—Yes, roughly.

3507. I have taken conventional multiples. If that is so, it gives this result. 88 per cent. holdings are of not more than 25 acres; but these comprise only 13.8 per cent. of the cultivated area. The number of holdings is 1,760,000. And you have 12 per cent. of the holdings comprising nearly 86 per cent. of the area presumably let out to tenants. The number of holdings of this class is 240,000?—Yes.

3508. *Dr. Hyder*: We are told these figures do not represent the units of cultivation?—No, I have made that quite clear.

3509. *Mr. Calvert*: I think you have said somewhere that you think the cultivating units are a little higher than the ownership holdings?—In villages that is so. For 140 holdings we have 112 cultivating units.

3510. That is rather unusual. That practically means that your non-owning tenant class is very small?—Very small. I am speaking now of the strictly ryotwari areas such as we have in the Deccan, and I think that is correct. The completely non-owning cultivator is present only in very small numbers.

3511. Therefore the 22 million acres which is owned by 12 per cent. of the owners is presumably all rented out to the petty owners?—I do not say all, but a very large proportion of it is.

3512. You cannot have more than 240,000 landless tenants, otherwise your cultivating units become higher than the others. It is simple arithmetic?—I do not quite follow it.

3513. (12 per cent. of the owners possess 86 per cent. of the area, i.e., 22 million acres. The rest, 5 million acres, is distributed among 88 per cent. of the owners.) Do your investigations indicate that cropping varies with the size of the cultivators' holdings?—No. I do not think I can say so. I think the larger holdings (I am speaking of the Deccan, where my investigations have been carried out) are cropped in exactly the same way as the smaller ones.

3514. We can take it the percentages for staple crops apply to these holdings?—I think so.

3515. If we want to visualise what we mean by a Bombay holding, we can take it that with 12½ acres a man would put down 7 to 8 acres of millet, 2 of wheat or rice, and so on?—Generally speaking that would be so.

3516. The 22 million acres owned by the bigger owners as against the 5 million owned by the smaller suggests that tenancy problems present an important question in Bombay?—Yes.

3517. (Do your economic investigations suggest that the tenant who does not own the land puts into it less energy than the cultivating owner?—I certainly feel that is the case in certain of the areas I have investigated. I have

* Not printed: Memorandum by the Bombay Government for the Commission.

never asked myself that question, but in certain areas it is distinctly the case. In fact men have come to me and said "This land does not belong to us, and we are not going to bother to do more than get our one crop from it."

3518. Your tenant cannot grow sugarcane on land rented for one year?—Certainly not. To grow sugarcane he demands at least a lease of 5, 6, 7 or even 10 years.

3519. He would be chary of heavily manuring land rented for a short term?—Certainly.

3520. Am I right in thinking that you have in Bombay the population divided into these classes: (1) Landless labourer; (2) ownerless tenant; (3) small owner who takes a little extra land as a tenant; (4) owner cultivating his own land; (5) owner cultivating a part of his land and letting the rest out on rent; (6) non-cultivating owner, who is only a rent receiver?—Yes.

3520a. Take the case of the owner who takes a little land on rent. Could you tell us at what stage or acreage he stops taking more land?—I should say the bulk of our peasant owners limit it to what they can cultivate with one pair of bullocks. That is the normal limit of their cultivation.

3521. Your arithmetical average for a pair of bullocks is 18 acres. Do you in this country use male buffaloes or cows?—It is rare. I have never seen male buffaloes in use in the Konkan, because it is a rice district and the buffaloes can work better on wet land. In other places they generally use bullocks.

3522. The small owner can therefore take extra land up to the limit of one yoke?—Yes, and hence a man will cultivate as a rule an area of between 12 and 20 acres. I am leaving out the rice districts and irrigated tracts.

3523. Then, when your owner is giving out land on rent he is giving out only what is beyond his one yoke of oxen?—Yes.

3524. About the non-cultivating owner, or the rent receiver, can you suggest any method by which he can be induced to farm on a larger scale?—I have tried to think out that problem.

3525. Something of the home farm idea?—I am almost hopeless about that.

3526. We have been discussing averages, and in an average there is always a larger number below the average than above?—That is the tendency.

3527. Therefore if you have an average of 18 acres you must have a far larger proportion cultivating less than 18 acres than cultivating more?—Yes.

3528. Does not that mean an enormous loss of bullock power?—Yes. Probably we may take 18 acres but it varies according to districts and the character of the soil.

3529. *Sir Thomas Middleton*: Are you dividing the total number of bullocks into the area?

Mr. Calvert: Allowing for a yoke of bullocks.

3530. *Sir Thomas Middleton*: Do you allow anything for bullocks which are old and past work, and so on?

Mr. Calvert: That makes the figures still higher. That is why I asked about cows and male buffaloes.

3531. *Dr. Hyder*: 18 is not the general average?—It is the figure *Mr. Calvert* got out.

3532. *Mr. Calvert*: The actual cultivating unit is going to be between 8 and 15 acres?—I said between 12 and 20, but if you include the areas with smaller units like the rice and irrigated districts it will probably be, as you say, between 8 and 15.

3533. *Sir Ganga Ram*: You never use camels?—Only in Sind: not in the Presidency. There may be some areas in Upper Gujarat, but I have never seen it.

3534. *Dr. Hyder*: With regard to the unit of cultivation, does this vary in different parts of the country? In the Eastern Deccan the average size is larger than in other parts?—That is the case.

3535. Am I correct in thinking that the figures you have given are only arithmetical, and that there is great disparity in practice?—Precisely. I am glad you insisted on that, because in these economic studies averages are most misleading.

3536. *Mr. Calvert*: We have been given the group of 5 to 25 acres, but we ought to have been given groups for 5 to 10 and 10 to 15, because 10 to 15 will be the biggest group?—Yes. I am afraid that cannot be helped. These are the figures supplied to me by the Revenue Department and I am dependent on them for these figures. They use this system of grouping.

3537. Your 10 to 15 group is obviously the biggest?—Obviously.

3538. We have no figures at all for cultivating units?—Not at present. I was talking to Mr. Anderson the other day, and he told me the Land Records Department is now attempting to collect statistics as to cultivating units, but it is only in its infancy.

✓ 3539. *Mr. Kamat*: Before I come to the activities of your department and your answer to the Questionnaire, I should like to ask you a few general questions bearing on the improvement of agriculture. If the improvement of agriculture is to receive any momentum at all, do you not think the intelligentsia of the country must take much more interest in agriculture than they do at present?—I certainly feel very strongly that they ought to do so. In England we consider that the townsmen are very much divorced from agriculture, but I do not think they are nearly as much divorced as they are in Western India.

3540. The intelligentsia here are divorced from agriculture. Is not that a great factor?—It is a very important factor.

3541. And yet, do you not think that since the Reforms there has been an awakening of interest in agriculture among the representatives of the people?—Perhaps a little. I do not think it has gone very far yet.

3542. *Dr. Hyder*: I do not think the intelligentsia have any land to stand upon to enable them to take an interest in it?—That is true.

3543. *Mr. Kamat*: Have the people's representatives in the legislatures ever turned down any of your constructive proposals?—I do not think they have, though once or twice they very nearly did so.

3544. Did they not take interest in agricultural matters and safeguard the interests of the cultivator by raising questions of grievances in regard to forests and irrigation?—They always have been ready to raise questions like that.

3545. *Dr. Hyder*: They do take an interest: but only from the layman's point of view?—Very often I am afraid they put their finger on the wrong point, because their knowledge of agriculture is extremely limited.

3546. *Mr. Kamat*: It has been suggested in certain quarters that perhaps an "agrarian party" in the Central and Provincial Legislatures would have a very great influence in favour of agricultural reform?—Of course, I ought not to express an opinion on that, but I have been anxious to get an "agrarian party" in the Councils for a long time.

3547. It has been suggested that in the Central Government, the Honourable Member in charge of Agriculture is overburdened with other portfolios, and it would help agriculture if he were relieved of some of them. He has at present to look after Education and Health?—Our Minister of Agriculture has three subjects: Agriculture, Forests and Excise.

3548. You are speaking of the Provincial Minister: I am referring to the Member of the Executive Council in the Government of India?—I am afraid I have not thought very deeply about it.

3549. Then, coming to the question of an effective agency for carrying on the various agricultural reforms which you have been advocating here, and which have been suggested to us at Simla, we have been told by the Agricultural Adviser to the Government of India that it would be desirable to have an All-India organisation. I am not concerned with the details now, but it

is suggested that there should be an All-India organisation to give a sort of fillip to the question of agricultural reform. On the other hand, you have suggested what you have called a Servants of Rural India Society. Now, which would be better in your opinion, an All-India organisation representative of the Chiefs and Sirdars and Provincial Departments of Agriculture and various public citizens, or a rural society as you suggest?—I want both. It does not seem to me that they fill the same field at all. I do want to get a continual stimulus from the Central Government. Exactly in what form that should be I am not quite clear, but however enthusiastic and energetic we are we do want to get a stimulus from the Government of India. At the same time I do not think any central body could do the same work as the society that I suggest. That is absolutely a different thing. Something of that sort is necessary if we are going to get the material which we have already in hand actually into practice.

3550. It has been suggested that the All-India organisation should be a very comprehensive body and that it should have sub-committees for research and other matters and also an executive committee and a secretary. You have also suggested a Central Research Board. Then again we have an organisation like the Central Cotton Committee. I should like to know how these different bodies will work, and whether you would like to amalgamate them as far as their energies are concerned and pool their resources?—I should like to have an Indian Board of Agriculture rather of a different character than hitherto, an Indian Board of Agriculture which would meet once or twice a year, which would have an executive committee and control of considerable funds which it could utilise either itself or by grants to various Provincial Governments for what purpose they deemed advisable. If we were pushing very hard a scheme for rural development through a Servants of Rural India Society, I think they might easily give a grant to the Local Government for development purposes. They might also give grants for research purposes.

3551. But what I want to know is this: If such an All-India organisation comes into existence would you still retain the Central Cotton Committee and the Central Research Board you suggested the other day, or would you abolish these two organisations and have one comprehensive central body. Would there be any purpose left for the other two?—I have not thought out clearly how the Indian Central Cotton Committee will fit in with a scheme of this sort. We had better leave that out of consideration. The Central Cotton Committee is a special board supported by the trade itself on a cess it levies on its own products. It is not subsidised by the Government of India at all, but it acts on an authority given by an Act of the Government of India.

3552. Would you retain these separate bodies for separate crops?—I would let them be Committees of an All-India Central Board or be independent, according to their own wish and according to the extent to which they were prepared to support themselves from the trade itself.

3553. Coming to the Provinces, you have at present an existing organisation in the shape of your Provincial Boards, your Divisional Boards and your Taluka Associations?—Yes.

3554. Would you descend still lower, inasmuch as the Taluka Associations have to take care of the interests of 100 to 200 villages?—I would very much like to go lower. I want to be quite clear. We have adopted at present as the smallest unit the taluka with a group of 100 to 200 villages because that is the smallest unit we can get at present in which we can get effective work and effective control.

3555. If we go below that?—If we go below that our power to carry the thing on gets too limited; but I would much rather have a group of 20 villages than 200 if we could get sufficient local energy and capacity to run it.

3556. With regard to your proposal for a Servants of Rural India Society, have you had any experience of small bodies of this character doing village social service or village reconstruction?—There have not been hitherto societies that have done similar work except where a society like the Servants

of India Society has sent a man like Mr. Thakar to make investigations in the Panch Mahals. But, on the other hand, there has been a good deal of enquiry by other bodies preparatory to such work. The Central Co-operative Institute has made a number of such inquiries with a view to developing something of this sort in various areas.

3557. In Bengal there are co-operative societies, we are told, which have done rural reconstruction work on a co-operative basis. Do you know whether they have proved a success or failure?—I cannot tell because I do not know. But my idea runs on very similar lines. If I was one of these Servants of Rural India I should certainly, in developing a village or group of villages, use the co-operative movement to the absolute limit, and I think that limit is a very large one.

3558. Do you think that the public spirit that will be required for running such societies will be found in all the Provinces including the backward ones?—My knowledge of most of the Provinces is imperfect. I know Bombay and to a certain extent Bengal and Assam. I do not know about the other Provinces.

3559. As the problem to be tackled is a vast one, are we on quite sure ground in assuming that this sort of public spirit you see in Poona and Bombay is universal, and that there is enough of it even in the backward Provinces to make the scheme a success?—I am afraid this is a matter on which I cannot offer any advice.

3560. Coming to your answers, I believe you have emphasised that so far as the problem in Bombay, and particularly in the Deccan, is concerned there are certain special features, one of which is the precariousness of the rainfall. From your investigations of rainfall during the last 60 years, you find that nearly one-third of the area of the Presidency is liable to famine?—That is the figure we arrived at while preparing the last edition of the Statistical Atlas.

3561. In all questions therefore of the welfare of the cultivator, is not the precariousness of rainfall the dominant factor which upsets a good many of our calculations?—Most emphatically it is, and therefore I have put in a special note on this question, because it is the precariousness of the crop, not the amount of it, which really makes agriculture an uneconomic industry in some areas.

3562. From the study which you carried on in the Deccan villages and the observations you have made there I think you told Mr. Calvert that the cultivator is badly off because he spends so much money on certain ceremonies? You have stated that the majority of the cultivators are on the deficit side. Is not this deficit due more to the precariousness of the rainfall than to the money he spends on any ceremony?—This is a very difficult question to decide. It is very difficult to say how much is due to one thing and how much to the other. From the most recent figures that I have given in this note I have shown that the case of a certain village where I carried on investigations after an interval of 10 years, during which two famines took place, the indebtedness was lower than before. That of course is due to transfer of property.

✓ 3563. *Mr. Calvert*: A man cannot borrow without credit and a man's credit is not increased by the precariousness of the rainfall and bad harvests?—That seems to be obvious.

J 3564. *Mr. Kamat*: Where there is a bad year every four years is not then the indebtedness due to the precarious condition of the rainfall rather than to the expenditure on ceremonies? If you admit that this tract is subject to this precariousness of the rainfall more than any other tract in the country, and also there are very few good years in a given decade, does it not stand to reason that the indebtedness is more due to the precariousness of the rainfall than to bad habit?—I do not think it follows. In the village that you are going to visit on Sunday, the indebtedness in the year 1917 was Rs. 29,000. There came a famine in 1918, and at once the indebtedness increased to Rs. 43,000. I went there 10 years later and now I find the indebtedness has come down to Rs. 20,000. What has happened is that they have borrowed up

to the limit of their credit during the famine. They have not been able to maintain themselves under these conditions and they have parted with their lands. The result is that the present indebtedness is rather less after the famine than it was before the famine. This rather controverts the point which you are trying to make. ✓

3565. *Dr. Hyder* : They have changed their status?—Yes.

3566. Since they have parted with their lands, it means that they have come down from being agriculturists to landless labourers? That is to say, we are creating a proletariat on the land?—We tend to have that in famine areas, or at any rate to have a large number of people with insufficient land to maintain themselves completely. ✓

3567. *Mr. Kamat* : Your answer comes to this. Having parted with their lands, owing to indebtedness, they have become landless labourers?—They have become landless labourers or partially so. (That is what my new study shows very clearly, namely, the number of actual landholders has not decreased appreciably but the number of people who depend partially on the land and partially on labour has increased.) ✓

3568. I should like to know why you consider the specialised vocational schools of the Loni type so indispensable in your system of education? Are they indispensable?—I think they are extremely valuable; nothing is indispensable. I look upon them as a valuable means of propaganda as well as education. If I turn out 150 boys every year, out of these 100 will go back to their land with a knowledge of better methods than people in the neighbouring villages ever knew before. Each of these boys will be a centre of education in improved methods of agriculture in their respective areas. That is what is actually happening.

3569. At present these schools are very few but you aim at having one such school for each district?—That is the declared policy of the Government.

3570. Even if you establish one such school for each district and turn out 50 boys a year from each, in a population of a million, 50 is a small number for propaganda purposes?—I do not think you can say that. You may as well say that the Agricultural Department is helpless because the number of boys turned out in a year is almost as large as the whole propaganda staff of the Agricultural Department. It seems to me if I can turn out 100 boys every year who will go out as propagandists, I turn out an extraordinarily valuable number. In ten years time I shall have 1,000 centres of propaganda work in the Presidency.

3571. Considering the expenditure you incur on these schools, do you think that such expenditure is commensurate with the value of the propagandist work the boys will do?—We get very good value for the Rs. 520 that we spend on each boy. If we spent Rs. 500 on the salary of a propagandist we should get less value out of it.

3572. We are told that in the Punjab there are no such schools as these, and that they are a luxury and are white elephants to maintain. You consider, however, they have great propaganda value?—I think so. I do not want them to be considered as in any way comparable with the Punjab schools. We have got the Punjab type of schools and value them as much as this type of school but they are for an entirely different purpose.

3573. You have told the Commission something about the marketing system and about the *adattis* and *dalals*. So far as the *dalals* are concerned, do you think they could ever be eliminated from any marketing system?—No. I think you are bound as a rule to have one middleman between the man who is selling and the man who is buying.

3574. Even in England?—Yes.

3575. Is there any system where there is no middleman?—Not that I know of, except on a very small scale. A farmer who brings his grain into the market in my own home town at times goes to the man who grinds it into flour and deals directly with him. But generally he deals with the purchaser through a man who is a broker or an agent who is paid on commission.

✓ 3576. It is not a question of eliminating the middleman but of raising his standard of business ethics?—And if possible to make the brokers a body whose profit will go to the growers instead of to an individual. You can make the co-operative societies take the place of middleman, for instance.

3577. You said something about the *adti* system here. Are you aware that in the *gul* market in Poona these *adtis* are a great help to the cultivators?—I think if they were no help they would not exist. They are a decided help; they enable you to put the sale of your goods in the hands of a man who is an expert in selling.

3578. And who helps the cultivator with advances of money and in other ways?—Yes.

3579. There again the question is to raise the business standard of the *adtis* rather than eliminate them?—There is no need for two middlemen. We might have a body which might act as both, as in the case of co-operative societies. I think the co-operative societies might give all the advice which is required by the seller and at the same time be a *dadal* who is paid commission by the buyer.

3580. *Mr. Calvert*: You mentioned that these people made advances of money. Do they charge interest on it?—Yes, of course.

3581. *Mr. Kamat*: With regard to subsidiary occupations, do you agree that, especially in a tract which is so precarious as you say this is, subsidiary occupations must be encouraged much more than they are being at present by your department?—Yes.

3582. Has the Government considered appointing a Superintendent of Subsidiary Occupations and propagating a knowledge of these things?—No, and I doubt whether that would be the right way of approaching the question.

3583. What in your opinion is the right method? Would you simply make out a list of possible occupations, without demonstrating to the cultivator what is a business proposition and what is not in his particular area?—I think probably some organisation which would work in connection with our local development authorities would be the best way, but I have not worked it out thoroughly.

3584. What I am driving at is this. At present this question of subsidiary occupations is no man's business?—I agree.

3585. The department considers it as no man's business?—Our department and the Co-operative Department are both deeply interested in it, but it is no special department's business and probably ought not to be.

3586. If some agency specifically to look after this is to be appointed it should work under your department?—It should work under both the Agricultural and the Co-operative Departments.

3587. You told *Mr. Calvert* that you were more in favour of promoting secondary occupations than cottage industries?—Yes.

3588. You would not rule out cottage industries which were dependent on agricultural produce, would you?—Not in the least.

3589. You know that in Ratnagiri mango pulp industry is carried on. Are you in favour of Government subsidising that industry?—Certainly, but that would not be a cottage industry; that would be a capitalist industry which would utilise cultivators as labourers.

3590. Even for that would you advocate that Government should subsidise that industry in the initial stages?—In order to introduce it, yes. It will have to stand on its own legs after a limited period.

3591. I should like to ask you one general question. You have advocated research, agricultural education, co-operation, measures against fragmentation of holdings, rural reconstruction and so on for the prosperity of the cultivators. What is the relative importance of these? Which do you consider as the most important on which you should concentrate your labours?—I do not think you can separate these and concentrate your attention either on some or others. You will have to look at the rural problem as a whole.

In certain parts the co-operative movement has served as a means of starting a real rural development. That has been the case in Sinā, where the emphasis on co-operative credit societies has given a fillip to the whole rural movement. In other parts the co-operative movement has not done so. In certain parts of the Eastern Deccan it has perhaps hindered such a movement. You have to treat each tract on its own merits and keep the whole problem before your eyes. My idea is not simply the technical improvement of agriculture but the development of the country side.

3592. Are you in favour of carrying on these economic surveys such as you have done in different parts of the Presidency?—I should very much like it to be done, but I am doubtful whether it can be done by Government agency.

3593. The Economic Enquiry Committee has recommended such surveys and detailed enquiries, probably by a Government agency; that is, through village *patels*, *patwaris* and other officers?—I think it would be of very little value if it were done in that way. What I should like to have would be a definite non-official board of inquiry like the one they have in the Punjab. Such a body could do the work, but if you try to put it in the hands of the Collector and other officials down to the *patwaris* I think it would be a failure.

3594. Therefore if these surveys are to be made they should be made by a non-official agency?—I do not think I could have done my investigations if I had been there simply under orders of Government.

3595. I want to ask one or two questions with reference to the economic progress of rural areas which you have mentioned in the note you have placed in our hands. Some of the statements in it are extremely interesting. With reference to irrigation schemes, for instance, you state that although Government are carrying on large schemes the total area irrigated has not increased?—That is what was really the case in 1921-22. The total area under irrigation in 1921-22 was not materially greater than in 1911.

3596. What steps are being taken by Government or your department to deal with the question of dry farming in particular?—I have explained this in my note on precarious tracts. The question of dry farming is of supreme importance in the tracts which have precarious rainfall.

3597. I want to know the staff engaged to deal with this problem of dry farming in the precarious tracts?—There are two methods. One is to improve the land, so that the rain shall be better utilised than at present. One side of the question is engineering and the other agricultural. So far as engineering is concerned Government gave me a land development officer 4 years ago, who was an engineer, and two or three men who were simply preparing plans for bunding. After they worked for two years the general result was so satisfactory and the problem came to the front so much more prominently that Government then enlarged the scheme and took out of my hands and made it a special department under a Special Superintending Engineer. That is as far as the engineering side of it is concerned. On the agricultural side they have given me a Soil Physicist who has been for the last 5 years investigating the possibilities of retaining water in the soil, after the land is levelled and banded. His results have been remarkably successful. Previously methods of increasing the crop by modifying the methods of cultivation of the soil have not been markedly successful in the Deccan, but now we have a prospect of increasing the crop by 33 per cent.

3598. So the problem in Bombay is not spending lakhs on irrigation only, but on other forms of land engineering?—I think so. I think both come in, but there are far more immediate possibilities in the methods of land improvement and extension of dry farming than in big irrigation schemes.

3599. *Sir Gagna Ram*: Does not dry farming require a special kind of seed?—There are certain seeds which do better under the dry farming system, but so far we have used the ordinary seed of the agriculturist and get 33 per cent. increased yield. The Americans have got a farm in which they try to develop seeds to suit dry farming, and we have that in view also. If we can do that we may get still better results.

3600. *Mr. Kamat* : Can you make a rough guess at how much you have added to the wealth of the Presidency by improved methods of cultivation and improved varieties of cotton, ground-nuts, rice, etc., during the last 5 or 10 years?—Only very roughly. In 1921-22 the total value of direct agricultural production in the Bombay Presidency was about 176 crores for the year. Our improvements up to the present have brought in an additional 2 to 3 crores, which means an increase of 1½ to 2 per cent. That, however, is the merest guess.

3601. Roughly, about 3 crores have been added owing to improvements introduced by your department?—Yes.

3602. *Sir Ganga Ram* : May not some of the improvements be ascribed to the higher world price of cotton?—I do not think that will make very much difference. It is the difference between the price of the old low grade cotton and the price of our improved cotton, which does not depend on the absolute value of the cotton itself.

3603. *Mr. Kamat* : You have said the production per acre in this Presidency has not materially gone up either in quantity or perhaps in money value?—Simply because I do not count 1½ per cent. as being a very material increase. It may be 1½ to 2 per cent. at present.

3604. From your studies, or from the statistics which you have collected in this book, you think that the purchasing power of the cultivator has gone up only by about 3·9 per cent.?—Something like that, and that varies very much with the area. In some, it has gone up materially, in others it has gone up to a very small extent.

3605. That is to say, in 10 years, he has advanced only by 4 per cent. in his prosperity?—About that, taking the Presidency as a whole.

3606. Does that include the prosperity which you have brought about by your improvements in method and supply of better seed, or is it by a natural process of better prices?—This includes, as far as I can make it out, the total increase in the purchasing power. Of course, as I said to Dr. Hyder, these figures are based on three or four assumptions which I think want a good deal of checking before they can be taken as valid. I do not insist on them to any great extent.

3607. You have stated in one of these memoranda in some place that the tendency to grow commercial crops is slightly on the increase?—Yes. You will find it on page 11 of the printed memorandum.*

3608. Whereas, in this report which you have compiled, I think you have said in some place that the tendency to grow food crops is stationary, and there has not been a material change so far, at least till the year 1922?—Up to 1921-22 I found no material change. There has been a distinct increase in the marketable crops since that time.

3609. So that the change in favour of cotton or ground-nut is of recent origin?—I think it is chiefly of recent origin.

3610. It has only taken place in the last three or four years?—If you take these figures on page 11, there is a slight increase even by 1919-20. But it is, I think, a change which is going on increasingly rapidly. I feel that the figures which I gave in the booklet were probably not as accurate as those which I have given in this memorandum.

3611. Do you think, in coming years, this tendency for growing cotton and ground-nuts will be prejudicial to the growth of foodstuffs?—I think we are a long way off from that stage yet. I think that foodstuffs are certainly grown to the full extent that it is necessary in order to supply the needs of the people.

3612. For the present, there is no fear that cotton, or ground-nut, or other commercial crops are encroaching too much on the necessary area for foodstuffs?—There is no such fear at present.

* Not printed: Memorandum by the Bombay Government for the Commission.

3613. Speaking about research, you have advocated a research fund in the Bombay Presidency. Then again, there are proposals before us that there should be a central fund for all the Provinces. Do you think the Provinces can raise these big research funds?—I do not know whether it will be a very big fund. It must be as big as each can afford. The only point that I make here is that it should be a definite, permanent charge on the revenues, to secure continuity of work, just as there is a Development Fund in England, which is in the hands of Commissioners, and which is practically independent of the annual budget.

3614. With reference to veterinary work in the Bombay Presidency, do you not think the Institute at Muktesar is too far off to be of any benefit to the Province?—I would not like to say that. I am going shortly to speak, *in camera*, about Pusa. I think Pusa has been very useful, though it has been a long way off, and I think Muktesar has also been useful, though it is long way off. I think that the work done at Muktesar and Pusa is essential. But in addition to that, we do want a research institute nearer home.

3615. You think it possible to have a research institute in the Bombay Presidency, attached to the Veterinary College?—I do not see why not.

3616. We were told that Muktesar manufactured sera, and that it is being done on such a big scale now that it brings in a large revenue, and the Institute is self-supporting. If you also manufacture sera here in the Bombay Presidency, will it not help you to make the whole scheme as much self-supporting as possible? Can you manufacture it?—There is not bound to be any difficulty, I take it, in our manufacture of serum.

3617. It would be possible in the Province?—Yes.

3618. In a laboratory attached to the Veterinary College?—That is the best place possibly; whether it is possible in Bombay or not I cannot say. There should be no difficulty in the manufacture, which should be carried on wherever the most suitable place may be.

3619. You would like to have a veterinary research institute and manufacture all the serum within the Province?—I was not thinking of the manufacture of serum. That is a detail. I would certainly like to have a veterinary research institute in the Province.

3620. *Dewan Bahadur Malji*: As Director of Agriculture your research station is in Poona. Do you not find the area is too large for your attention, the whole of the Presidency?—I certainly do find it so, as it is organised at present. I find it more than I can really cope with.

3621. The conditions also are very varying?—I do not mind the varying conditions. It increases my efficiency to have to deal with a number of varying conditions, I think.

3622. It is not possible to give that much attention to the varying needs, at any rate?—I do not agree with you there. I think, if you give me efficient local officers, there is a certain amount of benefit from general single direction throughout the whole Province.

3623. The next thing to which I invite your attention is the various needs of the different districts in the area. Would you say that the staff under you is by any means sufficient, regard being had to the needs of the various districts?—No. I have always said, whether you look at the work as a matter of research or propaganda or education, I could do with a very large increase of staff.

3624. Is not one Overseer per district the ordinary rule?—There are now two for each district.

3625. Do you expect that one Overseer can look after the needs of even one taluka satisfactorily?—I have already said that our local staff is very much smaller than it ought to be.

3626. Do you not think that the country-side is then almost in a neglected condition?—No, I cannot say that. We are trying to work on other lines, and our extension of Taluka Development Associations is very largely intended to replace direct Government agency.

3627. With regard to the Taluka Associations, when they were started was it not intended that they should be registered under the Co-operative Societies Act?—No. The matter was never mentioned at the time. That matter came up afterwards.

3628. We are more or less concerned with the co-operative as well as the development side?—I do not mind what you call the agency in a taluka to develop that taluka. But what I do want is an agency which is neither co-operative nor agricultural, but which has definitely for its purpose the development of that taluka. I would prefer that that organisation, whatever you call it, be registered under the Co-operative Societies Act. But I want one body and not two, and I do not care in the least what you call it, provided its definite purpose is not supervision but development.

3629. You do not mind if along with development, there is supervision?—No. I look upon that as part of the development.

3630. Some of these Taluka Development Associations have not yet been registered under any Act?—Yes; I think that is quite at their own option. It seems to me, if only I could get a body of men, my big difficulty is to get the men, who will work for the development of the area, I am ready to accept them on their own conditions.

3631. The existence of these bodies as corporate bodies would be more or less doubtful in that case, without registration?—As a matter of fact, Government's interest is only in regard to one year. They give an annual subsidy. If the society disappeared at the end of the year, Government have only paid one year's subscription.

3632. Has your attention been drawn to section 4 of the Indian Companies Act, wherein any body of persons, more than 20 in number, would have to be a corporate body, who could either sue or be sued?—I hope these will never sue and be sued.

3633. All the same, if there are misappropriations, the matter is one which may require your notice?—That is a minor matter.

3634. Would you not insist that such institutions should be registered under any of the Acts?—I am so anxious to get the work done that I would take any body, registered or not, as long as it will do the work.

3635. As a matter of fact, I understand some of these institutions were suspended on the sole ground that they were not registered? The annual grant of Rs. 1,000 or so was suspended for some time, because the institutions declined to register?—That has all been altered since.

3636. With regard to these Development Associations, your idea is to develop the business side of agriculture in the taluka area, side by side with the technical?—I want to develop everything in that area. It is not one side or the other side. Each taluka will be different.

3637. With the help of how many people?—All the people I can get.

3638. At present, admission is not restricted to members of co-operative societies?—No.

3639. Any man can come in, provided he pays the usual fees?—Certainly.

3640. With that qualification how is the concentration to take place? Will you put down some lines of action?—The programme of every Taluka Development Association must be approved by the Divisional Board. If the Divisional Board did not want to approve of it, they would go down and discuss the matter, find out a programme which suits that taluka, and which has the approval of the Divisional Board.

3641. I agree that these Development Associations will lead to much better results in future, provided they are looked after; but if you leave everything to non-official agency, do you think they will prosper?—I do not leave everything to non-official agency.

3642. Do you wish they should have some driving force from the Agricultural Department?—I have mentioned to the Chairman that there were three outside stimuli upon which to a certain extent I rely; the first one is

the District Agricultural Overseer of the Agricultural Department; the second one the local Co-operative Officer, and the third is the Divisional Board. I want all these stimuli at present, but I am hoping and looking forward to the time when there will be much more internal stimulus than you will ever get from outside. Then I shall feel that we have really got somewhere.

3643. There are potentialities for import and export business later on in these Taluka Associations. Do you foresee that when you look to the question of marketing?—Of course I foresee that; that is part of development.

3644. Then their activities would extend far beyond the regions within the control of these associations?—Perfectly so.

3645. I would question you with regard to the educational side of agriculture. So far as agricultural education is concerned, is there anything worth the name in Gujarat? Just as you have a school at Loni, have you got a counterpart of it in Gujarat?—There are schools at Godhra and Surat.

3646. Do they at all bear comparison with Loni?—The Godhra school has done very good work, but not so important as Loni.

3647. With the one school at Godhra, such as it is, do you find the results are successful?—Any way, it has been commended on every hand. The boys go back to their own land. The local Collector is very well pleased with it. As far as the boys are concerned, they certainly do what we expect them to do.

3648. Do you not think that many more such schools are necessary?—I do.

3649. In the village elementary and primary schools, has not the present trend of education brought about only writers? In the case of schools without an agricultural bias, is not that true?—I would rather not commit myself to a statement like that.

3650. Do you think, without any large increase of these bias schools, we can do anything much better?—That implies criticism of the present system of education which I do not like to go into. The present system has done good work. Many of our graduates are products of the present system of education, although it may be improved. The agricultural bias schools are moving in that direction.

3651. As regards the curriculum of the bias schools, do you find that the curriculum is the same everywhere?—The curriculum of the bias schools was developed by the Director of Public Instruction and myself working together, and it is supposed to be similar in all parts of the Presidency.

3652. So far as the crop experiments on Government farms are concerned, do you think people would be very much more induced to look to the various changes and benefits, provided they are allowed to look into the accounts side of the business? What I mean is, do not people wish to be convinced that agriculture, such as is carried on, is from a business point of view a profitable concern?—We tried to do that by demonstrating the improvements on their own land.

3653. But, are accounts given as to the expenditure incurred and the proceeds realised?—In every case, we give an account of the special expenditure as a result of that improvement and the special return which has arisen from it. That is all that we need.

3654. With reference to propaganda work, do you not think it worth our while to carry on such propaganda in rotation for each taluka?—I again do not quite understand what you are driving at.

3655. What I am driving at is to point out that in each taluka, if the propagandist work is proved to be convincing for accepting new and improved methods of agriculture, people are not apathetic in taking up improved methods, provided they are satisfied that there is more benefit to be earned thereby. Have you found their attitude in any way defiant?—No. I think I have put down as clearly as I could and repeatedly that I do not find the people object. I do not find the people conservative.

3656. Then, why are they not taking to the improved methods at once?—But they are. I think, as soon as we can convince the people that what we have got is a good thing, the people are extraordinarily ready to take it up.

3657. That is exactly what I say. As to crop experiments, formerly the District Officers, the Sub-Divisional Officers used to conduct them for the villages. That has been discontinued, has it not been?—All the local officers did in the way of crop experiments was to do crop measuring experiments, in order to determine the yield per acre. They have never done any other experiments.

3658. Has that been discontinued?—That has not been discontinued, but it has been placed in the hands of my department.

3659. Does your department do it every year in each district?—Not in each district every year, but it does a certain number of such experiments each year.

3660. In some parts of the agricultural districts in Gujerat, I particularly refer to Pardi in Surat district, what is the position? Is the country in any way advanced, or is it going back?—It is one of the tracts which, in the last 25 years, has been declining.

3661. And the same is the case with reference to the Matar taluka in the Kaira district?—In Matar taluka there has been a similar decline, which is noted in the Census Report.

3662. Have any steps been taken to find out the causes?—I think, Dewan Bahadur, you are a responsible member of the Co-operative Institute, which has recently made an investigation in the Pardi taluka.

3663. Do you not think that there is much to be done by the Agricultural Department, provided sufficient assistance is rendered to them?—A very great deal.

3664. The country which was once garden land is now grassland more or less?—But that is very largely the ordinary result of the existence of Bombay. Bombay wanted grass; this was an area where water was a difficulty and where a large amount of grass would grow. Most of the land was held by large landowners who did not want to cultivate themselves; it paid them better to get the grass from it and export it to Bombay than to let it out to cultivators.

3665. Your attention has not been directed to the indebtedness in Pardi?—I have not looked at it.

3666. Most of the lands, as you have found in the Deccan, are transferred to the *sowcars*. Is that not so?—Yes.

3667. As regards agricultural labour, may I know whether if the labour is not organised, the results would be very dangerous in some of the parts where the cultivation is not actually carried on by landholders themselves?—I do not quite follow you.

3668. You have told us that in various places, there are some who are landless cultivators, there are others who own land, and there are others who partly own land and partly labour on the land. Now, where there are landholders who do not cultivate themselves, they rely practically upon the labour to be had in the villages. There is great discontent between them and the labouring classes. Have you found out any means of reconciling them?—No, I have not. (I am afraid that in most of these cases the interest of the landlords when they are non-resident rent-receivers is so absolutely opposite to that of the people who are the actual cultivators, that it is very difficult, if not impossible, to reconcile them.)

3669. Some day, as in the case of the organisation of industrial labour, agricultural labour organisation will, from your point of view, be necessary?—I think it is certain to come.

3670. With reference to general education, do you not find that there are some lessons necessary which may lead to agricultural pursuits later on?—Yes, and at the present time I may tell you that the Director of Public

Instruction and I have taken in hand the ordinary 4th class reader with the idea of adapting it much more to rural conditions than at present.

3671. The second thing to which I request your attention is with regard to the indebtedness of the agriculturists. Do you not find that they are taking very much less advantage of the insolvency laws? Do you know that the agriculturists, as a rule, do not go to the Insolvency Court?—No, they do not.

3672. And, in that way, the indebtedness always remains?—Yes. In other words our cultivators are extraordinarily honest; that is another way of putting the same thing.

3673. Even if they cannot pay, they still go on?—Yes.

3674. In reference to the distribution of seeds, do you keep large stocks of seeds other than cotton?—Only when we have got definitely improved seeds, then we do keep as large stocks as we possibly can. For instance, we keep large stocks of rice seed in the North Konkan; we keep large stocks of cotton in practically all our areas; we are now keeping large stocks of wheat in Sind, and we have, at one time or another, kept large stocks of wheat in the Panch Mahals.

3675. Is the Sind wheat suitable to Gujarat?—No.

3676. This year you know perhaps there is a great demand for seed in Gujarat?—Yes.

3677. And most of the lands which were to be sown with other crops will now require to be sown with wheat seed, and no wheat seed can be made available by the Government?—No, because we have not got enough stocks.

3678. *Dr. Hyder*: Why is there a demand for it this year?—There is a certain demand, as a result of the character of the monsoon.

3679. *Dewar Bahadur Malji*: Can you make arrangements to supply requisitions for seed to agriculturists under the responsibility of the District Central Banks?—If the District Central Banks approach us, we can obtain for them large stocks of such seed and the seed most suited to that particular area.

3680. Do you not think that would be a satisfactory arrangement?—Yes, absolutely.

3681. As regards sale societies, in Dharwar have the people now commenced to run the show themselves?—Cotton sale societies. Take the ones at Hubli and Gadag. They are absolutely self-controlled bodies.

3682. Is attention so often necessary from the department now?—No, I do not think so. We have our definite, defined functions in connection with those societies which we do. Beyond that we do not interfere.

3683. In the matter of wholesale sales societies, do you not think a Government subsidy in the form of giving them competent men for the purpose of grading is very essential?—Government are doing the grading, and I think it is better and commands much more public confidence if Government continue to do the grading rather than that Government should subsidise a society to do its grading. I feel that grading is a thing which should be done, if possible, by an independent body.

3684. Have you any idea of helping Development Associations in that direction? When they go to sell the produce of their taluka through their agency, would not some such help be necessary?—Where the quantity of a particular material is large enough to justify grading, then I am prepared to put the matter up to Government in order to establish a definite grading by stem.

3685. You know the conditions of Gujarat. In the Panch Mahals, the Bhils generally look upon their cattle as their wealth?—Yes.

3686. They invest in cattle as soon as they have got any money, and they commence to sell the cattle as soon as they are short of funds?—Yes.

3687. With that sort of thing, and with no other property, do you not think cattle insurance should be resorted to by such Provinces?—I think cattle insurance is a thing which ought to exist in all countries and in this

country as well as others, but until we get rinderpest and other diseases checked so that the premium is reduced to a reasonable amount cattle insurance cannot be done.

3688. I can understand it may result in losses. At the same time, should not the losses be made up partly by Government in the initial stages of this matter?—I do not believe in Government coming in in things like that. I think Government could do much better in checking the disease which now raises the premium to impossible limits.

3689. Then practically agriculture in that part of the country is not quite an assured business, because you cannot rely upon any property in the first place, and secondly they practically sell off the animals just like uttering currency notes, so that there is no guarantee of the money being repaid?—Yes.

3690. The experiment that is carried on at present by the Provincial Bank rests merely on the *morale* of the society there. How far can that be depended upon?—I do not follow.

3691. The people of this Bhil tract move to any other village, in case they find themselves heavily involved or oppressed by *sowcars* or societies, because between the societies and the *sowcars* there is a great deal of trouble. The society cannot take up the whole business themselves, and they cannot give up the *sowcars*. Then there is a tussle. If the people go out to the Indian States, and there is no insurance, there will be no securities that we can expect from this type of people. Do you not think some insurance should be devised?—I do not think you can insure any product which requires a premium of 10 per cent., and that is the position in the case of cattle at present.

3692. What is the total Government agricultural revenue of the Bombay Presidency?—That I cannot tell you.

3693. How much per cent. is spent upon agricultural experiments?—That I cannot tell you.

3694. You have seen the houses in the rural areas?—Yes.

3695. Are they sufficiently spacious for the requirements of agriculturists?—I think the housing is bad, but I do not think rural housing is a thing which I should concentrate on as the thing which is the worst.

3696. Do you think the time has arrived when Government should consider the propriety of extending the building sites area?—You mean whether the *gauthan* should be increased in the villages?

3697. Yes?—My experience is that the *gauthan* is generally sufficient.

3698. The *gauthan* and the cultivator live in the same place?—Yes.

3699. Is that not quite incompatible with sanitation?—You mean when the cow lives in the same house as the cultivator?

3700. They keep all their animals there?—It is the system, and I do not think there is necessarily anything insanitary about it.

3701. Would you advocate, with reference to those Development Associations, that some of the sales of their commodities should be exempt from payment of local taxation?—I am all against this sort of thing. It seems to me that when you try to run a movement by means of exemption from taxes you are on a rotten basis.

3702. Then, how will they meet the local competition?—If they cannot meet local competition on a commercial basis they have got to go down.

3703. Do they not do it in other countries?—I do not know what they do in other countries, but I think it will be an entirely wrong policy to base the co-operative movement in India on exemption from local taxation.

3704. *Sir Thomas Middleton*: In describing the ideal organisation of research that you would wish to see, you advocated a Central Board with funds which it should allot to different Provinces?—That is my ideal.

3705. And you strongly deprecated the idea of sending in any programme. Now, on what principle should the central body allot funds if they see no programme?—I think the amount that should be allotted, say, to the

Bombay Government would be settled in consultation with them. The Local Government would write to that Board and say "We can profitably spend 10 lakhs of rupees on research work, will you make us this grant?"

3706. And presumably every other Province in India would do the same thing?—Yes.

3707. How is the body who is responsible for allotting the funds to decide? Their fund presumably will be limited?—The difficulty would come in the first instance, but the difficulty would not last long, because they would get annual reports, and when the reports come in they will be able to know which Presidency deserves the most.

3708. Do you not think it is a particularly valuable exercise for an agricultural officer to be required to frame a programme?—I do, and in fact he *must* frame a programme.

3709. Then why should he not submit it to the Central Board?—I may be an inveterate decentraliser, but we in the Provinces feel that we are the best judges as to the way of spending money in the Province. I feel what might happen, and has happened, is the central body sitting at the other end of India would have two schemes before it. We know which is the more important for us, but they looking at it from another point of view would ask us to spend money on the scheme which is not the more important for us.

3710. Two schemes from one authority or from different authorities?—No. Supposing there are two problems in connection with rice. We know which is the more important to us. But if it was left to the central authority funds would probably be allotted to the other one because it happens to be the most important to Bengal. That sort of thing has happened. I am not speaking from imagination.

3711. Presumably the authority that has made that allocation to Bengal has good reasons for doing so?—To Bengal, and not to Bombay. Probably that might be the most important thing for Bengal.

3712. I see your point. With reference to training, you indicated that you preferred a system of apprenticeship after passing through the three years' course in college to a system of post-graduate studies?—I do very much, and I have a lot of experience of both.

3713. Have you not got two classes to think of? You have specialists like the Plant Physiologist you have referred to, and you have also got men who are employed in the general agricultural work of the Province? Do you think that the case of a specialist could be sufficiently met by the three years' general course of study that makes up the agricultural degree?—I do not. What I have in mind is this. Take the breeding of cotton. I have some extraordinarily efficient Cotton Breeders. I take a man from the college who has done very well in connection with botanical work, and I place him under one of my expert Cotton Breeders for a period of three or four years. Then, if he is well reported on at the end of three or five years as being a man who is developing the necessary capacity, I send him abroad for one or two years for special training under a man of the first water.

3714. The general view is that that kind of training in technique ought to be gained, while the worker is young?—The trouble is that if you do, you waste such a lot of money. I cannot pick out a man who is going to be a good Cotton Breeder. Out of every six men selected from the college for that work only one is successful. I would like to try him for four or five years under the experts of my own department before I spent a lot of money in sending him abroad.

3715. I do not object to your testing him as a Cotton Breeder. What I suggest is that before he takes up that specialised work he ought to have some more training in science than is provided by a three years' course. You have got six subjects in that course, which makes it heavy task for an ordinary student?—I agree. The men who come straight from the University, even if they happen to be the best, are of very little use to me for years. Their outlook is wrong and it has got to be corrected.

3716. Whether they are of much use largely depends upon the particular job they are intended for?—No, because one of the big difficulties I have is to get the men to have an agricultural outlook. A man comes to me from the college with a botanical outlook; botany is his principal subject. He looks at it as a botanical problem and not as an agricultural problem, and until he comes to have an agricultural outlook he is not of much use to me.

3717. Under such a course of study as you prescribe the student will not have learned more than the elements of physiology?—Exactly, and therefore I apprentice him to my best man. I have a good Plant Physiologist doing high plant physiology at Surat.

3718. You talked of the Loni students finding employment as substantial village *patels*. Do you mean as headmen of the cultivators?—It is not a question of not finding employment as substantial village *patels*. I said that the students were the sons of substantial village *patels* and that they went back after training to cultivate their own land.

3719. I thought you said that they were finding employment as *patels*?—No.

3720. You said that copper sulphate has come to be very extensively used for dressing *jowar* for smut. Have you in fact heard any complaints about it?—There has been no serious complaint about it. They are now using it on over half a million acres.

3721. It is an agent that one ought to use with considerable care. I wanted to know whether you had received any complaints about its effects in retarding germination?—No, I have not.

3722. *Sir Ganga Ram*: What use do you make of the immense amount of molasses which is produced in this country?—As a matter of fact the amount of molasses we have is small because we are making *gul* and not sugar. There is no sugar manufacture in the Bombay Presidency except in one factory.

3723. Do you not get some percentage of molasses?—Practically none. There are some refuse drippings from *gul* but the amount is very small and that is used as fodder.

3724. In what shape?—The animals on the farm come and eat it.

3725. Do you know of *molassine* in England?—Yes, very well.

3726. It used to be made of wood pulp and molasses?—It is made of various things.

3727. An engineer was exhibiting a machine for making cattle food from molasses at the Cambridge Agricultural Show in 1922?—I saw it.

3728. Have you done anything towards popularising that?—We have already done that. I have already issued a leaflet recommending them to mix other things with the molasses.

3729. You want machinery for that. If you do it with machinery you can keep it for years?—I do not know whether it will be worth while.

3730. It will be very useful in the famine periods?—But every bit of stuff is used up immediately. We have one big sugar factory here where they do make molasses and they tell me that the whole of their molasses is bought up for the manufacture of alcohol at Nasik.

3731. Have you any substitute for clover in this Province?—Yes.

3732. In the Punjab we have one substitute which has been highly commended by the Agricultural Department; it is called *senji*?—We have tried it, but it will not work here.

3733. Why?—I do not know why; we have tried it.

3734. It works well in the Punjab?—Our soil is entirely different and our climate is different.

3735. It is a leguminous crop and replaces the lost chemicals of the soil. It is good fodder and is given all over Punjab for milch cows?—I know that, and I am trying it in Sind. In the Presidency it has hitherto been a failure.

3736. Then, you have not got proper seed. Have you tried Canadian fencing for keeping out wild pigs?—We have tried various forms of fencing.

3737. The Canadian type is very cheap; it costs Rs. 1,500 a mile?—Ours costs about Rs. 1,700. There is not much difference. If you will give me an advertisement of it, I will try it.

3738. Could you give me, without infringing upon your secrecy, your five years' programme of research?—I am sending the Secretary a three years' programme which was put forward in 1924.

3739. Could you give me a copy of it?—I will send it to the Secretary.

3740. Because I think that with all your research enthusiasm I should say you must be overlapping things which are already known in other parts of the world. With reference to communications, in this Province are your irrigation channels and drainage channels properly bridged? In the Punjab there is great necessity of having bridges all over the Province wherever there is a drainage crossing. The necessity is felt more for such bridges than for metalled roads, because our carts can easily go on unmetalled roads?—I think you had better ask it of our irrigation officers.

3741. I want to know from you whether all village communications are bridged?—Not in many cases. There is no need for them, because they are only blocked a few days in the year; most of the time they are dry.

3742. We are attempting in the Punjab to bridge all our metalled and unmetalled roads so that a motor car can go anywhere?—We are a long way off that.

3743. When I was passing through Karachi I found a lot of trade in boiled rice. Does boiling make for preservation?—The rice is boiled simply in order to make it easy to remove the husk.

3744. Does it keep out some germs which spoil the rice?—I think it does tend to prevent damage by insects.

3745. Is it not tried here?—It is done in Sind. It is done with certain rices in the Konkan, but most of our rices would be spoiled by boiling and people will not boil it.

3746. Have you introduced indigenous proverbs in connection with the Agricultural Show?—I have collected a good many. I have got them both in English and the local language.

3747. What kind of tobacco do you grow?—We have laid ourselves out to grow tobacco for the local market.

3748. Have you any special kind of tobacco to mix with the other varieties? Our Gujarat tobacco has already a very good market of its own. It is a very good tobacco as it is.

3749. In the Punjab we have *hajra*, which if mixed with other kinds makes them very palatable?—I will talk to the people in Gujarat about it.

3750. I will get you some seed?—Thank you very much. We should be very pleased to grow it.

3751. What are the wages of agricultural labour here?—They vary from about 6 annas to about 14 annas per day now.

3752. So much as that? Where do they get 14 annas?—In the sugarcane tract.

3753. For unskilled labour?—Yes, for ordinary agricultural labour.

3754. Can you tell us what percentage of the total area is left uncultivated because the holdings are too small and uneconomic to cultivate?—I am afraid I cannot give you such figures.

3755. Will you make a note of it?—I will make a note, but I think such figures will be impossible to get.

3756. Not even approximately?—I will try and get some figures for you.

3757. *Sir Henry Lawrence*: You told us that landholders are exempt from taxation on any improvements they introduce in their land. Does that encourage the application of capital to land?—I think it does.

3758. Is there any considerable amount of capital being employed in the improvement of land?—I think there is a very considerable amount now.

You will find in almost every village some people building embankments, some digging wells, some doing other things.

3759. We are told that District Boards have allowed their roads to deteriorate?—I think that is the case.

3760. What particular areas have you in view?—The matter has arisen so frequently that it may be taken as a fairly general statement.

3761. Have the roads been transferred to the District Boards within the last few years on a large scale?—So I understand.

3762. And it is urged in their defence by certain District Boards that they are transferring the expenditure from the maintenance of the larger roads to the improvement of village roads. Do you think it is correct?—That is very likely. I cannot say one way or the other definitely, but I think it is very likely.

3763. It is a matter within the discretion of the District Boards whether they will improve village roads or spend the money on the maintenance of larger roads. You would not dispute their discretion in the matter?—I certainly would not.

3764. Have you issued any manual on cattle-breeding to indicate to cattle owners the proper principles for the improvement of their cattle?—I have a bulletin of that kind which has just been drawn up by Mr. Bruen in my office. We have not issued one, but it is ready for issue.

3765. Will you let us have a copy of it?—I will.

3766. I think you said that nothing has been done for improving the subsidiary industries?—Yes.

3767. Are you acquainted with the work done for handlooms?—Yes, I am. So far as weaving for weavers is concerned, they have several peripatetic schools and one for weaving for farmers.

3768. That is not under your control, but under a separate officer?—Yes, I only inspect it and report.

3769. Under what officer is it?—Under the Director of Industries.

3770. *The Raja of Parlakimedi*: Do you mean to approach the railway authorities for better facilities for cattle when they are transported?—I certainly will be pleased to do it.

3771. Will you do it?—I will do it.

3772. For a place which gets about 15 inches of rain and has got light black cotton soil which is the best variety of cotton seed suitable?—It altogether depends on how the rains come in the course of the season. We have such land in Gujarat where we grow 1,027 Broach cotton. We have similar land in the Southern Division here where we grow Upland American cotton. It will depend on the temperature and how the rains come through the season. If you give these particulars I will be able to let you know which is the most suitable variety.

3773. In answer to Mr. Kamat's question you said that a good percentage of your boys go back to their land?—Yes.

3774. Do the landowners' boys go back to agriculture?—Yes. A very large proportion of our students, both in schools and colleges, are actually landowners and many of those go back to the land, but not many landlords.

3775. When you speak of landowners you mean people who possess land on lease?—No, people who own small parcels of land.

3776. In their own possession?—Yes.

3777. *Sir James MacKenna*: On Saturday you made some statement about central research, which I think you have modified later on. With reference to that subject, I take it that you do accept the principle of central research?—I certainly do. I should be very very sorry indeed if central research were abandoned altogether.

3778. As an organisation to assist the Provinces in carrying out research?—Most assuredly.

3779. If there were adequate provincial representation in this central organisation, which I think is almost certain to be the case, do you not think you could allow provincial programmes to be submitted to this Central Board? I will take a concrete case. We have common to Assam, Madras, Burma, Bengal and Bombay the rice problem. Do you not think that many of the problems from these Provinces with regard to rice could conveniently be dealt with by men who have been working for years probably on similar problems in their own Provinces?—I certainly think it should and I think it ought to be. I should be delighted to have a committee of specialists on rice to examine the work which has been done in Bombay.

3780. Of course it should be centrally organised?—Yes, I should welcome an inspecting committee of that kind.

3781. Or a consultative committee?—Or a consultative committee which would make suggestions for future work.

3782. In all your long examination there is one very important function of the department which has not been touched upon, and I would like your opinion on it. Do you think the utility of the Board of Agriculture is all it was in the earlier days and how do you think it could be improved or extended?—I am almost the only member who has attended the meetings of the Board of Agriculture from the year 1904 onwards and I certainly think that in recent years it has not been of the utility it was in the early years. In the early days we all sat down round a table and thrashed out our problems in the light of the experience of each one of us. In recent years the tendency has been to discuss administrative problems and pass resolutions as to what Government should do. Now, I think the Board of Agriculture would be of much more use if it were a consultative committee of specialists rather than simply a body which makes recommendations to Government for administrative changes. I also feel that at present it has got somewhat unwieldy in size and the men are not probably most suited to the purpose I have in view. I think if we can make it a body more like what it was in the beginning, that is to say, a body sitting round a table thrashing out actual problems, each man giving his own experience, and deciding not what Government should do but what we should do, it would be much more useful.

3783. Are you in favour of reviving the sectional meetings which originated some years ago but which I understand have been abandoned?—I should most certainly recommend the revival of the sectional meetings; but I would not revive them so much as a meeting of botanists and a meeting of chemists. I would revive them rather as meetings of officers working on rice, or officers working on some other subject.

3784. These sectional meetings would be of great assistance to the central research organisation?—I think very useful.

3785. *Professor Gangulee* : During the course of your evidence you stated that if you utilise the rainfall in tracts without irrigation, a larger area of land can be brought into cultivation. Have you tried any experiments in dry farming?—Yes, and we have recently intensified it to a considerable extent. Until 5 years ago experiments in dry farming were more or less casual with us; I mean they were not of major importance; but during recent years we have had a special officer whose principal duty has been to devise methods for the retention of water by soils in these tracts and hence devise the best methods of using dry farming in our own tract.

3786. Have you tried to use the method of subsoil packing?—We have not, because, as a rule, we have not got subsoil in those tracts; that is the trouble.

3787. Have you tried to find out drought-resisting varieties of crops?—Yes; we are trying in almost all our most important crops.

3788. Is anything by way of crop insurance possible in those areas?—At one time I was very sanguine about crop insurance. In these precarious tracts I personally would not undertake farming unless I could get some form of insurance: the chance of loss is so great. When I was in England I made enquiries at Lloyds as to whether they would look at any proposal of this sort,

that they would pay damages in proportion to the reduction of the crop below 50 per cent., paying nothing if it was over 50 per cent. of normal, but paying graduated damages if it was below 50 per cent.; but they would not look at it.

3789. This is a matter to which attention must be given?—I think it is a matter of very great importance, if you are going to get men with business outlook going into agriculture in the drier tracts of this Presidency at any rate.

3790. You stated that Government should encourage professors and scholars to get study leave in foreign countries. With the development of central research stations in India, do you think it would be necessary still to send students abroad?—I would not like to say. I would like to send a man to the best centre in the world. It might be in India or outside it; I would not limit it to England, or the Continent or America. For certain purposes I would send a man to Brazil; for certain purposes to South Africa; and for certain purposes to Mr. Howard at Indore.

3791. Do you think you have developed research in India to such an extent that our boys can go to Pusa and Muktesar for training?—Not necessarily a station. I would send the man not to a place but to a man for training.

3792. I consider organisation in agriculture is most important. Research has made certain progress in India and I think the immediate need is better organisation. Therefore I am very much interested in the Taluka Development Associations. You started this movement in 1922 and I understand you have got 55 associations at present?—Yes. I think one or two more associations have been started since that figure was arrived at.

3793. They have had about three years' growth?—Yes.

3794. Has the initiative for the formation of these associations come from the people themselves?—In some cases the people themselves took the initiative and in other cases the Government official, the *mamlatdar*, took the initiative. There have been a certain number of cases where the initiative has been local.

3795. Supposing the people of a region are anxious to start a Taluka Association, what would be the procedure?—There are two methods. We generally arrange to have a meeting at a central place in the taluka and invite cultivators from all over. These meetings are sometimes organised by the Agricultural Department and sometimes by the local *mamlatdar*. Then if the idea takes on, we have a deputation generally consisting of one Government officer and some cultivators from the villages in the taluka in order to make the thing widely known and to see whether there is likely to be any local support. Then when we have got some idea as to the local support it is likely to have, we call a general meeting of all the people interested in the movement and inaugurate the association, appointing a committee and secretary, and adopting bye-laws.

3796. These organisers belong to the respective taluka?—As a rule the secretary belongs to the taluka. Having appointed a secretary and committee they then ask us to supply them with a propaganda officer.

3797. At present there are 55 secretaries?—About that.

3798. Do you at any stage train these organisers so that they may look at the rural problem as a whole?—At present nearly all our taluka association secretaries are co-operative society men and the training of the co-operative society secretaries is the function of the Central Co-operative Institute. We have not had special courses for these men yet, but the time is coming when I am prepared to arrange with the Co-operative Institute for special courses for these men.

3799. So that they may get an agricultural outlook?—That is the idea.

3800. How are these associations financed? Partly from Government and partly from local people?—They are financed in several ways. We try if

possible to get a capital fund; that is to say, we try to get people in the taluka and outside it to give us considerable sums down which are invested and on which we can get nearly 7 per cent.

3801. The organiser is a paid man?—Yes.

3802. How much does he generally get?—His pay and travelling allowance are supposed to be covered by the Government grant of Rs. 1,000 a year. The first method of finance is by getting a capital fund. The second is subscription from co-operative societies or individuals or villages as a whole. The third is the Government grant which is equal to the income from other sources all put together up to a limit of Rs. 1,000.

3803. Who checks the expenditure?—The account is submitted to the Divisional Board and they send it on to me with a recommendation as to the amount of Government grant which should be given. The Registrar and I go over it and then finally we decide what the grant shall be.

3804. So the Divisional Board is the immediate superior?—Yes, to which the Taluka Development Association reports.

3805. The accounts are submitted to them?—Yes.

3806. And they consult you?—When the programme is submitted to the Board the Deputy Director of Agriculture for that Division and the Assistant Registrar for the Division are members of that Board.

3807. I am very much interested with the record of work done by the Taluka Association of Pachora. That is a very extraordinary record in a short time?—It is a very good one; it is one of the best.

3808. Can I take it that the other associations also are equally good?—You can take it as typical. It is one of the best.

3809. Have there been any failures?—Particularly in the Konkan there have been many abject failures.

3810. Will you please give the reason why it has been a success in one place and a failure in another place?—Where they have not been a success it has usually been in landlord areas, where landlords have been away in towns and where the people have no permanent interest in the land. Where we have had to deal with peasant cultivators there has been greater success.

3811. *Mr. Calvert*: With regard to propaganda I gather that in Japan the Agricultural Department confined its assistance strictly to co-operative societies. If the people want help from the Agricultural Department they must organise themselves in societies first. You do not favour that?—I would not go so far as that, but I certainly would favour it as far as it is possible to go. We do give a definite preference to cultivators who are organised in co-operative societies for the supply of materials or for any other purpose.

3812. *Mr. Kamat*: You told Sir Henry Lawrence that all the roads under the District Local Boards are bad?—I did not say so. They have deteriorated; they are not so good as they were.

3813. If the means at the disposal of the District Local Boards are limited, would you prefer in the interest of the villagers spending the money on the village roads at the expense of the bigger roads?—I feel that the most emphatic need in our rural communications is the village roads.

3814. And therefore they are justified in spending the money on the village roads?—I should be content that the other roads should deteriorate slightly if we could only get better village roads.

3815. Do you think that there is any necessity to maintain the unwieldy Board of Agriculture? Do you not think it desirable to resolve the Board of Agriculture into committees of experts?—I think there is a function which the Board of Agriculture as we have hitherto known it can perform. I think it is a good plan for people to meet not as experts but as people devoted to the improvement of agriculture as a whole. I would make it a meeting of Directors and a few other officers who can definitely look on the agricultural problem not as experts but as a whole.

3816. As it is at present do you not think it is an unwieldy body and if it meets only once in two years it serves very little purpose?—It is at present an unwieldy body and I am afraid people take very little notice of its resolutions.

3817. As regards the sugar industry in the Deccan, you have specialised in sugarcane growing?—Yes.

3818. What do you think are the prospects of the sugar industry in this part of the country?—The sugar industry in the Deccan cannot of course be considered apart from the sugar industry in the world as a whole. The next five years are going to be a very hard time for the sugar industry everywhere. In the Deccan, I do not think we can produce sugar per lb. as cheap as they can in a number of other areas; hence, until the price of sugar goes up considerably beyond what it is at present, I think it is only an exceptional concern that can make sugar production in the Deccan a real commercial success.

3819. So that within a reasonable period you see no future for the industry in the Deccan unless under special circumstances?—I cannot foresee more than five years, but at the present time any attempt to establish any new sugar factory in the Deccan would be I think a most unwise proceeding because I do not think there is any likelihood of its being a commercial proposition within the next five or six years.

3820. As the canal schemes grow and as time comes for the sugar industry to be established, do you think that State aid can be given to it?—I think when the thing has a prospect of becoming a commercial proposition the question of State aid may be considered. At the present time it would be throwing money into the sea.

3821. At a later stage would you be in favour of the question of State aid being examined seriously?—I would most certainly. I am speaking of sugar-making, not *gul*-making.

3822. *The Chairman*: Would you favour the granting of some money reward to research workers for successful pieces of work?—No; I do not think so. I would be very much against that. It would seem to me to destroy the spirit of scientific progress. I feel rather strongly on that because I do not feel we shall get the work done if we do not arouse scientific enthusiasm independent of whether a man is going to get special commercial returns out of it.

3823. Have you any other reward in mind?—Of course, we as scientists have rewards which we would value perhaps more than anything in the world. For instance, there is nothing that any Government could give me which I should value so much as a Fellowship of the Royal Society. I mean there are things which we as scientific men would value more than anything that any Government can give and I think we had better stick to those.

3824. You do not contemplate the creation of any such reward in India?—I think a reward which is not universally recognised is not much good.

3825. You have subscribed to the importance of informing the intelligentsia on rural matters. Are you in favour of instituting a degree on rural matters?—Yes.

3826. Have you ever contemplated the institution of a degree of rural economics?—Not as such; but we have been (I speak now as a member of the Bombay University, as representing one of our big educational institutions) gradually developing recently the importance of economics in our University and the stage is now reached at which we are almost at the point when I can get a distinct section for a degree of rural economics. I think it would be an exceedingly wise thing to do.

3827. Rural economy in its widest sense?—Certainly, I do not mean merely historical classical economics as applied to agricultural products, but rural economics in its widest sense.

3828. When you institute that degree would you make it a qualification for public service other than in the Agricultural Department?—I would most emphatically. I think it would be a tremendous filip to it if it were done.

3829. Has the question been actually mooted?—No, not in this part of India.

3830. Can you give the Commission any idea how such a movement can be set on foot?—At present I am reporting to the University within the next three months on the University school of economics and sociology, and one point I am going to insist upon in this is that in this post-graduate school the students must devote time and attention and staff if necessary to this outlook.

(Dr. Harold H. Mann gave further oral evidence on Thursday, the 28th October, 1926, see pages 266-270.)

**Dr. WILLIAM BURNS, D.Sc. (Edin.), Joint Director of
Agriculture, Poona.**

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(a) The existing organisation for research in the Bombay Department of Agriculture is as follows:—

The Director of Agriculture is himself the final referee in all research matters, and is the Chairman of all Research Committees. Under him at the College is a staff of semi-independent experts who perform teaching and research duties. For teaching purposes they are under the control of Principal, for research under the Director. These men are of Imperial or Provincial grade. Below them are Assistant Professors and Lecturers whose main work is teaching, but who are also expected to do some research and, in addition, certain graduate assistants who are entirely devoted to research. The Assistant Professors are gazetted officers; the others are not.

Elsewhere in the Presidency there are small research stations, each in charge of an agricultural graduate and with a staff partly graduate and partly non-graduate under him. These stations are mainly for the purposes of plant breeding and are of recent origin. No teaching whatever is connected with them. Of recent years the fact that so many of our problems are on the borders of several sciences has induced us to organise Research Committees from the personnel of the department. These Committees pool the experience of several kinds of experts and give their united guidance to the actual workers. Outside the official organisation proper, we have also been conducting, mainly by the Research Committee system, researches financed by the Sassoon David Trust. Our experience of research work is, therefore, considerable. I would make the following suggestions as regards the organisation in general:—

(1) The Director of Agriculture must necessarily be a Director of Research. This is one of the great advantages accruing from having a technical Director from the department itself as against a civilian Director. It is plain that although the Director may be a man conversant mainly with one science, he must have a working knowledge of all the sciences underlying agriculture and of agriculture itself. It is no easy matter to find a person of these qualifications; but it is essential if work is to be properly directed. It is also worth noticing that any subordinate officer placed in charge of a research section or of a research station—particularly the latter—must have an all-round acquaintance with the sciences underlying agriculture. If isolated, he will often have to deal with problems outside his own special science for which no immediate advice from any other person is forthcoming. It is essential, therefore, that research workers should have this broad training. The effect of this is to indicate that too early specialisation is undesirable. The present course for the degree of Bachelor of Agriculture of the Bombay University, which permits limited specialisation in the last year with possibilities of post-graduate work in any direction, appears to me suitable for the training of men who will do research. It is obvious, however, that the training previous to graduation is not sufficient. If a man is selected for research work, he must be carefully trained in research methods by a senior research officer, and he should be ruthlessly got rid of if after a reasonable period of probation he does not show signs of being a good research man. The best method of training him would doubtless be to associate him with a higher officer in some piece of work actually in progress, to make him responsible for some small part of it, and let him understand the general scheme of the whole work. I have so far dealt with the top and bottom of the research scheme, *viz.*, the Director and the recruits; between them comes the body of junior and senior experts whose main work is investigation of various problems and production of new knowledge. It is obvious that these men must be organised into some kind of groups, either according to the science which

is their speciality, or according to the problem on which they are working. Their teaching duties and their administrative work should not be allowed to interfere with their research. I am personally of opinion that teaching and research mutually assist one another, provided that senior research workers are not overburdened with too great a number of teaching periods. Administrative work, however, has, in my experience and I think in the experience of most research workers, been an agent which increasingly wastes time that should be otherwise occupied. It is absolutely amazing how much time can be taken up with the mere routine of the office finance, of answering questions regarding personnel and pay and of dealing with matters which are not within the province of research at all. A really desperate effort is needed to prevent the accumulation of this kind of work and the consequent sterilisation of the research officer. It is not desirable that the senior expert of a research section or station should be merely a Director; he should be a prolific research worker. Where *all* the work is done by assistants, progress is slow and results are indefinite.

The degree of control between the Director and his staff and between senior members of staff and their subordinates is a matter which must be left more or less for local adjustment; but certain plain lines can be indicated.

Agricultural Research is obviously limited as to subject-matter; but so far as method of attack is concerned, there should be the greatest degree of freedom. It is also essential that results shall be produced within a reasonable time; and hence one of the functions of a Director and also of a senior research officer must be to see that work progresses at a reasonable speed. In planning research programmes we seldom allow a time of less than five years, when dealing with problems of living plants. But within this period it ought to be possible to show at least some definite results and possibly some very considerable results indeed. Again researches must be conducted economically. This does not mean in a miserly manner. It means deciding what extent is essential, and then getting the best while cutting out the absolutely non-essential. The planning of research programmes is, therefore, as important as the consequent carrying out of these programmes, and the most careful thought and repeated criticism should be made before actual expenditure is begun.

(2) As regards the financing of agricultural research, I think the time must come when keeping a nucleus of permanent workers, the best results can be got by putting up definite schemes to solve definite problems, each scheme being a self-contained unit as regards finance. This will include special apparatus, additional land, if necessary, and temporary personnel. The training of such temporary personnel would afford recruits for permanent posts in the department as they fell vacant.

(b) So far as skilled workers are concerned, I am of opinion that the majority of scientific workers need an under-study, who could replace them on a moment's notice and who would be available to start similar work in another centre. In the ordinary course of events, the man next below is such an under-study. But there are various cases in which it has been difficult to replace a specialist officer on account of the lack of such under-studies. In planning any research organisation we must look ahead and consider the training of men who will carry on work at the same time high standard as that at which it has been previously conducted. It is desirable that research workers should be encouraged to take study leave. This widens their outlook, freshens their intelligence, improves their technique, and increases their confidence. They also make valuable scientific friendships.

So far as field or laboratory facilities for study are concerned, I have little complaint to make. The only striking case that has come to my own knowledge is in connection with researches conducted by myself and my colleagues on the improvement of grasslands. The essential thing in such work is to be able to fence waste lands on a large scale and money has not been forthcoming for this. It is an apparently dead loss, but without it

we cannot get results that are either scientifically accurate or striking to the popular eye. I regard research into the scientific value of the indigenous theory and traditional methods of agriculture, as most important. It is the function of the research worker "not to destroy but to fulfil," and he can often help forward, by another stage, processes that have gone as far as they can go without scientific help.

QUESTION 2.—AGRICULTURAL EDUCATION.—(i) I think that there is no room in the Bombay Presidency proper for another College of Agriculture at the present moment; but I think it is likely that a College of Agriculture for Sind would be successful.

(ii) No remarks.

(iii) I would not say that all teachers in rural areas should be drawn from the agricultural classes; but certainly those, who have to teach agriculture or nature study, as for example, in the so-called agricultural bias classes in this Presidency, should be drawn from the agricultural bias. These men having lived along with plants and animals have a ready-made store of knowledge and experience, which prevents them committing errors that a city-bred man is liable to.

(iv) The attendance at the College of Agriculture, Poona, is as numerous as one would expect.

(v) The main incentive which induces students to come to the College of Agriculture is the hope of Government service.

(vi) The students are not mainly drawn from the cultivating classes. About 25 per cent. are drawn from the cultivating classes.

(vii) At present no further modifications in the existing course of study in the Agricultural College, Poona, appear to be called for. The course has been twice modified since its inception and is at present fairly workable and meets the requirements.

(viii) School plots are desirable where there is a teacher of the agricultural class with a proper training who will himself work alongside his pupils. School farms are, I think, unmanageable except at the schools specially devoted to agriculture, such as our agricultural vernacular schools which are really vocational training centres.

(ix) The majority of students who have studied agriculture in the College of Agriculture, Poona, have entered into Government service in one department or another.

(x) I do not quite understand this question.

(xi) No remarks.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(d) The most striking instance of the success of propaganda within my own experience is the introduction of the use of Bordeaux mixture against grape-vine mildew in Nasik. This work was taken up in 1910 and was carried on by the department assisted very largely by Mr. H. V. Gole, a prominent landowner and vineyard owner in Nasik, for four years. At the beginning the people were exceedingly suspicious of the new process. But it has now become thoroughly established as one of the routine practices of grape culture, there being a fair local trade in copper sulphate and spraying machines. Reasons for success are:—

(1) the effectiveness of the method,

(2) the relatively small cost of the treatment compared with enormous saving effected, and

(3) the hearty and disinterested co-operation of a local man.

QUESTION 4.—ADMINISTRATION.—(a) I have never been able to imagine any really effective means of co-ordination of the agricultural activities of the Governments in India, nor have I been able to see the usefulness of control of the Provincial Governments by the Government of India in the matter of agricultural research and propaganda.

(b) I do not think that the increase of the scientific staff of the Government of India is the best way to make expert scientific knowledge from one

Province available in another. I think it would be much better done by delegating an officer of one Province to spend some time along with his opposite number in another Province.

(c) (iv) *Meteorological Department.*—I think that there can be much closer co-operation between the Meteorological Department and Agricultural Department. I desire specially that parallel data should be collected both on the Meteorological and the Biological side as regards the relation of the growth of crop plants to the weather. This is very necessary for—

- (1) determining the critical periods in a plant's life;
- (2) enabling us to choose the best variety for a given set of meteorological conditions;
- (3) enabling us to choose the best dates for certain agricultural operations; and
- (4) working out the relationship between pests and diseases, especially in epidemic form, and the weather.

This work is only at its beginning even in other parts of the world, but it is essential here and will be of the greatest possible help to the plant breeder, the plant pathologist, and the agriculturist proper.

QUESTION 9.—*SOILS.*—(a) (iii) It has been our experience in pursuing our investigation of means for improving grasslands that the increase in vegetation that follows a rational system of grazing is one of the best means for preventing erosion. On the other hand, the reckless destruction of the vegetation due to unrestricted grazing is a direct invitation to erosion. The prevention of erosion is, therefore, one of the by-products of any system which makes for the best use of grazing lands.

(b) (i) The land at Kalas near Poona, which has been under the control of the Department of Agriculture since 1920, has markedly improved. This is due to the checking of grazing and the development of the field, possibly vegetable cover.

(ii) The land in the neighbourhood of the Bhamburda forest area has suffered more deterioration mainly due to the existing nullahs being still further cut back into the hills and widened in the plains, and also due to the exposure of rock by the washing away of the surface soil since the vegetation is not sufficient to hold it in place.

(c) No remarks.

QUESTION 11.—*CROPS.*—(a) (i) The improvement of existing crops by breeding offers immense opportunities since in so many cases the existing crop is unselected, consists of several strains and, therefore, offers a wealth of opportunity to the plant breeder. Obviously the first thing which the breeder must aim at is increased yield. Having got this, we must next attempt to get sub-races which are specially adapted to different tracts or which are resistant to the diseases which affect almost all cultivated crops. Hybridisation is only to be undertaken when there is a definite purpose to be fulfilled, as for example, combination of long staple with high ginning percentage, and should not be undertaken light-heartedly merely to see what will happen. In the case of certain crops, where the cultivation is exceedingly good, science can best help by investigating the possibility of isolating a new and better variety. Generally speaking, a race isolated from the crop already adapted to the soil is better than an introduced one. This does not necessarily always hold good; and trial of exotic varieties should certainly be part of the programme of research, although the main improvement should be healthy throughout a long outbreak.

QUESTION 13.—*CROP PROTECTION, INTERNAL AND EXTERNAL.*—(i)* One is almost inclined to believe that we have got in India all the pests that we are likely to get. Certain diseases have not appeared perhaps due to the climatic conditions being unfavourable. In the Bombay Presidency, for example, wart disease and blight of potatoes have never made their appear-

* See Question 3999 on page 116.

ance, although potatoes are imported from Europe by the ship-load every year. The existing measures of fumigation for nursery stock seem to me sufficient.

(ii) Internal measures against infection can best be done by increasing propaganda for the use of well-approved remedial or prophylactic methods such as the steeping of *juar* seed in copper sulphate, the spraying of grapevine and of betelnut palms against their respective mildews and the popularisation on a large scale of such operations as sweeping for grasshoppers.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(i) *Fruit growing and Fruit preserving*.—There is little doubt that opportunities exist for the extension of fruit growing, particularly on areas commanded by canals. The real difficulty in connection with the extension of fruit areas is economic. In the first instance, most fruit trees with the exception of banana and papaya will not give a yield of any kind before the third year and in some cases before the fifth. It is, therefore, a long wait during which capital invested is giving no return except such as may be got from subordinate crops cultivated between the rows of fruit trees. Again, the marketing of fruit offers distinct difficulties, as this trade is very much in the hands of middlemen. Fruit-growing offers itself as a suitable subject for the development of co-operative sale societies associated with standardisation of the varieties planted and grading of the fruits when harvested.

As regards fruit preserving, the few firms which have in a small way started the canning of fruit and fruit juices have been able to keep their heads above water, but are handicapped by—

- (1) the timidity and unpunctuality of investors;
- (2) the difficulty of getting large concentrated areas of one type and fruit; and
- (3) the necessity of importing tins.

QUESTION 23.—GENERAL EDUCATION.—Here as elsewhere we are faced with the problem of educating peasantry and still keeping them on the land. The agricultural bias classes in the elementary schools are a first step towards the solution of this problem. Here everything depends upon the teachers of these classes. They must be more than mere teachers of agricultural science or agricultural practice. They must in their own way exert such an influence as will enable the pupil to find his agricultural environment of the most interest and the one in which he will most readily spend the most of his life. There is no doubt that the mere spread of the ability to read would greatly help our agricultural propaganda. The ability to keep accounts undoubtedly assists in the prevention of debt and if along with these essential things can go a scientific study of the soil, plants, animals, and the weather, then agricultural education in the elementary schools is certainly justified. But the difficulty as elsewhere will arise later on. When driven by ambition, either his own or that of the community, the educated boy is made to feel that he can do better than remain on the land and so joins the ranks of those who seek their bread in non-agricultural occupations. Undoubtedly the same remedy which has been useful elsewhere will also be useful here. I refer particularly to means for increasing the amenities of life in agricultural areas and for increasing both the wealth and self-respect of the agricultural worker.

QUESTION 26.—STATISTICS.—The only suggestion in this connection I have to make is that we require not only the collection but also the interpretation of statistics. I have indicated in my reply to question 4 (c) (iv) how this can be done in connection with meteorology and agriculture. It seems to me that we require in each department of agriculture a really expert statistician whose work would not be so much the actual compiling of figures as the studying of what these indicate. Such a man also if he has the necessary mathematical training can be of very great help to plant breeders and to those in charge of experimental work in plots with regard to the interpretation of their work.

Oral Evidence.

3831. *The Chairman* : Dr. Burns, you are Joint Director of Agriculture at Poona?—Yes.

3832. You have put in a very interesting précis of evidence for which the Commission is greatly obliged to you. I do not know whether you would care to supplement that by any statement at this stage?—I think not.

3833. Would you tell me at the outset, then, how you divide your responsibilities with Dr. Mann?—That is laid down in a Government Resolution according to which roughly, he deals with research, the budget, publication, and one or two other matters, including such things as the Cotton Transport Act and relations with the Indian Central Cotton Committee. I am responsible for the rest. There are no watertight compartments, but that is a rough outline.

3834. Is the resolution to which you refer one dealing *ad hoc* with your appointment?—Yes.

3835. I have very few questions to ask you at this stage, as I think your written evidence is very clear. On page 100, dealing with the present course for the degree of B.Ag. of the Bombay University, you say, "It is obvious, however, that the training previous to graduation is not sufficient." Would you develop that a little?—There I am dealing with the question of the training of men for research. What I think is this. A man who has taken a degree of any kind has only passed the very first stage of his training, if he is to be a research officer. He must have further training, but not immediately on top of that. My feeling is that the period of tutelage should not be unnecessarily extended and, having taken his degree, he ought to have a certain amount of experience and then have further training after he has, so to speak, found his feet and done some real work.

3836. So the remark to which I have referred is no reflection on the teaching of the Bombay University?—No.

3837. On page 101 you say that a really desperate effort is needed to prevent the accumulation of administrative work in the hands of the responsible Directors and the consequent sterilisation of the research officer. Have you any plan to suggest whereby this may be avoided?—The only thing that occurs to me is this. In the case of an institution such as the College of Agriculture, I think it should be possible to centralise the greater part of clerical work in one office which could deal with it for the whole institution, instead of each officer having to deal with it separately.

3838. Would you require a secretary for that?—Yes.

3839. That would be a new appointment?—Yes.

3840. On page 101 you say, "As regards the financing of agricultural research, I think the time must come when keeping a nucleus of permanent workers, the best results can be got by putting up definite schemes to solve definite problems, each scheme being a self-contained unit as regards finance." Are you thinking there of the organisation of research according to crops?—It might be according to crops and it might be according to a definite problem such as drought, for instance, which affects all crops.

3841. You think the experience of organisation by crops suggests that that is an efficient basis of organisation?—My own experience of organisation by crops is not sufficient to enable me to say "Yes" or "No" to that question.

3842. You have not formed any views in that direction from what you have seen and heard of the work of the Indian Central Cotton Committee?—That, I think, is a very definite exception.

3843. On page 101 you say: "It is desirable that research workers should be encouraged to take study leave". At what stage in their career do you contemplate this study leave being given?—It is a little difficult to

define that accurately. My feeling is that after a man has entered into the real work of the department, and possibly developed into quite a brilliant worker, there will come a stage when he will get no further unless he has some stimulus of this kind. Exactly when such leave should be given is largely a matter partly for the individual and partly for the exigencies of the department; but I should say roughly not less than 5 or more than 10 years after he has started work.

3844. You do not believe in young research workers going abroad too early in their career?—I do not think they are psychologically ripe for it then.

3845. I am not quite clear what your own experience in the districts has been?—Not very much. My work until April of this year has been as Economic Botanist to the Government of Bombay and, since 1922, also Principal of the Agricultural College. I have only 6 months' experience as Joint Director, and so far as the districts are concerned my experience has been confined to occasional visits (not more than two months in the year) all over the Presidency for special jobs. My interest is therefore largely in certain special problems, and I have not much experience of the actual agricultural life of the villages.

3846. I quite understand. On page 104 under the heading of "Statistics", you say: "It seems to me that we require in each department of agriculture a really expert statistician whose work would not be so much the actual compiling of figures as the studying of what these indicate." What do you mean by "each department of agriculture"?—I meant each Provincial Department.

3847. You do not suggest a flock of statisticians in any one Province?—No!

The Chairman: There are a great many other questions I should like to ask you, but I will reserve them until I see what questions my colleagues desire to put.

3848. *Sir Thomas Middleton:* Does your duty include the supervision of the small research stations that are at present established in different parts of the Presidency?—No; that is definitely under Dr. Mann.

3849. With regard to the question of the training of the research worker, your own experience, I think, has been very largely in the direction of research, during the earlier years of your service, at any rate?—That is so.

3850. I have been looking at the course of study prescribed for your degree, and what occurs to me is that while it is an admirable course for general training in agriculture and allied sciences it does not afford enough time for the man who wishes to become a specialist in such a subject as bacteriology to get the technique that is essential for him. I put the point to Dr. Mann and he was disposed to take the contrary view, that the time was enough, but as you have been engaged specially in this department of the college I should like to have your opinion?—I can only say what I have already said in reply to the Chairman, that we do not look on the man as a finished product when he leaves, and I think he requires extra training, but I would rather have it after one or two years of additional work.

3851. It is from that point I wish to start. As for his being a finished product, of course he is not that until he has been a very long time in the service. What one finds in Great Britain, however, is that there are certain types of work that the student can tackle most effectively just after he has left the University. I am thinking now of the plan we adopt very largely in Britain of selecting Honours graduates and sending them for a special course possibly in one of our own laboratories or to Germany or America. Our experience is that that method of training has been of very great value in widening their outlook, and it is only after a young man has had such a post-graduate course that he would be taken on as a beginner in research work. You think he would do better to go straight away into harness and get his technique at a later stage?—I think so, because our conditions in this (as

in practically everything else) are special. If he is going to have a post-graduate training he must, apart from such opportunities as Pusa affords, go abroad. The majority of them prefer to go abroad, on account of the additional *cachet* attached to foreign training. That takes away their Indian outlook. A man is not getting into his mind the problems he has afterwards to solve; he is in a totally different setting and studies in a totally different environment.

3852. I follow that and I think your point is sound; but would it not break down if facilities were available within this country?—I am not at all sure about that. I am merely expressing an opinion based on facts with regard to men who have been abroad and men who have not.

3853. Perhaps you wish to suggest that it is more difficult for you to judge of future promise just after a student has graduated than it might be in our case in Britain?—I do not know that that is my point of view. My point of view is that the man requires to test himself and to be tested and to have the rawness of his studenthood taken off him, so to speak. Then, when he takes his further training he is a research worker and knows what he wants to get out of it; he can pick and choose. There is also the point that he has been for a very long time under tutelage in schools, at the arts or science college and at the agricultural college, and if I were he I know I should be deadily tired of training and anxious to get some work to do.

3854. I do not think your second point is so important, because really keen men are only too glad to get abroad to extend their experience?—Yes, but I suggest this is the way he should get his experience. The best way to do it is this form of apprenticeship to actual work.

3855. That may or may not be so, because it is quite conceivable that there may be people elsewhere who could train your young men better than anyone in the Bombay Presidency. When we found we could not train our students satisfactorily in Great Britain we sent them to Germany and elsewhere. It narrows down your opportunities if you use only your own officers for training your recruits?—That is so.

3856. With reference to your research committees, I see you have found these committees very useful?—They have worked.

3857. I understand from what you say in your memorandum that these committees are not committees in the ordinary formal sense, but are committees of persons who are interested in the problem, each of whom is there to contribute his own experience?—That is so.

3858. You say on page 102, "I do not think that the increase of the scientific staff of the Government of India is the best way to make expert scientific knowledge from one Province available in another". Obviously that is a view for which there is a good deal to be said, and I should like to hear you expand it a little. Is the position not conditioned by the amount of money available? It is sometimes necessary to accept an arrangement, which is not an ideal one, for financial reasons?—This raises the question of the organisation outside the Provincial Departments, which is a very big question. I admit there are questions in which more than one Province is interested. As I have said, I do not quite see how the arrangement is to be made whereby the Provinces are to co-operate. I do not know that I can say very much more at this stage.

3859. If an organisation were possible to enable them to do so, would you think such co-operation would or would not be desirable? Do you think Provinces are better left free to work out their own problems, or do you think that, assuming it were practicable, some form of central co-ordination would be in the interests of India?—My feeling is this. The Agricultural Departments have been organised, as you are aware, each within its own Province, and to a large extent they have kept their eyes on the questions within their own borders. They have been so extraordinarily busy within their own borders that they have hardly had time to look beyond them, even

if they wanted to. It is only now that people are beginning to see there are questions which affect more than one Province. If there is to be co-operation, however, it seems to me it must come from the initiative of the Provinces which desire to co-operate and not be something imposed on them from above.

3860. Has not the main difficulty in developing research in the last 10 or 15 years been the finding of the right men? Has that been your experience here, that the finding of the right men has been the greatest difficulty?—No, I do not think I could say that has been either a difficulty or a great difficulty.

3861. You are fortunate, then. I had thought that by increasing the scientific staff of the Government of India one could economise the men who are available?—That indicates definitely a reduction of the number of experts in the Provinces.

3862. Not necessarily. It is quite conceivable that given the right men in a central position the number of men in the Provinces might be increased very rapidly. That increase depends, apart from financial considerations, on the personality of the men chosen for the central work?—That is so.

3863. Your own work was originally that of an Economic Botanist, I think?—Yes.

3864. I should like to get your view as to the relative value to you in this Presidency of methods of selection and methods of cross-breeding in getting the type of plant you want. In a general way, which have you found more useful in Bombay?—In the case of most crops we have so mixed a population here that selection gives us results, and hence hybridisation has only been undertaken in the case of a few crops at a late stage. Selection has been our most potent weapon.

3865. The field for selection was very large indeed?—Yes.

3866. Can you tell me whether the cotton distributed from Surat and round Dharwar were selections or crosses?—The 1027 is a selection.

3867. That is a Surat cotton?—Yes.

3868. What about Dharwar?—Both the Dharwar cottons are selections.

3869. I got the impression somehow that there was one hybrid, not of the Dharwar type which you were distributing in Bombay?—There is a set of cottons we are dealing with in Khandesh which are said originally to have been hybrids, but we are very doubtful about their origin.

3870. Dr. Mann made an estimate that the amount of cross-fertilisation would be about 6 per cent. of the crop. Have you any figures?—I can only take the figures which have been given in various publications, and which vary from 0 to 30 per cent.

3871. When dealing with education you made the point that everything depends on the teacher. The teacher is your difficulty?—Yes. That is inevitable.

3872. *Sir Chunilal Mehta*: You say on page 102, "The students are not mainly drawn from the cultivating classes." Is there any particular reason why this is so?—I think at the present moment it is largely due to the fact that the other classes are more literate than the cultivating classes and more easily able to take the preliminary year in the arts college.

3873. With reference to what you say under the heading of "Administration" on page 103, and about which you have been questioned by Sir Thomas Middleton, are you still of opinion that what you say there about the interchange of views between officers of different Provinces will give the best results?—That is my feeling.

3874. There is really no great difficulty in your scheme of delegating an officer of one Province to spend some time with his "opposite number" in another Province being carried out provided funds were available?—I think it could easily be arranged.

3875. You have worked especially on grasslands, have you not?—Yes.

3876. There is very great scope for improving the grasslands in this Presidency?—That is so.

3877. What was the result of your investigations and what are the difficulties you have found in propagating these improvements?—This work was undertaken largely on account of similar work which has been done in the U. S. A. on the improvement of range land in the big grazing areas particularly and in the drier parts such as Texas, Arizona and Nevada. Using practically their methods we have got practically their results, namely that the actual grassland at the present moment is carrying a very small amount of very poor pasture, because it is trampled over, and the good species do not get a chance. If we can keep animals off and prevent trampling, particularly in the early parts of the rain, there is no part of the Bombay Presidency in which good grass cannot be grown. I ought to mention one other factor and that is the amount of water which is retained in the soil; that is extraordinarily important. If we can by any means increase the amount of water held by these bad lands, the species change. It is not a matter of re-seeding at all; it is a matter of allowing the natural changes to take place if we can keep off cattle, prevent burning and trampling and allow the water to accumulate. The whole crux of the matter is fencing, and as that is expensive, some cheap substitute is essential. The one place where this improvement has been done without fencing is at a place near Nasik where for at least 30 years a large area of grassland has been most carefully kept by the co-operation of the villagers, and produces grass which can be seen for miles around as being a different thing on account of the change in the grass pasture.

3878. On page 104 you express your desire to increase the amenities of life in agricultural areas and to increase both the wealth and self-respect of the agricultural worker. Have you any proposals as to how that can be done?—I am afraid I can give no proposals, but I may possibly mention three simple facts that have come to my notice. One is that two of our students used regularly, even while they were students, to run a night school in one of the neighbouring villages. Another student of mine in his holidays used to teach his villagers football. At the time when the Indian Army School of Education was in Belgaum, their then Commandant, Colonel Radford, decided that it would be very good for the men studying under him to do a little of this work. They were non-commissioned officers who were afterwards to teach agriculture. In addition to preaching the gospel of better agriculture, they helped the villagers in many ways. For instance, they built a hall for the village; it was a rough thing made out of planks and corrugated iron; but, having built it, they used it to give lectures on sanitation and other subjects, and I believe they did a great deal of good. I have forgotten the name of the village, and the school is no longer there, but it was a case of constructive work which they took up largely as an experiment and kept on because they liked it.

3879. Have you had any experience of the Taluka Development Association doing anything of the nature that you suggest?—I have only got into touch with two so far, and they seem to be rather troubled as to what to do; their difficulty is to get a programme.

3880. Have you considered Dr. Mann's suggestion of going further down to a smaller area and taking up all this kind of work through the Servants of India?—The matter has only come to me through his evidence.

3881. You state here that you are in favour of rural bias schools?—I am.

3882. You consider they are doing a good deal of good?—I think it is too early to say whether they are doing good, but they contain the possibilities of a great deal of good.

3883. *The Raja of Parlakimedi*: How do you approach villages with a view to assisting them in the improvement of their crops, the protection of

their crops against disease, and so on?—That is rather a matter for the propagandist section with whose work I am not so familiar. Our work with them is first of all through the man on the spot, the Agricultural Overseer, who ought to know them personally and who very often does.

3884. But as to the crops which are under your charge, how is your message carried to the villagers?—By the ordinary propaganda machinery of the department; I do not try to do it direct.

3885. Do you have your suggestions translated into the vernacular so that they may be circulated among the villagers?—Certainly, our leaflets are in all the vernaculars, and the men who work in the districts of course speak the vernacular of their area.

3886. Does livestock come under your charge also?—Only indirectly in so far as mere administration is concerned, at this moment.

3887. Has it come to your attention that near big cities such as Bombay and Poona certain practices are resorted to during the lactation period when the calf leaves the cow which often have the effect of causing the cow to go dry for ever?—It has not come to my attention; it is outside my purview at this moment.

3888. *Sir James MacKenna*: As Economic Botanist to this Government for many years, have you found Pusa of any assistance to you in the earlier stages or later stages of your work?—Certain of the workers at Pusa have been of very great assistance to us in advising and in other ways. With regard to grassland, for example, Mr. Howard gave me some very excellent advice in connection with the putting together of the results. It meant I had to re-write the whole of the memoir, which I gladly did, but the result was justified by the remark which was afterwards sent to me by Clements in America, who is perhaps the foremost man on that subject, that the thing might have been done in his own laboratory. That was flattering and it was the result of Mr. Howard's advice.

3889. You think, as a provincial officer, that Pusa is of considerable help to the Provinces and its existence is justified?—I would not generalise about Pusa; I am only dealing with individuals in it.

3890. Did you find Prof. Gammie, another Imperial officer, of much help to you when you first came to India?—I was sent to study under him.

3891. *Professor Ganqulee*: With regard to research work, I understand that most of your work is concentrated on plant breeding, is it not?—The plant breeding work has been very largely outside my hands from the beginning. The two pieces of plant breeding work which were in my hands as Economic Botanist were the breeding of a drought resisting variety of *bajri*, and the breeding of a better race of castor.

3892. You are particularly interested in grasses, are you not?—That is one of the things I have been interested in.

3893. Have you undertaken an ecological survey of grasses of the Presidency?—Yes, of the Presidency itself.

3894. Confined to the Presidency?—Yes. We have not attempted breeding any grasses, though we have studied variations within species.

3895. Do you think that is a line of work which may profitably be followed up?—I do not see much possibility because of the difficulty of getting a large supply of seed at a cheap rate.

3896. Have you paid any attention to horticulture?—Before a Horticulturist was appointed, it was also one of my duties to look after that branch.

3897. You realise that the supply of seed is an important consideration from the cultivator's point of view?—Yes.

3898. Have you any seed testing laboratory?—Yes.

3899. Do you test all the seeds that are supplied to the cultivators?—No, we test such samples as are sent to us, and, on the whole, a good many samples, are sent, both from the Government and the public.

3900. There is no organisation for the maintenance of purity of seed?—Yes, there are the plant breeding stations; there is a section which is devoted entirely to that.

3901. And you have that section here?—In each plant breeding station.

3902. You test your seed before distribution to the cultivators?—Are we not confusing two things, one being purity and the other germination percentage?

3903. In seed testing we take into consideration both its germination and purity, and so on?—That is all actually done at the station where the breeding is done.

3904. A good deal of attention is devoted to this seed testing in England?—Yes, I have seen the Scottish laboratory: I have not seen any of the others.

3905. Do you suggest that the administration work is rather heavy?—I do.

3906. You think that is a handicap to research work?—Distinctly.

3907. Have you any suggestions as to how this handicap may be removed?—Only the suggestion I have already made; the centralisation wherever possible of that type of work in a special office.

3908. On page 101 you speak of "each scheme being a self-contained unit". It is not clear in my mind what you mean?—What I mean is this: assuming you have a staff which has its normal budget, but you desire to tackle a problem for which this particular staff and this particular budget is not big enough, then it seems to me one ought to put up to the Local Government a scheme in which more money and more men are asked for. It may not be for one year; probably it would be for five. Then one would have it specially sanctioned as a special grant for a special purpose; after the end was attained, then the additional workers would be disbanded and the additional land would be given back.

3909. You say, "It is the function of the research worker not to destroy but to fulfil". Will you amplify that?—The Questionnaire definitely asks about the scientific value of the indigenous theory and scientific methods of agriculture. I presume what is intended is to ask whether one is going to say, "This is all wrong and you must do something else", or whether we are going to find out what the value of this may be and why it should be so. I take the latter point of view. Since this practice has been evolved and since it has actually been in use, there must be something in it; it is our business to find out why it is in use, and, if possible, to improve upon it. The case I have in mind especially is the local practice here of opening up and exposing the roots of fruit trees, particularly oranges, in order to force flowering at a particular time. That works, but it is very often exceedingly bad for the tree; it may be that science can come in and get the same result by using that method, but improving the way in which it is done.

3910. With regard to education, you said the main incentive which induces students to come to the College of Agriculture is the hope of Government service?—Yes.

3911. But I understand that about 20 per cent. of your boys have taken to farming themselves?—Yes.

3912. Is there still that tendency?—Yes, there is still the same tendency.

3913. With regard to demonstration and propaganda, you cite the instance of one prominent landowner who initiated some method of demonstration. Now supposing this local man were not in existence at Nasik, how would you introduce this particular demonstration?—I think we should have to find another person, that is all. It would be surprising if there were not one man in the village whom we could persuade.

3914. But, assuming that the landowners would not take any interest in your research?—I can hardly envisage such a state of things.

3915. You say there should be closer co-operation between the Meteorological Department and the Agricultural Department. Do you undertake the work of collecting meteorological data?—We merely record the ordinary things for our own use at a small station on the farm.

3916. Do you record rainfall?—We take rainfall and humidity.

3917. Do you record the radiation of the sun's rays?—No, we have not the instrument.

3918. Do you take soil temperature?—Yes.

3919. Do you attempt to correlate these factors to plant growth?—We have not got either the knowledge or the staff yet; that is where we want the meteorological people to help.

3920. Independently of a meteorological department on your own farm, perhaps you could have meteorological arrangements for your work?—We have only attempted it in one small way and that is in connection with the growth of *bajri*.

3921. *Mr. Calvert*: You answered some questions put by the Chairman as to the facilities for research work, and so on; in your written note you say; "It is desirable that these workers should be encouraged". Would you kindly make that more concrete: what kind of encouragement would you give?—I mean if a man shows no tendency to go, he ought to be asked to go.

3922. Would you give him more for expenses?—No, the study leave rules as a matter of fact are very liberal.

3923. They are not very fully taken advantage of, are they?—I think one reason is that it is very difficult to spare men; that is where the trouble with regard to an under-study comes in where you do not always have an equally good man ready to step into his place when he goes on study leave.

3924. You do not think the study leave rules should be made more liberal?—I have not taken study leave myself, but my Indian staff who have taken study leave have found it sufficient; at least, so they tell me.

3925. We were told the other day of a member of the Imperial Agricultural Service who had never visited Rothamsted?—I am one of them.

3926. That cannot be due to lack of enthusiasm?—I think it is largely due to the fact that when one goes home one wants to do other things.

3927. Would it not be a good thing to encourage officers when they go home on ordinary leave to visit these institutions?—Most certainly.

3928. It might be suggested to them; it should be made easy for them to go there, and possibly the leave might be extended for that purpose?—There is no initiative from the India Office to encourage officers to visit these institutions. I have never had a note from the India Office saying, "Will you kindly go round these places and look at them?"

3929. As Economic Botanist you are or have been concerned with plants of indirect economic importance in agriculture?—Yes.

3930. That is to say, plants which have no direct agricultural use but which might be used to bind the soil and prevent erosion. I suppose that would be rather outside your sphere of activity?—No, very much inside it. That question has arisen both in connection with erosion and in connection with sand binding.

3931. Have you advised on this question of sand binding?—Yes, I have once or twice.

3932. Have you been successful?—We have the plants, but I have never seen the things I have recommended applied on a big scale.

3933. We can find the land all right if you can find the plant?—We have two plants that will do it.

3934. Do you think a further Botanist should be appointed to take up side lines like sand binding?—That again is a special problem which I would sooner see tackled in the way I have already mentioned, as a special problem, with a special budget and a special personnel.

3935. In this particular sphere of yours is there any measure of help or co-operation between you and the Professors of Botany in the various colleges?—Yes, there is.

3936. You do work together?—Yes.

3937. And is their post-graduate work linked up with yours?—Until quite recently some of their post-graduate students were coming to me.

3938. *Mr. Kamat*: You said about 25 per cent. of your agricultural graduates go back to farming?—Yes.

3939. Out of that 25 per cent. who take to farming, how many, to your knowledge, make farming a distinct success from a business point of view?—For that again we have no figures: it is extraordinarily difficult to obtain statistics as to the men who have passed out as to what they do or whether they are successful or not.

3940. Do you not think it is rather important as a matter of prestige for the college students, that such examples of distinct success in farming should be brought to the notice of cultivators?—I do think so.

3941. Would it not be advisable to keep a record of those people who take to farming and ask them to give an account of their careers?—Certainly.

3942. Do you know a single instance of one of your college students who has made college farming a great success?—Yes, I do.

3943. I mean made a fortune?—I will not say made a fortune, but made enough to enable him to come to Bombay, buy tractors and take them back with him. That was a man from the United Provinces who took our course and degree. He had his land and capital, of course, before he came to us.

3944. Where your students have not been successful to what do you attribute that failure?—Is it due to want of capital or want of land?—I have not gone into any single case in detail. I think the difficulties are largely land and capital.

3945. If Government were to give land on certain concession terms, do you think the students would take to farming as a business in greater numbers and find their own capital?—That is an exceedingly difficult question to answer. We have amongst our students some men whom nothing will stop from farming; that is the class we want; that class would take up the offers you suggest. Whether it would be wise to induce any other class to take it up I am very doubtful.

3946. In your system of agricultural education you have now at the top the Agricultural College and you have also the Loni type of special schools?—Yes.

3947. In between those two, have you any institutions in which boys could be trained in agriculture with a knowledge of English of a secondary character?—The short course of one year given at the College of Agriculture to some extent does fill that gap. Men come with a knowledge of English sufficient to follow the teaching, who do not wish to take a degree, whose work is more largely practical and has less of the underlying sciences in it than the college course itself. That is a course which has distinct possibilities in it.

3948. Is the short course a popular feature of your system of education?—It is popular in this sense that we can always get the small number that we can actually accommodate: 10 to 20.

3949. On page 104 with reference to fruit growing and fruit preserving you say, invested capital has to wait a long time before it gets any return from the fruit growing. It means a wait of 3 or 4 or 5 years in the case of most fruits?—That is so.

3950. But if at the end of 5 years the return is good, are not people attracted to fruit growing on the scale we hear of in foreign countries?—On the whole they are not, because so far the class that has graduated from our college has not got the necessary capital.

3951. But if at the end of 5 years, it gives a good return, can they not find capitalists who will go in for it on a large scale as a business, as they do in other countries?—That brings in the element of risk, and the majority of our students cannot afford to run any risks.

3952. In other words, they do not inspire very great confidence in investors; is that the position?—I am thinking now of the individual man who is not prepared to start on a line of work in which he does not see the prospect of an immediate livelihood.

3953. To take a concrete case, if you can prove that orange growing or citrus growing is a paying proposition which pays 8 to 9 per cent. on the capital invested, why cannot your graduates inspire sufficient confidence in investors to get enough capital?—I presume the reason is that we have not got a striking example on a big scale yet to show them.

3954. Will you describe in detail what difficulties the fruit growers have to meet in the marketing of oranges and mangoes, for instance?—I am afraid my knowledge is insufficient to answer that question. Horticulturists can deal with that very much better. I understand the difficulty is mainly due to the fact that the fruit is handled by more than one person between the actual grower and consumer; there is a great deal of loss in transport and there is no grading.

3955. Take, for instance, the Poona market for the sale of oranges. Fruit comes into Poona market from a long distance, about 15 miles. Generally, is there more than one middleman to handle the fruit between the grower and the consumer?—I am afraid I cannot give you a definite answer on that point; my knowledge is not sufficient.

3956. So far as I know, there is only one middleman, and he handles the whole thing between the grower and the consumer. Fruit preserving has been tried on a large scale?—I would not call it a large scale.

3957. I suppose a beginning was recently made in one or two places?—Yes.

3958. Do you think there are possibilities in canning and fruit preserving?—I think there are definite possibilities.

3959. I believe the difficulty with regard to imported tins has recently been solved; tins are now manufactured in Bombay?—Yes.

3960. The difficulty is with regard to capital, I think?—Very largely.

3961. Chiefly an economic difficulty?—I think so.

3962. Do you think in certain areas people have not appreciated the value of fruit preserving, and therefore Government should help to start factories?—No, I would rather the industry worked its own way unhelped, because, if it did so, it would be on a sounder basis.

3963. Would you be in favour of the Government subsidising those who undertake to establish the industry?—Not a direct subsidy.

3964. How are people likely to gain confidence in fruit preserving as an industry unless they see some demonstration?—By the ordinary way that any business firm manages to get its products sold, I presume: by the cheapening of the process and the advertising of the product.

3965. But if it is left to private enterprise and the man who undertakes the production makes a mistake, that would have a very bad effect on the possibility of other undertakings being subsequently commenced?—Yes.

3966. The danger of the ill effects consequent upon a mistake made by a private producer might be obviated by a little pioneer work; would you not support that?—No; my experience is that once that help is given it is exceedingly difficult to withdraw it.

3967. *Dewan Bahadur Malji*: At page 104 you say: "Fruit-growing offers itself as a suitable subject for the development of co-operative sale societies associated with standardisation of the varieties planted and grading of the fruits when harvested". Have you tried this experiment in connection with any co-operative fruit sale society?—No, I have not.

3968. Have you anything in view in the immediate future?—No, I put that down purely as a theoretical statement because it is so obviously the line which should be followed.

3969. Is not this idea very possible in this part of the country?—It is.

3970. Would you mind trying it?—I can make no promises at this stage.

3971. Are you in favour of a system of granting licenses for the sale of seed to guarantee its purity and germinal capacity so that purchasers would not have to buy in the market without any guarantee?—I do not think the abuse is sufficiently great to demand such a remedy, and I also think it is impossible to enforce that type of legislation unless the population is determined to enforce it.

3972. Do you not think it might be applied to cereals?—I have not yet had brought to my notice any serious case of abuse in which such legislation would be necessary.

3973. Are you in favour of the publication of meteorological news in the vernaculars?—I had not considered that. The news itself is not of so much importance to us. It is the correlation of the actual meteorological phenomena with the growth of the plant that I am interested in. We want particularly to know when plant damage is likely to occur; we can avoid that damage if we know in time.

3974. So that the notification of the meteorological state of affairs to the public would be a matter of some importance?—Yes, but not at this stage; it requires a good deal of work yet by the Meteorological and Agricultural Departments.

3975. *Sir Ganga Ram*: On page 102, you say: The majority of students who have studied agriculture in the College of Agriculture, Poona, have entered into Government service in one department or another"?—Yes, in the Provincial Departments as Deputy Collectors and in the Educational Department as teachers.

3976. In the Education Department do they receive sufficient pay?—I have not heard complaints.

3977. Have you tried to secure all the appointments in the Irrigation Department for your students?—No, but one or two have secured appointments in the Special Irrigation Division where they have been studying the problems of salt land.

3978. In the Punjab they have guaranteed that all the appointments as *Zilladars* in the Irrigation Branch shall go to agricultural graduates?—I am afraid our organisation does not allow that.

3979. When you spoke of fruit preservation, to what fruits were you referring?—Preserves have been made of mangoes, bananas and figs.

3980. Is there a fruit preserving factory?—Yes, there are three to my knowledge.

3981. Do you include horticulture in your teaching syllabus?—Yes, we do.

3982. And sericulture?—No, that is only included as part of their entomological studies; it is not taken up as a technical branch.

3983. Is there any part of this Presidency where the population take sericulture seriously?—I cannot remember at this moment; I think the Salvation Army have one place, but it is not taken up as an industry of the population.

3984. You say you want to increase the amenities of life in agricultural areas. How are you going to do that?—I have already said in answer to

a similar question that I can only give a few cases that I have known where it has been done in a small way; I have no general recommendations to make.

The Chairman: I think the point has already been very fully covered.

3985. *Sir Chunilal Mehta:* Agricultural officers on leave, when they can afford the time, try to visit institutions and to attend congresses?—That is so.

3986. I think you attended the Potato Conference when you were on leave?—I did.

3987. So that, whenever they can, officers on leave do try to enlarge their knowledge?—That is so.

3988. *Mr. Calvert:* When you attended that Conference were your expenses paid?—They were, but I was sent definitely in that case as a delegate of the Government of India.

3989. *Sir Chunilal Mehta:* To your knowledge there has been no demand for improvement in the amount of financial assistance that is given for study leave?—No, there has been no demand.

3990. *Sir Thomas Middleton:* In connection with your grass experiments, is there any area or district in which the formation of enclosures has been taken up by the villagers?—There is this one place.

3991. Is there any apart from Nasik?—No, I cannot call to mind a place where it has been taken up.

3992. Do you attribute that mainly to the cost of fencing?—Partly to the cost of fencing and partly because the ordinary villager does not understand that the grass will of itself improve if it is properly treated.

3993. I should have thought he could be brought to comprehend that. The two difficulties I see are fencing and rights of common pastures?—In some cases that is so, and there, of course, the difficulty of dealing with the whole village comes in, especially where you have factions.

3994. *The Chairman:* Do you find that the rural population has an accurate knowledge of the food value of grasses?—In places where cattle are important you find that the people understand the relative values of the species very clearly.

3995. Are you yourself doing any work in connection with fodder preservation?—Personally, no.

3996. Who is doing that work in this Presidency?—The Livestock Expert and the Deputy Directors.

3997. In doing your selection work on grasses, do you have regard to the preservative qualities of the grass?—Yes, I ought to correct that statement; we have been experimenting, particularly with pit silos, on the behaviour of these grasses and weeds in pit silos.

3998. So that to that extent you have been carrying out experiments in the preservation of fodder?—That is so.

3999. On page 103 you say, "One is almost inclined to believe that we have got in India all the pests that we are likely to get." Are you sure you want those words to stand as they are typed? I do not know whether you would care to modify them at all?—I will modify them in this way: "Up to date there has been little attempt until recently to restrict pests from outside entering India."

4000. You desire to leave it at that?—Yes.

4001. What do you regard as the most important line of research that you are engaged on at the moment?—From the general point of view I should say research on means for producing drought-resisting varieties of crops.

4002. Any particular crops?—The one that I am working on is *bajri*, one of the inferior millets, but it applies to all crops.

4003. In what neighbouring Province is that particular crop grown?—You get it very largely in Madras; you also get it in the Central Provinces and in the United Provinces.

4004. Take Madras for the moment; is any work being done in that direction on that particular crop in Madras?—I am not acquainted with any work being done there; it may be but I am not acquainted with it.

4005. In the Central Provinces?—I have not seen it mentioned.

4006. In the United Provinces?—There again my ignorance is complete.

4007. Are you satisfied that if work of that sort were being done in those three Provinces you would know about it?—No, I am not satisfied.

4008. So that on that single concrete example it emerges beyond dispute that correlation of research work is lacking?—That is so.

(The witness withdrew.)

**Mr. E. S. FARBROTHER, Superintendent, Civil Veterinary
Department, Bombay Presidency, Poona.**

Replies to the Questionnaire.

QUESTION 1.—(a) (ii) VETERINARY RESEARCH.—Practically the whole of the Veterinary Research work carried out in India is performed at Muktesar where the Imperial Institute of Veterinary Research is situated. In addition to the research which is done there, the Institute—with its branch at Izatnagar—also manufactures all the sera and vaccines required in the Provinces and Indian States; in fact, I gather that the manufacture of these products is now the chief function of the Institute.

The Institute has attached to it a very large estate, the administration of which, together with that of the Institute, takes up practically the whole of the Director's day. As he is also the senior research officer, he cannot have very much time to devote to this branch of his work and since he is usually an officer selected specially for his research abilities, it appears to be a pity that he cannot devote more of his time to the work for which he is especially fitted. I think it is necessary therefore, if Muktesar is to take its proper place in connection with veterinary research that there should be appointed a whole-time Director, and for reasons which I will attempt to show later, he should be an officer with a wide experience of Indian conditions and with administrative ability. Such an officer could easily be found among the senior officers of the Indian Veterinary Service. The whole of the research staff would then be able to give its undivided attention to its legitimate work.

The full staff should be recruited as soon as possible and I understand that this is to be done.

Muktesar, situated as it is up in the hills of the United Provinces, though in an ideal situation for the work which it has to undertake is too isolated to be able to deal with local problems, and must remain a central research institute, dealing with the wider problems in connection with animal disease only. For this reason it is necessary to have in addition local research laboratories for dealing with the more local problems which are met with from time to time. In this Presidency, I understand that administrative approval has been given for the erection of an up-to-date bacteriological laboratory in connection with the Bombay Veterinary College, and if an efficient and experienced research staff is recruited the work which I have in mind could easily, I think, be undertaken there. Up to the present time no serious research work has been carried out in the Presidency for the want of properly equipped laboratory and a trained staff. Our present method is to send material to Muktesar and the Director there is always very willing to give any assistance he can. But it is impossible for him to send his officers all over India to investigate these conditions in the field. There is also plenty of room for research into the treatment of disease in which both the central and local research institutions could be of immense value to the Provincial Services. It would be necessary that the officers of both the central and local institutions be able to tour and in Presidencies where local laboratories are opened in connection with colleges, it must be understood that they are not only there for teaching purposes, but are an essential part of the Provincial Service and that the officer controlling the District work has as great a claim on the services of the laboratory staff as the college has. If this is not possible then it would be best to have an independent laboratory to assist the district workers.

In all research work it is essential that the programme, if it is to be taken to a successful conclusion, must be continued without interruption such as might result from the want of funds. To insure a continuous supply of money, the possibility of forming a veterinary research fund might be taken into consideration. The fund could be administered by a committee appointed by the Government of India and the money allotted where

it is required. It is conceivable that most of it would go to Muktesar, but some could also be spared for the local institutions when it was urgently required for special purposes.

Research into animal diseases is of the greatest economic importance in India and it is necessary that it be put on a sound footing. I suppose that in no other country in the world is less interest taken in this subject, although the bullock is essential to the livelihood of the vast majority of the population.

QUESTION 4.—ADMINISTRATION.—(a) and (c) (i) It is my opinion that a Government Veterinary Service can be best utilised in the detection, investigation, and control of epidemic and other diseases which are of economic importance. In India, however, the various provincial Veterinary Services have been given other work to do in addition to this, viz., the management of veterinary hospitals and dispensaries. In the Bombay Presidency and Sind the hospitals and dispensaries are maintained by the District Local Boards and the services of the subordinate veterinary staff are lent to the Boards for running these institutions; but as the men are also to carry out the work in connection with epidemics they remain under the control of the Superintendent. The position is peculiar from the point of view of the staff as they have two masters to serve, it cannot be satisfactory to the Boards for they have no control over the men in charge of their veterinary institutions and it is not satisfactory from the point of view of the Superintendent for since all, or practically all, of his staff is in charge of stationary institutions, he finds it difficult to concentrate his men where they are most required when extensive epidemics occur. If the Veterinary Assistant Surgeons are to run their dispensaries properly and the livestock owners are to get the full benefit from these institutions, the former must be always present. Such is not the case, for the owner never knows whether the "doctor" will be present. On the other hand, if disease is to be properly dealt with hospital work must suffer. Under present conditions both branches of the work suffer.

From an economic point of view, the control of contagious disease and the investigation of unusual mortality among livestock are of the utmost importance, and it is in this work that Government Veterinary Services should be employed. There is plenty to be done in the whole of India for a whole-time diseases of animals department to be formed in each Province and an essential part of their organisation would be the local research laboratories already referred to. The activities of these departments should be confined to the detection of disease (a most important item), investigating their causes, and undertaking measures to combat them. In their efforts in this direction, they must be supported by legislation. The staff must be freed from all work in connection with hospitals and dispensaries, the entire control of which should be left to the Local Boards, Government officers acting only in an advisory capacity to the Boards. It is only in this way that India can get the best value from its Veterinary Services.

The Government of India could and should assist in the work by having a Veterinary Department of its own, similar to the Bureau of Animal Industry in the United States of America. With such a department with the Central Government, it should be possible to co-ordinate the efforts of the local departments in their efforts to combat epidemic diseases. The head of the department would be the Director of the Muktesar Institute of Veterinary Research and it is for this reason that I have stated (under Veterinary Research) that the Director should be an officer with an extensive knowledge of Indian conditions and with administrative experience. The duties of the Government of India department would be (1) the co-ordination of work in the Provinces and Indian States, (2) the prevention of spread of disease from a Province or State to adjoining territory and (3) the investigation of the wider problems of animal disease met with in India, for which purpose it has already got an excellent research station at Muktesar.

It appears to me to be very doubtful if the full value of Veterinary Services to agriculture has yet been realised in India, or at any rate, in the Bombay Presidency. Very little money is spent on it in comparison with other departments, and its progress has been hampered by the absence of higher officers. The Superintendent has to do all the administrative and executive work with the help of one Personal Assistant and five Veterinary Inspectors—officers of ungazetted rank. In this respect, it compares very unfavourably with the Civil Veterinary Departments of other Provinces, most of which have two or more I. V. S. officers and a full complement of Deputy Superintendents. The work in all branches has considerably expanded in the past few years and if progress is to be continued, it is essential that decentralisation must take place. Recently proposals were submitted to Government for this purpose and administrative sanction was accorded to a partial decentralisation by the creation of a separate office for the Deputy Superintendent. It is important, however, that at least one, and preferably two more Deputy Superintendents be appointed in addition to the one already appointed, and for whom the creation of a separate office has been approved. This would relieve the Superintendent of all routine duties and leave him more time for his administrative work and for general supervision.

In the Bombay Presidency there are three separate veterinary establishments, each of which has a separate Head, who is directly under the control of the Minister of Local Self-Government. It appears to be desirable for the better co-ordination of the work within the Presidency that these different establishments should be brought under one Head, who should be designated the Director, Civil Veterinary Department. This officer should be responsible to Government for the proper administration and control of all veterinary work, including veterinary education, in the Presidency and Sind. His assistants should be designated Assistant or Deputy Directors as the case may be. The present system is unwieldy and has so far as I am aware, no counterpart in any other Government department. Apart from the better administration and co-ordination resulting from the amalgamation of the three departments, it would probably result in a certain amount of economy in administration.

For any movement towards the better co-ordination of veterinary work in India, it is necessary that the Indian States be brought within the scope of the movement; to this end the Senior Veterinary Officers of the States should be invited to attend the meetings of Veterinary Officers, which are supposed to be held every three years. These meetings should be held regularly and more frequently. I would suggest that instead of Veterinary Officers attending the meetings of the Board of Agriculture in India as members of the Board, the Veterinary Officers' Conferences should be held biennially and scope for discussion extended. At present, the discussion of administrative subjects is excluded from the programme of these conferences, but I see no reason why Veterinary Officers should not be permitted to discuss such questions among themselves, instead of having to discuss them in the full meeting of the Board of Agriculture.

An essential to the better co-ordination of veterinary effort is the existence of some central authority to head the movement. There is no representative of the Veterinary Services with the Government of India who could organise it. Had that Government appointed its own Veterinary Adviser, he could do all that is necessary so far as local financial conditions permit, and I would strongly advocate the appointment of such an adviser. He could combine with his advisory duties that of Director of the Imperial Institute of Veterinary Research at Muktesar, in the same way as the Agricultural Adviser is also the Director of the Agricultural Research Institute at Pusa. His office should be under the direct control of the Government of India and he should be responsible to that Government for all veterinary work which it may decide to undertake. At present, the Government of India appears to have delegated all veterinary work to the Local Governments, but if a really serious effort is to be made to control disease, then

the Government of India will have to take part and a Veterinary Adviser will be essential.

QUESTION 15.—VETERINARY.—(a) I do not quite understand how the system of placing Civil Veterinary Departments under Directors of Agriculture was ever introduced into India. No one would, I imagine, suggest that the Medical Department should be placed under any but a professional officer and I do not see why the Civil Veterinary Department should be treated differently to its sister department. I am emphatically of opinion that the department should not be under the control of the Director of Agriculture, but that it should have a Director of its own. In this Presidency, the two departments were separated in 1919 and since then the Superintendent has been directly responsible to the Minister and I consider that this system should continue.

In my opinion it is wrong that a professional department should be placed subordinate to any but a professional officer. The Minister in charge also should receive his advice on professional matters and the requirements of the department direct from the department concerned and not through the medium of a lay officer. So far as I am aware this is the only department which it has been suggested should be treated otherwise than in this manner.

The principle of separating the two departments has been accepted by all Local Governments in India with the exception of the Punjab. It has worked well and there is no necessity to retrogress by placing the Civil Veterinary Department under the Director of Agriculture again.

(b) (iii). I am not entirely in favour of the transfer of control of veterinary dispensaries to provincial authority but would advocate it under certain conditions. I have already stated that I consider it essential that separate departments should be formed for the detection and control of contagious diseases of livestock. If such departments were formed I would leave the entire control and management of veterinary hospitals and dispensaries to Local Bodies, Government Veterinary Officers only acting in an advisory capacity to them. If, on account of financial reasons Local Bodies are unable to support these institutions without the whole of the assistance that Government is now giving them, and if Government are unwilling to maintain a sufficiently large staff to meet both requirements, then I would advocate that Government should take over entire control of all dispensaries. This proposal has already been submitted to Government as an alternative to the creation of a separate department for animal disease.

(c) (i) and (ii). Speaking generally, agriculturists make good use of our veterinary dispensaries so far as they can and I think I am correct in saying that over 50 per cent. of the cases treated belong to that class. Stationary hospitals and dispensaries can only properly serve a limited area though many people come from outside that area and ask for medicines for the treatment of their stock. The majority of the patients treated, however, come from the town or village, or its immediate vicinity, in which the dispensary is located. One dispensary cannot serve the whole of a taluka or two or three talukas as the case may be and to remedy this I have considered the introduction of itinerating dispensaries having a jurisdiction of not more than one taluka. Two such dispensaries have already been started and a few more will be opened shortly, but it is too early yet to state whether this system will be more successful than the stationary institutions. In the past itinerating dispensaries have not proved a success in this Presidency, the probable reason being that they were expected to serve too large an area.

(e). Usually there is very little difficulty in securing sufficient serum to meet the demand. Owing to the distance of Muktesar from Poona, it takes about a fortnight for a consignment to reach us after indenting by wire, and we are occasionally without for a few days. A very heavy demand on Muktesar may also result in a little delay and I would like to see the possibility of opening a more central serum depôt investigated.

(f). The main objection I have met with from villagers to submitting their stock to preventive inoculation is of a superstitious nature. With the spread of knowledge of the advantages of preventive inoculation however, this objection is being gradually broken down. Another objection to the use of preventive inoculation against rinderpest has recently arisen and that is the short period of immunity conferred. Formerly we were able to state that immunity against this disease would last about three weeks, but recent research has proved it to be of shorter duration. This necessitates re-inoculation of protected stock during an outbreak and the people have not yet become used to this. Many instances have occurred however where re-inoculation has been undertaken with complete success, the animals so protected having remained healthy throughout a long outbreak.

Fees, at the rate of two annas per head are charged for all inoculations and vaccinations other than rinderpest in this Presidency and this does undoubtedly act as a deterrent in many cases. Frequent reports are received that the people would be willing to have their stock protected if it can be done free and in certain cases this is done as an object lesson on the value of this treatment. I have suggested that these fees should be abolished altogether as the income derived is very small in proportion to the expenditure and because they do act as a deterrent to the more widespread use of preventive inoculation.

QUESTION 16.—ANIMAL HUSBANDRY: IMPROVEMENT OF LIVESTOCK.—(a) (i) In all efforts to improve the breeds of livestock in India no serious attention appears to have been given to the effects which epidemics have on all such operations. Rinderpest is practically always causing losses and periodically a great wave of this disease passes over the country and takes enormous toll. Hæmorrhagic septicæmia and blackquarter occur every year and carry off many victims. Foot and mouth disease is not so important so far as mortality is concerned, but is of great economic importance; anthrax is of very great international importance owing to the export trade in hair, hides and wool. In addition to these epidemic diseases there is certainly a heavy annual loss from parasitic diseases, the true extent of which we do not yet know, as mortality from this cause is not often reported. We do, however, know that a large number of parasitic diseases exist. The effect of all this loss on breeding operations is obvious and there can be no doubt that disease, combined with famine is largely responsible for the present deteriorated condition of Indian cattle. If improvement in the livestock is to be effected we must first deal with the cause of deterioration, and one of the first essentials is undoubtedly the systematic suppression of epidemic diseases.

One of the great weaknesses of the present system of dealing with contagious disease is that there is no obligation on the part of the owner to undertake measures to prevent disease spreading, nor is the Civil Veterinary Department given any authority to insist on necessary measures being undertaken. Secondly our reporting agency is very weak. Many epidemics are not reported until they have gained a good hold, thus making their suppression more difficult. Thirdly, the Civil Veterinary Departments have not been organised to deal with the situation properly. With this I have dealt previously and will not enlarge on it any further.

So far as the carrying out of measures of control is concerned, the only way to obtain the desired results is to compel livestock owners to take such measures as are considered desirable to prevent disease from spreading. By this I mean that efficient control can only be effected by means of legislation. As to whether this legislation should be undertaken by the Central or Local Governments is a question which must be considered. In the United States of America, where a similar system of Government obtains, Local or State legislation for the control of disease within their own limits, is undertaken by the State Governments, and the Central or Federal Government deals with interstate control. The weakness of this system apparently lies in the fact that there is no uniformity among the various States, and I am of opinion that this can only be remedied by the Central Government passing a Diseases of Animals Act for the whole of India. The Government of India

would probably have to take an active share in the work, in the same way as the Federal Government of the United States does. So far as anthrax is concerned, in view of its international importance it is incumbent on the Government of India to take steps to prevent the dissemination of the disease in India and to and from India and other countries.

The improvement of the reporting agency is a great difficulty. In the Presidency proper it is one of the duties of the village police officer to report the existence of disease in the village. In some cases, however, the police *patel* is in charge of a group of villages and the fact that an epidemic is causing losses among the stock of one of them is frequently not brought to his notice—at least, that is the excuse he offers for not reporting it. In other cases the *patel* does not realise the importance of this duty, and many cases have come to notice where an epidemic has been creating havoc among the livestock of a village without the fact being reported at all. The only way I can see of improving on this is for the veterinary staff to go round the villages, fairs and markets, examining the cattle and immediately reporting and taking action to prevent its spread when discovered, and for this it is of course essential that a department for control only should be organised.

The measures which should be insisted upon are as follow :—

- (1) It is essential in the first place to have prompt reporting, and whatever agency is used for this purpose, the responsibility of this must be impressed upon it, and failure to report should be punishable.
- (2) Isolation and segregation of affected and incontact animals, without this all other measures would be of little avail. It is essential that incontacts be segregated as well as the affected isolated, as the former are capable of carrying infection, although they may not be showing active symptoms.
- (3) Disposal of carcasses. The present custom, and it is difficult to stop, is for the Chamars to remove the carcasses, skin them and throw the remains away. This should be prevented and all intact carcasses disposed of by burning or burial.
- (4) Disposal of excreta, etc. This is as essential as the disposal of carcasses.
- (5) Closure of all fairs and markets in areas where disease is existing. These fairs and markets are frequently the cause of disease spreading over wide areas.
- (6) Control over the movement of herds owned by dealers, butchers and graziers. These herds are a frequent source of contagion and we have at present no means of stopping the movement of these herds, whether they are a source of danger or not.
- (7) Thorough disinfection of all stables and standings, etc., where diseased animals have been.
- (8) Thorough disinfection of all transport used for the conveyance of animals.
- (9) The compulsory inoculation of incontact animals with antisera in the case of those diseases for which it is available. In Madras I understand that this is now being attempted.

One feels that we can do nothing under existing conditions to prevent disease from spreading and causing infinite harm to the livestock industry. This has been particularly impressed upon me in connection with two extensive epidemics with which I have had to deal in the past six or seven years. The first was in Baluchistan where the disease was introduced by hired transport animals imported from the Punjab for military purposes. It spread rapidly over the lower part of Baluchistan and into the upper part of Sind. In the case of the hired transport animals, the Officers of the R. A. V. C. were able to suppress the disease once they decided to undertake compulsory periodical inoculation. In the villages, however, it was a

different matter. A certain number would agree to have their cattle protected and probably carried out the measures recommended to them. Some would not, and it is these irresponsible people who are responsible for the disease spreading in all directions. The same experience was met with in this Presidency in 1924-25-26. In spite of the inoculation of large numbers of animals with antirinderpest serum, the disease continued to spread and all one could hope to do was to reduce the mortality. In this I consider we were very successful, but it was obvious that if disease was to be confined within narrow limits, the optional method of control would have to be abolished and compulsion introduced.

Oral Evidence.

4009. *The Chairman:* Mr. Farbrother, you have put in a note of your evidence in two instalments. I deal first with the one which begins with *Veterinary Research*. I would ask you first whether you wish to make any statement of a general character or whether you are prepared to proceed at once to questions?—I have no particular statement to make.

4010. I observe from what you have put before the Commission that you are fully alive to the importance of the bullock and of cattle generally in assisting agriculture in this country. Your note begins with a statement of the position of the Institute at Muktesar?—May I be permitted to say I have never visited Muktesar personally. This is purely from knowledge I have picked up.

4011. We will bear that in mind. Do you think the Muktesar Institute is fulfilling its purpose as a central research station?—So far as I can gather, I think it is.

4012. In your experience in this Presidency, have you known it to fail in any specific directions?—No.

4013. You set out in your memorandum suggestions for the reform of the organisation at Muktesar; you say you think that if Muktesar is to take its proper place in connection with veterinary research there should be appointed a whole-time Director. What relation do you think that Director should have to the Government of India?—I think he should be Veterinary Adviser to the Government of India.

4014. Have you anything to tell the Commission about veterinary education in India?—I have never been intimately connected with the question of education except so far as my men are concerned. I think, for instance, the course of instruction might be extended and made more advanced than it is at present.

4015. How many posts fall vacant every year?—We are at present recruiting about 10 men a year ourselves. Next year I have got administrative approval for the appointment of 15. That is roughly what we are absorbing. There is very little else for veterinary surgeons to do in this country except Government service at present.

4016. What would be the qualifications for these appointments?—They are graduates of Bombay Veterinary College.

4017. On page 118 you speak of the advisability of forming a veterinary research fund. How do you propose to get the money?—I do not know quite, unless it is obtained by public subscription and assisted by Government in some way.

4018. But you have no definite scheme in mind?—No, I have not a definite scheme in mind.

4019. On page 119 you say: "It is my opinion that a Government Veterinary Service can be best utilised in the detection, investigation, and control of epidemic and other diseases which are of economic importance. In India, however, the various provincial Veterinary Services have been given other work to do in addition to this, viz., the management of veterinary hospitals and dispensaries." Surely for carrying out what you regard as the essential duty of the service it is necessary to have some clinical material, is it not?—There is plenty of clinical material.

4020. So that you do contemplate the service having charge of certain hospitals?—What I contemplate is a service similar to that which we have in England: a contagious diseases branch of the Ministry of Agriculture.

4021. On quite a different point: on page 120, you are speaking of the Board of Agriculture meetings; your suggestion there for reform is that veterinary officers might confer amongst themselves. Would it not be possible to combine both plans?—Yes, I think it would, if we could meet at the same time at the Board of Agriculture, as a meeting of veterinary officers alone I mean.

4022. Because it is important that veterinary opinion in this country should be kept in close touch with purely agricultural problems, is it not, where those problems touch matters of cattle improvement and so on?—We are really not actively engaged in cattle improvement ourselves in this Presidency; the Agricultural Department have taken it over.

4023. I am aware of that; but take the question, for instance, of immunity from disease; that is partly a question of heredity, is it not?—I do not think it is as regards the diseases with which we have to contend.

4024. You do not think the fact of the susceptibility of imported stock as compared with indigenous stock to certain diseases prevalent in India, particularly in relation to the schemes for the improvement of breeds by crossing with imported stock, is important?—The reduced immunity of imported stock is chiefly due to the fact that they have not been subjected to infection. I mean the English animal is much more susceptible to rinderpest than Indian cattle are.

4025. So that you do not think it is a case of heredity but of acquired immunity, the result of infection?—Yes.

4026. It really is your view that no good purpose is served by bringing the Veterinary and Agricultural Services together in reference to the breeds of cattle?—No, I would not say that; I think there are questions on which veterinary advice may be necessary; probably veterinary representation would always be necessary on the Board of Agriculture.

4027. On what tangible points do you think advantage accrues from that meeting between the Veterinary and Agricultural Services?—What I had in mind was that they may require some advice on veterinary affairs in relation to their cattle-breeding.

4028. Our ideas have again come to agreement?—I do not think so quite; I may not be able to make myself clear.

4029. On page 122 you lay stress on the relation between epidemic diseases and the improvement of cattle?—Yes.

4030. Your view being, I take it, that the high mortality amongst cattle deters those who might otherwise spend time and money on improving the breeds, from doing so?—Yes, I think probably it does.

4031. What point had you in mind when you set down those words?—The constant loss that the breeders are put to from contagious diseases must deter them from putting a lot of money into the breeding of good stock.

4032. So that there again there is a very close inter-relation between your service and the improvement of breeds?—Yes.

4033. I am interested to note, and I am sure my colleagues are, that in your view there is a case for the passing of All-India legislation to control epidemic diseases?—Yes.

4034. Have you had experience of the ill effects of the absence of such essential legislation?—Yes, I think I have.

4035. Could you give us a case?—We have had very extensive outbreaks of rinderpest in the Presidency recently and my experience was that we were unable to check its spread. We were successful in reducing the mortality, but I was not able to stop it spreading from village to village and probably back again to villages at which it had already been.

4036. On this point you are also of opinion that it would be necessary to attempt, at any rate, to work in conjunction with the Indian States?—Yes, I think so.

4037. Have you had any indication as to how any suggestion of that sort would be received by the Indian States?—No, I have not so far; from the minor States in the Presidency I have had requests for assistance in the suppression of their outbreaks.

4038. In the meantime I take it that if there is an outbreak of haemorrhagic septicaemia just over your provincial boundary, there is nothing to prevent the owner of an infected animal walking straight across your boundary leading his animal, is there?—Nothing.

4039. On this matter of legislation by the Government of India I notice in the provincial memorandum* provided for the Commission there is mention of the Glanders and Farcy Act, which is the only Act of the kind in force. Have you had any experience as to how that Act works?—I have to put it into force every year.

4040. And is it your view that the operations of that particular statute have tended to check the spread of these diseases?—So far as regards glanders and epizootic lymphangitis, yes.

4041. I gather it is your view that the only hope of dealing adequately with outbreaks of contagious disease amongst animals in this Presidency will be by the formation of a mobile corps which could be removed to that part of the Presidency where the outbreak has occurred?—Where the corps was chiefly required, yes.

4042. Otherwise the whole of your force is dissipated amongst the various districts?—Yes, under present conditions.

4043. And you cannot effect any substantial concentration at the point of danger?—No, that is my trouble at present.

4044. Do you know whether any plan of that sort has been considered by Government?—I have submitted proposals to Government in connection with legislation as to contagious disease.

4045. Do you know what was the result of your suggestions?—They are not taking it up for the time being; they are, I think, awaiting the result of this Commission.

4046. Now is your chance to drive home the point. Do you wish to say anything more than has been set down in print about it? Would you like to emphasise the importance of the formation of such a corps, or do you think you have said all that can be said about it? How about its cost? That is an important point?—That depends largely on whether Government is only going to keep a corps for that purpose or whether it is going to keep one corps for this purpose and one for the management of dispensaries as they are at present. That would, of course, increase the cost considerably.

4047. You would not suggest, when there were no epidemics, keeping your corps standing by like the Metropolitan Fire Brigade?—There will be plenty of work for them. Epidemics are always with us.

4048. Turning to your other memorandum, you lead off with a clear statement of your views on the present system whereby in certain Provinces the Civil Veterinary Departments are placed under the Directors of Agriculture. That does not apply to this Province, does it?—No; we are at present separated.

4049. Whose battle are you really fighting on that page?—No one's. The Questionnaire asks for an expression of opinion as to whether the Civil Veterinary Department should be under the Director of Agriculture or independent.

4050. I want your frank view on this point. What do you envisage as the ideal organisation as far as veterinary work, cattle improvement work and dairying work are concerned? Have you any desire to bring these three together under one Head?—No particular desire, no.

4051. You have no ambitions about cattle improvement?—I have no desire to bring it under my control.

4052. You do not think it ought to be?—I do not think it is very important whether it is under the Agricultural Department or the Civil Veterinary Department.

4053. You have no tinge of the normal departmental avidity in these matters?—I have never had the control of cattle-breeding in my hands.

4054. Would you care to tell the Commission anything about your view of the suitability of the serum-simultaneous method of prophylaxis? Do you think the time has come when the system has been sufficiently worked out to

* Not printed; Memorandum by the Bombay Government for the Commission.

make it a practical one for general application?—I think the disadvantage of it for general application at present, particularly in the case of small owners, is that the animals have to be laid up for a period of about 10 days. The small owner would not be able to do that.

4055. I understand the period of rest in the case of some animals is a good deal more than that?—That is the minimum.

4056. What is the percentage of mortality?—In the few we have done it was *nil*; there was no mortality. We have not done very many in this Presidency up to the present.

4057. Can you give me any figures about the application of this serum-simultaneous method? Do you know how many animals have been protected by this method in this Presidency in the last 12 months?—We have tackled 2 farms in the last 12 months. In one, the Government farm at Bankapur, we did the greater part of the stock, and in the other, a dairy farm, we did about half. Total stock protected was 182.

4058. The general public has not made any use of the treatment?—The Palghar Dairy where animals were protected in January 1926 is a private body. To that extent the general public have taken advantage of the system and we have had applications from other private bodies and individuals to protect their cattle and this is being done in the near future.

4059. How about the serum-alone method of inoculation against rinderpest? Has that been used lately?—Yes, we use it very extensively.

4060. I think you give some figures about that in your memorandum, but in case this figure is not given, can you tell us how many animals have been done?—In 1924-25 we did something like 117,358 inoculations against rinderpest, and in 1925-26 about 91,300. The disease was not so prevalent in the latter as in the former year.

4061. The immunity lasts so short a time that I suppose you only inoculate in districts where the disease is actually present?—In the case of actual outbreaks only.

4062. I should like confirmation or the reverse from you on this point, which we have heard from another witness. Is it the case that rinderpest hangs about the village so long that if you inoculate a portion of the animals only they are very apt to be infected after the immunity conferred by their inoculation has disappeared?—Yes. I have in mind one village where the disease prevailed for 2 or 3 months, and we were doing inoculations continuously among some of the animals to protect them. Those which were protected continuously were not affected by the disease, but the disease continued in the village itself for some time afterwards.

4063. On a different question, if you had your own way and if your central Provincial Service was devoted entirely to research and dealing with contagious disease and so on you would contemplate some service at the disposal of the districts, would you not?—I think it would be better if the districts could arrange their own in that respect.

4064. This is really an important point. To what extent do you conceive your own service should control the district service? Do you contemplate a complete divorce between the two?—Yes, I think they should be separate. The District Local Boards would appoint their own men.

4065. Entirely?—Probably with the advice of a senior officer. We should act as advisers to them and make recommendations to them if they required it.

4066. Have you any clear conception how that would work? Have you planned it out yourself?—I do not think that the Boards could entirely support and maintain their own establishment and institutions without financial assistance from Government at the present time. Given the financial assistance and the advice of Government technical officers, I consider the Boards could manage their own institutions.

4067. I understand that as part of that system you would recommend a further multiplication of local animal hospitals? You would like more of

them?—I should certainly like to see more hospitals opened. We have not enough of them at the present time for ordinary purposes.

4068. Under the charge and control of the District Boards?—Yes, if we have a separate department.

4069. Are you going to have a central animal hospital as well? You are going to carry on research at the centre?—Yes.

4070. You will require a certain amount of clinical material with which to carry on that research?—Yes.

4071. How would you provide it?—Our men could get that in the villages in connection with their work on contagious and other diseases. The District Local Board men would also be able to take advantage of the research institute in regard to their problems.

4072. I had not thought of a central research station without shelters for animals and all the equipment one is accustomed to see at these places?—Yes; it would have to be fully equipped and have accommodation for experimental animals.

4073. *The Raja of Parlakimedi*: Do you encourage the taking in of boys from outside British territory, from the Indian States, and training them in veterinary science?—I think we do. I have not control of the Veterinary College, but I think they encourage it and are quite willing to take any people the Indian States wish to send.

4074. Do you also encourage the lending of Assistants from your department to Indian States when they want it?—We have not been asked for that, except occasionally when there has been an outbreak of contagious disease. We have not lent men to the States for their ordinary work.

4075. If the Indian States are prepared to pay for all the implements and other things, have you any objection to doing so?—I do not think such a case has occurred up to the present. I have never been asked to supply men from the department except to deal with contagious disease. In any case we should have to refuse for want of staff.

4076. As regards the advantages of inoculation against rinderpest and other diseases, such as that which affects the nostrils of the animals, do you have the advantages of inoculation published and circulated amongst the villages?—No, we have not had that done.

4077. Do you not think it advisable that your department should do such things?—Certainly it is.

4078. It is not being done now?—No. I may however state that at the last meeting of Veterinary Inspectors in my office held on 24th August 1926, the question of publishing results of inoculation in village *chavdis* and *mamlatdars' kacheries* was considered. We decided to institute an enquiry into the ways and means of introducing such a system, but the results of the enquiry are not yet to hand.

4079. *Sir James MacKenna*: On page 120 you say: "In the Bombay Presidency there are three separate veterinary establishments, each of which has a separate Head, who is directly under the control of the Minister of Local Self-Government." What are those three establishments?—There is the Bombay Veterinary College, the Principal of which is also in charge of the veterinary work of the Harbour Board; there is the Civil Veterinary Department of the Presidency proper, and the Sind Civil Veterinary Department, which is separate.

4080. Three officers with the qualification of M. R. C. V. S.?—Yes.

4081. Do you not think the Hon'ble Minister would rather be advised by one than by three?—Yes.

4082. An establishment like that would stand a Veterinary Adviser such as exists in other Provinces, would it not?—Yes.

4083. I take it the method of dealing with veterinary matters in this Presidency is by means of fixed dispensaries?—Yes. We have recently, at my

suggestion, introduced a couple of touring dispensaries, but at present we do not quite know whether they will be a success.

4084. How many Veterinary Assistants have you?—114 at present engaged.

4085. What is roughly the cattle population?—Presidency proper 8,433,397 and Sind 2,324,703 according to the Census of January 1925.

4086. How many Inspectors have you?—Five.

4087. How many Deputy Superintendents?—One, who is my Personal Assistant.

4088. Am I right in believing that the incidence of cattle disease here is relatively less than in most other Provinces in India?—I cannot say; I have no statistics to show that.

4089. Do you not think the best method is a combination of fixed and touring dispensaries? In the one case the owner has to bring his animal to you; in the other you go to him?—Our men do a certain amount of touring, of course.

4090. But they are rather tied to the hospital, are they not?—Yes.

I would recommend you to write to the Veterinary Adviser of the Government of Burma for his new scheme, combining the two, which makes provision for a flying column to meet the case of sudden epidemics.

4091. *Professor Gangulee*: You advocate the separation of the Civil Veterinary Department from the Agricultural Department. Do you suggest this on grounds of more efficient administration?—Yes, on the whole.

4092. You advocate such separation for all Provinces, do you not?—Yes; I think it would probably lead to greater efficiency.

4093. You say in your memorandum that you advocate separate departments for the detection and control of contagious diseases. Do you mean you want two departments, one for detection and the other for control?—No. My idea is that there should be a separate department for the detection and control of contagious diseases, separate from the department which is in charge of dispensaries.

It is not clear in this note.

4094. *Mr. Calvert*: Would you expand that a little?—At present our men are in charge of dispensaries.

4095. You have some touring dispensaries as well?—Only two at present, and they are purely experimental. What I suggest is that we should have a separate department on similar lines to the contagious disease of animals branch of the Ministry of Agriculture at Home, whose work is entirely in connection with contagious diseases. These dispensaries take the place of the private practitioner, who is absent in India.

4096. Would it be a field department or a research department?—A field department and also research.

4097. Then there would be two departments in the field?—One is practically confined to the dispensaries, and works on the everyday diseases of live-stock. What I am thinking of is a separate department for contagious diseases.

4098. *Professor Gangulee*: Then you make a reference to Local Bodies. Do you not think Local Bodies are capable of the control of veterinary dispensaries?—I have not said they are not.

4099. I wanted to know your view about Local Bodies taking control of these dispensaries?—I think with the help and advice we could give them they could control them.

4100. They are not able to control them independent of any support from the Provincial Government?—I do not think they would be able to do that.

4101. Your experience is that these touring dispensaries are a failure?—I have not said so.

4102. You say in your note they have not proved a success in this Presidency?—That was in the past, before the present department was formed.

They had one or two of them then which had to cover something like a whole district. It is impossible for one man to do that.

4103. Would you advocate a provincial station for the manufacture of serum?—I do not think that is necessary. Muktesar can turn out all we want.

4104. You say you would like to see the possibility of a more central serum depôt?—That is for storage, so that it could be more easily obtained.

4105. Is there any periodicity in the outbreaks of rinderpest in this Presidency?—There appears to be, yes.

4106. What factors control that periodicity?—It would seem to be something like this. After a very extensive outbreak, a large number of the animals probably attain a certain degree of immunity. The young stock when they are born have not that immunity, and so we get a new generation less immune than the old generation.

4107. You say the two annas charge for inoculation acts as a deterrent in many cases. Do you think it would make much difference if that charge were not made?—Yes, I think it would mean there would be more inoculations against blackquarter, anthrax and so on.

4108. Would you recommend compulsory cattle inoculation?—Yes, I would.

4109. A word about the veterinary inspection service. In the event of an outbreak of contagious disease, what agencies have you in existence now for reporting the matter to the authorities?—The present agency in this Presidency is the village *patel*.

4110. Is that satisfactory?—It is improving gradually, but it can hardly be called satisfactory at present.

4111. What measures do you recommend for the disposal of the carcasses during an outbreak?—Burial or burning.

4112. Under the supervision of whom?—The veterinary officer, or some other responsible person.

4113. And if they are not available in the area?—We should have them available in the area if I had what I am asking for.

4114. Are there many cattle markets and fairs in this Presidency?—Yes, a certain number.

4115. Do you think that they are instrumental in the spread of disease?—We have had instances where that has occurred.

4116. At the time of the fair, do you send someone there to exercise supervision?—Yes, as far as possible.

4117. Is the Veterinary College in Bombay popular in the Presidency? Are more students being attracted to it?—I think their numbers are increasing.

4118. *Mr. Calvert*: I understand from the printed note submitted to the Commission that cattle-breeding operations were taken from the department in 1919. Why was that?—The Director apparently considered it was more suitable. As far as I can gather from the orders (I was not here at the time) he thought it was getting rather a large subject and that it required the whole-time services of one officer.

4119. Are cattle-breeding operations now under veterinary or agricultural officers?—Agricultural.

4120. Do you know that the Hissar cattle farm, the biggest in India, is under purely veterinary control?—Yes.

4121. Would you in view of the success of that farm still advocate that it should be under the Agricultural Department?—No; if it is being successfully run up there I see no reason to change the control. I have not advocated its transfer.

4122. You have no particular advocacy, one side or the other?—No.

4123. Are you satisfied with the preliminary training of the students who join the Veterinary College in Bombay, with the grounding they get before

joining the college?—I only know them through being an examiner, and their knowledge of English seems to me rather poor.

4124. So that when they go out as veterinary subordinates they are not well equipped with a knowledge of English. It is a 3 years' course?—Yes.

4125. Do you think there is some room for improvement in the course?—Yes.

4126. *The Chairman*: Is it part of your responsibility to make a representation on that point to higher authority?—I do not think so. I am simply concerned with the work of the Civil Veterinary Department; the Principal of the college is responsible for all educational questions.

4127. *Dr. Hyder*: Do you make any report as an examiner?—The Board of Examiners make a report.

4128. You act as an examiner. Do you make a report to that Board?—A combined report is sent in by the Board of Examiners at the conclusion of the examination.

4129. *Mr. Kamat*: Speaking about the District Local Boards and the veterinary subordinates under them, you said the position was peculiar from the point of view of the staff, in that they had to serve two masters. What alternative method would you suggest? Would you have two separate staffs, one for the District Local Boards and one under you?—Yes.

4130. What would your own separate staff do at times when there were no epidemics?—Unfortunately, we have always epidemics.

4131. There are epidemics throughout the year?—Practically throughout the year.

4132. In fact, you want a whole-time department for animal diseases?—There are not only epidemics to be seen to; there are other causes of death such as parasitic disease, which we have not been able to tackle properly up to the present owing to the men being placed in charge of stationary hospitals. Owing to that we do not come across them as we should.

4133. You say you find it very difficult to concentrate your men in times of epidemic. Is not that more or less natural, even in the case of hospitals for human beings? When epidemics occur the Civil Surgeons have to be given extra work?—I think they have a special staff to assist them.

4134. Are you sure there is a special staff for that purpose?—I think they have what they call a general duty staff, or something like that. I am not certain on that point.*

4135. You refer to the Epidemic Diseases Act and compulsion against owners either in the matter of prevention of disease or reporting of disease. What penalty would you have? Would you make it a criminal offence?—Yes, I think it should be. I think it is criminal for a man not to take precautions to prevent disease spreading from his own cattle to other people's.

4136. Has this been tried in other Provinces to your knowledge?—They have a Cattle Act in Madras. I am not quite certain how it is working there.

4137. How long have they enforced it? Have you any idea?—It is an old Act now. They have had it for a considerable time, but I understand they have not had the staff to work it properly.

4138. If it is an old Act, has it had any effect on the spread of contagious diseases, or on the insufficiency of reporting?—So far as I know, it has not been actively enforced in Madras until recently.†

4139. It has been a dead letter?—Yes, for want of staff to enforce it.

4140. If it is a dead letter there, why do you advocate it here?—If we had the staff we could work such an Act.

* On further enquiry the witness finds that the general duty men of the Medical Department are utilised for relief and special duty, such as attendance at fairs, etc.

† The witness subsequently pointed out that the Madras Act was put into force in certain tracts in 1925-26 with successful results in restricting outbreaks of rinderpest.

4141. It is not only a question of legislation, but of having adequate staff?—Yes. We want the staff to work it.

4142. If your other suggestion of a separate department and separate staff, apart from the District Local Board staff, were adopted would you not be able to cope with it without legislation?—We want legislation to assist us.

4143. You want legislative power behind you and the staff to put it into effect?—Yes.

4144. Is this your greatest hindrance to cattle-breeding?—I think it is one of the great hindrances to cattle-breeding; the other is famine.

4145. Do you attribute greater importance to the difficulty about compulsion or to famine conditions?—They are both very important so far as the breeding of cattle is concerned.

4146. Supposing such an Act were passed, providing for measures for isolation, segregation and disposal of dead animals, arrangements will have to be provided for those in almost all the village areas if you have compulsion?—Yes.

4147. In that case, would not that be rather a big scheme for a Province to carry out, from the financial point of view? To make arrangements for segregation and isolation in various localities would mean that the financial aspect of it would be a serious hindrance?—It should be possible for a Province to carry out its own regulations financially.

4148. The financial aspect of it would present no serious difficulty?—It depends on the extent to which it was worked, of course.

4149. *Sir Ganga Ram*: Do you know that Muktesar is making 5 lakhs a year for Government by selling serum?—I have heard they have made a profit.

4150. Can you not make that serum here? Why can you not keep your share in that to yourself?—We have not got the facilities at present.

4151. Is there any physical difficulty?—No, provided we could get the required number of animals down here to carry out the work and a suitable station.

4152. Who is your technical superior in the Presidency?—I am directly responsible to the Minister.

4153. You are not responsible to any other technical officer?—No.

4154. Does horse-breeding come under you?—It did; we have discontinued it. The District Local Boards of Ahmednagar and Sholapur still keep a few stallions but Government is not doing anything in the Bombay Presidency proper at present in that direction.

4155. Have you any farm here like the farm in the Punjab, where you can get bulls of good quality for breeding?—There is one at Charodi in Gujarat and another at Bankapur.

4156. Do you look after the herds from a veterinary point of view?—Yes, so far as our professional services are required. We have nothing to do with the management.

4157. *Sir Thomas Middleton*: Comparing the organisation of veterinary work in this country with that with which I am familiar with in Britain, we have there (1) the Ministry of Agriculture and Fisheries controlling disease and (2) private practitioners doing work which, I understand, is done by Local Boards in this country?—Yes. That is more or less the situation.

4158. The Local Boards in India replace the private practitioner in England, and there are in rural districts either no private practitioners, or very few?—In the absence of private practitioners, the District Local Boards, with the assistance of Government, open dispensaries for the benefit of the people.

4159. Apart from the large towns, is there any considerable number of private practitioners?—Outside Bombay, I do not suppose there is one in the Presidency making a living.

4160. So that, in fact, if the Local Board does not provide the dispensary and hospital accommodation required, there is no agency to take the place

of the private practitioner?—I sometimes wonder whether the dispensary has not displaced the private practitioner nowadays, at any rate in big places like Poona.

4161. *Dr. Hyder:* Do the military *salutaris* take up private practice when they retire?—Yes, I think so.

4162. *Sir Ganga Ram:* Is your staff allowed private practice?—Yes.

4163. What remuneration do they take?—We do not lay down any rules for the charging of fees. We allow them to make that arrangement between themselves and the owners of the patients. The usual charge is about Rs. 2 per visit and conveyance.

4164. *Sir Thomas Middleton:* I gather you consider that the proper function of the Civil Veterinary Department should be the regulation of contagious diseases?—Yes.

4165. Apart from financial difficulties, which have already been referred to, and the small number of the staff, how do you think you could ensure reporting? That is the difficulty I envisage?—That is one of my difficulties at present. That is one of the reasons why I want whole-time staff, so that they can move about and discover disease.

4166. If you had whole-time assistants, would they discover outbreaks? Is not the task too big?—I do not think so.

4167. They would be able to inspect fairs and markets, but the inspection of villages is a very big task?—We have still the other agencies working in addition.

4168. So that you think, if you had this organisation which you indicate, there would be no substantial difficulty on account of non-reporting?—There would still be some difficulty, but I think it would be very much reduced indeed.

4169. One point to be borne in mind in regulating disease by orders is that we should not issue orders which we cannot enforce. So far as I can judge the situation, I should think you would have very great difficulty in enforcing orders in this Presidency?—I am rather optimistic about this subject.

4170. *Dr. Hyder:* My colleagues have examined you on your written evidence, and I want to elicit information on a few points mentioned in the report which you have submitted to the Bombay Government for the year 1924-25. I understand you act as examiner to the Bombay Veterinary College?—Yes.

4171. I understand that the percentages of passes were 73 in the First Professional, 72 in the Second and 80 in the Third. Do you not think those are high percentages?—They are high. They are good percentages.

4172. In cases of surra do you treat by Bayer 205?—In this Presidency the number of cases of surra is not great. We want facilities for putting horses suffering from surra under treatment.

4173. You have got 83 dispensaries for all the districts and 6 more are to be opened in the course of the year. Is that a large enough number for all the districts?—No. We are supposed to recruit up to one dispensary for every taluka.

4174. Where are these dispensaries usually located?—At taluka headquarters.

4175. You say something about the Burdizzo method of castration. Do you think that Government should undertake to pay for that?—I made that suggestion in my report to get it, used more extensively.

4176. Are there any special areas in this Presidency in which such diseases as rinderpest are specially rife? Apart from Nasik and Dharwar have you any such special areas?—The report was for the year 1924-25. That was the year in which we had a virulent and extensive outbreak of rinderpest; and though certain tracts were more affected than others, it was general every-

where except in the Panch Mahals. No particular area of the Presidency is more liable to visitations of this disease than another.

4177. I find the table showing cost of feeding absolutely blank?—We had no breeding operations going on.

4178. What is the system which you have as regards rewards to people for reporting diseases?—We do give rewards for assistance to the department in the form of presents and certificates. But the sum allotted for the purpose is not very great, viz., Rs. 200.

4179. What do you think of the *pinjrapoles*? Are they breeding centres of disease?—I do not consider them to be so. They are sometimes visited by disease, but that is from the importation of new stock. In the Bombay *pinjrapole* we have managed to reduce considerably the incidence of disease by arranging to isolate all new comers to the *pinjrapole*.

4180. You are not in charge of Sind directly?—I know Sind.

4181. There are only 16 veterinary dispensaries in Sind. Do you think that is a large number?—No, it is insufficient.

4182. In Sind you have 17 Veterinary Assistants and one man on reserve duty?—Yes.

4183. That one man apparently is your mobile column. He would not check many outbreaks? You said something about the breeding of horses. What has become of the breed of horses used by the Mahratta cavalry in the old days. Does that breed still exist?—There are very few horses in this Presidency worth mentioning.

4184. *Sir Chunilal Mehta*: Would you tell us what your relationship is with the Livestock Expert, in view of the remarks on page 122 of your note? Is there co-ordination or consultation between your department and that of Mr. Bruen?—None, except when they want our services for treatment of their animals.

4185. What sort of co-ordination should there be? Would you suggest any method?—No, I do not think I can suggest any particular way in which co-ordination should take place at present.

4186. *Dewan Bahadur Malji*: Your Veterinary Assistants are allowed to have private practice even when they are on duty. They draw their salary, and you allow them also to pocket fees?—Under Government orders they are allowed private practice.

4187. Then, their fees are unlimited. They may ask for any amount on the principle of demand and supply?—I do not think the income from that source is very large at the present time.

4188. In the village this is felt to be very revolting?—I do not quite follow what you are driving at.

4189. I am driving at this point. Should your Veterinary Assistants be allowed to demand any fees without any control from the superior officer?—We have not laid down rules as to what fees they should charge.

4190. What will be the result if any Veterinary Assistant is unreasonable in his demands? What is the owner of the sick animal to do?—He can go to the dispensary.

4191. But what will happen when there are no dispensaries near by?—We are trying to reach those centres through the touring officers.

4192. Can you suggest any better arrangements?—No.

(The witness withdrew.)

Mr. V. H. NAIK, M.A., Bar.-at-Law, Collector of Bijapur, Bombay Presidency.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—Bijapur district of which I am in charge as Collector is noted for uncertain rainfall. Scarcity and famine frequently occur. The important problem for investigation in this district is that of conservation of moisture, so as to make crop production possible by the application of dry farming methods. For investigating this problem and carrying on experiments, a research station is necessary for the district.

QUESTION 2.—AGRICULTURAL EDUCATION.—(i) The present supply of teachers and institutions is not sufficient.

(ii) Bijapur district is in urgent need of an agricultural school.

(iii) Teachers in rural areas should as far as possible be drawn from the agricultural classes.

(iv) I have no exact information as to attendance at existing institutions. If it be not satisfactory, the way to secure better attendance is to improve the curricula and methods of instruction.

(v) The agricultural education of adults in rural tracts may be started by holding classes of short courses of agricultural instructions in suitable centres of each district. They may be popularised by making the instruction practical and interesting and by offering prizes, certificates, etc., to mark appreciation.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(a) In my opinion, the use of iron-plough, the introduction of improved Kumpta cotton (Dharwar No. 1), and the steeping of *jowari* seed with a solution of copper sulphate in order to protect the crop against smut disease are among those measures that have proved highly successful in the Karnatak Division of the Bombay Presidency.

(b) If improvements are tried on a field scale at suitable centres of each district, and if systematically organised parties of cultivators are brought to see the standing crops raised under improved methods, that will surely increase the effectiveness of field demonstrations.

QUESTION 4.—ADMINISTRATION.—(c) (i) There is at present no major port of international importance on the whole sea-coast between Bombay and Colombo. It is said that the coast of North Kanara is suited for the development of a port of such magnitude. Bhatkal, now a small British port on the coast of North Kanara, was in the 16th century B. C. the gate-way between Vijayanagar and the outer world. It is understood that the Karnatak Indian State of Mysore seeks to develop it into a modern port. From the wider standpoint of British Karnatak and other territory, lying around and within it, this port or the neighbouring port of Kumpta may deserve to be developed as a British port. The country to be served by it grows cotton of good quality, and other agricultural produce on a large scale. It may in fact become an important cotton port on the coast of British Karnatak and redound to the agricultural prosperity of the country. The subject may be investigated.

QUESTION 5.—FINANCE.—The extension of the existing system of village co-operative credit societies, the establishment of special land mortgage banks, and the development of the Government system of *taccavi* are measures that may be recommended for the better financing of agricultural operations.

Short term credit.—Village co-operative credit societies are eminently suitable for providing their members—ryots—with short term credit required for the purchase of seed, manure, bullocks, etc.; and they may be started and developed everywhere. The District Central Co-operative Banks with the Provincial Co-operative Bank at the apex finance the village credit societies. In my opinion these co-operative institutions—village, district and provincial—may specialise in this business of short term credit. The service they can

render to agriculture by supplying ryots with funds even for the purchase of ordinary agricultural requisites will be undoubtedly great.

Long term credit.—For enabling ryots to take up permanent land improvements, such as, excavation of irrigation wells, construction of wads (field embankments), etc., long term credit is necessary. For providing such long term credit, special land mortgage banks with State aid may be established in suitable tracts and the system of *taccavi* extended everywhere.

A special land mortgage bank may be formed on the following plan:—A portion of the shares of the bank may be taken up by Government and the rest by the investing public. Long term deposits also may be obtained. Loans may be advanced on a first mortgage of lands for purposes of land improvement or debt redemption. Small annual instalments payable over a sufficiently long period of years may be fixed for the liquidation of the loans. The bank may have the power of recovery under the provisions of the Land Revenue Code. The Collector may be the president of the bank, *ex-officio*.

Taccavi.—Care may be taken to see that only energetic and industrious cultivators are given *taccavi* loans for schemes of land improvements previously approved. It may also be seen that the schemes are properly drawn up by skilled officers and that they are profitable. If cultivators who are selected carry out such approved schemes, they are sure to benefit. That will doubtless make the *taccavi* system popular and successful.

In my opinion, the distribution of *taccavi* to approved cultivators may be in the hands of the Collector's staff, as it has been in the past. There may also be a sufficient number of agricultural officers of the type of embankment officers for examining land improvements proposed by applicants for *taccavi* and preparing sketches and estimates.

The above remarks about the *taccavi* system may apply to special land mortgage banks also.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—If a ryot who is otherwise competent, has a large debt carrying a high rate of interest, the way to help him is to investigate his liabilities, to pay off the same with an advance at a lower rate of interest, and to take annually from him, in satisfaction of the latter, a small sum over a sufficiently long period of years. Government may take power to investigate the liabilities of suitable cultivators who are overburdened with debt with a view to help being given them in the manner indicated. The funds required may come either from Government direct or from special land mortgage banks.

QUESTION 8.—IRRIGATION.—For Bijapur district I suggest the following:—

(i) There are six sites suggested as suitable for making canals. They are:—(1) Kolchi, (2) Shivyogmandir (Govanki), (3) Aiholli and (4) Ramthal on the Malaprabha, (5) Herkal and the Ghataprabha and (6) Galgali on the Krishna. Of these, (1) Kolchi, (2) Shivyogmandir (Govanki) and (3) Herkal are recommended as specially promising. Their immediate survey may be taken up.

(ii) Tanks for irrigation may be constructed in suitable localities. The Superintending Engineer on special duty has on his list a good number of suitable sites for such works.

(iii) Wells for irrigation:—Wells are successful in Indi taluka and a few other tracts of the district. The extension of irrigation wells in these tracts alone is recommended.

QUESTION 9.—SOILS.—Wads (field embankments) may be constructed along contour lines. By construction of a wad or a series of wads across the water channel, the whole field will become divided into a number of plots. By tillage across each plot it will tend to become level, and rainwater that will otherwise flow away will be retained and spread over it. Further, the erosion of the surface soil will be prevented. As a wad or series of wads properly constructed results in the retention of rainwater in the field, it yields some crop even in a year of deficient rainfall. Its crop yield is of course increased in a year of good rainfall.

QUESTION 10.—FERTILISERS.—The use of cowdung as a fuel may be penalised with proper safeguards.

QUESTION 11.—CROPS.—(a) (i) A great improvement of existing crops can be brought about by supplying ryots with pure and selected seed of important varieties of crops grown.

(iii) As to the distribution of seeds, the case of Bijapur district may, for example, be considered:—

The total cropped area of the district is 2,886,000 acres. Of this, that under cotton is 866,000 acres; that under oil-seeds 56,000 acres; that under wheat 129,000 acres; that under *jowari* 1,400,000 acres; that under *bajri* 175,000 acres; and that under other cereals and pulses 117,000 acres.

The seed of no crop is so badly mixed and so impure as that of cotton. Ryots' cotton is taken to ginning factories, where it is ginned and the seed gets mixed and broken. In the southern talukas of Bijapur district Kumpta cotton is grown, whereas Khandesh cotton is grown, to some extent, in the northern talukas. The result is an appalling mixture of cotton seed, which ryots obtain from ginning factories or shops in the bazar and sow. I would suggest the following plan for producing pure Kumpta cotton seed and supplying it to ryots in this district:—

The Agricultural Department may start a cotton seed farm of about 300 acres and raise seed sufficient for sowing 15,000 acres. The seed yield of the departmental seed farm may be supplied to selected big farmers, having in all 15,000 acres under cotton. They should bind themselves to cultivate their fields well, gin the produce separately and sell the seed to a co-operative society, supplying cotton seed to ryots throughout the district. The seed of these 15,000 acres will suffice for nearly 750,000 acres. The departmental seed farm suggested here may be worked separately or in conjunction with the experimental or research station suggested in the answer to question No. 1.

The seed supply of other crops such as oil-seeds, wheat, etc., may also be organised on a similar plan.

(iv) In Mudargi and Nargund Pethas of Dharwar district, the thick clumps of prickly pear afforded shelter to pigs which damaged crops. During the period of crop growth extending over several months, villagers kept watch over-night to scare away pigs from their fields and their health consequently suffered. But a campaign for the destruction of prickly pear by applying fire to it, by allowing it to dry, by cutting it down afterwards, and by burning it again, was carried on in 1923, 1924 and 1925 throughout the III Division of Dharwar district, including Mudargi and Nargund Pethas. The result was that pigs finding their abodes destroyed migrated to distant hills. Thus the country side was freed from the pig trouble. In another part of Dharwar district containing thick forest, walls were constructed for keeping away the pig from the fields enclosed by the wall. These measures have proved successful.

(c) In Mudargi Petha, above referred to, the soil is light and sandy. The crop of *kharif jowari* grown in such soil is bound to be poor. Ryots sought to grow ground-nut in rotation with *kharif jowari*, but the pig damaged the ground-nut crop and thus checked its extension. But the campaign of prickly pear destruction has driven away the pig and I understand that the area under ground-nut which is a more profitable crop than *jowari* has increased considerably in Mudargi Petha in the last two years.

QUESTION 16.—ANIMAL HUSBANDRY.—The Government scheme of storage of *kadbi* for saving cattle in a year of fodder famine was worked out in Bijapur district this year with success. The total quantity stored is over 65 lakhs lbs. at a total cost of Rs. 47,000. Of this, nearly 60 lakhs lbs. were stored this year at a rate of Rs. 6·85 per 1,000 lbs. Proposals have been made for storing nearly 219 lakhs lbs. in the ensuing season at a cost of Rs. 1,50,000. Thus the total quantity to be stored by the end of the next season will come to 284 lakhs lbs. at a total cost of nearly Rs. 2 lakhs. The total number of plough cattle in the district is 134,000. The provision of about 670 lakhs lbs.

of *kadbi* will suffice for 1rd of these plough cattle for 5 months at the rate of 10 lbs. per day per animal. As ryots also store *kadbi*, it is recommended to store 500 lakhs lbs. for the present. ✓

An average Government stack of *kadbi* is 100' long and 20' wide at the ground surface and its height from bottom to apex 30'. The cross section of the stack is pentagonal. The stack is plastered with mud. It is known as *Kilbanavi*. It contains over 3 lakhs lbs. of *kadbi*. It is estimated to last 4 or 5 years and to lose 15 per cent. of the stock at the end. Ryots ordinarily store *kadbi* in small heaps called "Goodu" and put mud over them. These "Goodus" are said to lose nearly 50 per cent. of the *kadbi* in one or two years. The Government *kadbi* storage scheme is thus calculated to conserve the fodder resources of the district.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(1) Kurbars in Bijapur district are sheep graziers. They also weave *kambli*s (country blankets) from wool. They may be taught better methods of sheep-raising and wool-weaving.

(2) Village carpenters and blacksmiths make agricultural implements and supply them to ryots. The former may be taught better methods.

(3) There are weavers of coarse cotton cloth in the district. They may be taught better methods.

Co-operative organisation may be tried for the improvement of these village industries.

QUESTION 19.—FORESTS.—Kurbars in Bijapur district are sheep-graziers. They have applied for additional forest area, being thrown open for the grazing of sheep and goats. The matter is being considered favourably by the Forest Department.

For improving the grazing quality of forest areas, the Economic Botanist proposes to initiate experiments.

QUESTION 20.—MARKETING.—(a) For stimulating the development of market-gardening, fruit-growing and other intensive forms of agriculture, each agricultural belt may have in the centre a large city. There are instances of fruit-growers discouraged to some extent, by the non-existence of a big consuming centre at a reasonable distance. The subject is a vast one, and I venture to call attention to it.

QUESTION 22.—CO-OPERATION.—(a) The honorary organisers of co-operative societies may be replaced by a paid staff of Government officials, especially for organising co-operative societies in backward areas. ✓

Non-official agencies, such as the Central Co-operative Institute, do not seem to be capable of taking up the difficult task of organising and developing various types of co-operative societies. The Central Co-operative Institute with its branches holds conferences and training classes and issues periodicals. The propaganda of this nature, the Institute appears to do well. It may also take up the work of supervision of its constituent societies and the local supervising unions of societies to be started may become part of the machinery of the Institute. But the organisation and expansion of societies and their statutory audit may be left to the paid staff of the Registrar.

(b) Credit societies may be organised and developed everywhere.

Purchase societies.—It will perhaps be expedient to have a single large society for a whole district for the purchase and distribution of agricultural requisites such as seed, manures, implements, etc., rather than many small societies, each for a village or a group of villages or a taluka. A district society may buy, on a large scale, agricultural requisites and distribute them throughout the district. The society may also take up the dissemination of agricultural literature, establish a library and a museum and hold meetings. It may have branch offices in talukas and distribute agricultural requisites through them to ryots. These branches may thus serve the purpose of institutions now known as Taluka Development Associations. A centralised district society with adequate funds appears to be necessary, if the non-official side of agricultural propaganda and the supply of agricultural requisites are

to be efficiently organised. The Agricultural Department may treat as Taluka Development Associations the taluka and petha branches of the district society and give grants accordingly to the latter.

(c) Societies for the sale of produce such as cotton, oil-seeds, etc., may be developed. They may arrange to secure good seed, as the existing cotton sale societies of Dharwar district have done; and hand it over to the district agricultural purchase society for distribution to ryots.

(d) I consider that credit societies have made available to the cultivator capital at reduced rates of interest and that their operations have also tended to lower the rates of interest demanded by the ordinary moneylender.

Non-credit societies also are to some extent attaining their objects; but their operations need to be systematised and developed on a large scale.

QUESTION 23.—GENERAL EDUCATION.—I venture to submit that in a country like India, teeming with millions of small agriculturists, the whole system of general education—elementary, middle school and higher—needs to be agriculturalised to a marked degree. What is general education after all?—It is the impartation of knowledge of facts and figures in different grades to pupils, so as to improve their mental equipment. Facts and figures of history, geography, mathematics and natural science are collected together and graduated into different elementary, intermediate, and advanced series. The impartation of the elementary series of such facts and figures is said to provide the pupils with elementary education; that of the intermediate series with middle school education; and that of the advanced with collegiate or higher education. It does not appear to be an impossible task to collect facts and figures, specially bearing on agricultural history, agricultural geography, agricultural mathematics and also facts and figures of various branches of natural science, in their relation to the processes of agriculture and rural economy, to graduate them, and to incorporate them into the curricula and practical exercises of general education—elementary, middle school and higher. A number of elementary schools have recently been given what is called agricultural bias; and the experiment is said to be successful. That perhaps indicates that the whole system of general education can be effectively agriculturalised with the highest possible good to the country and its people. If the system of general education is divorced from the agricultural needs of a vast country like India, and if we make a rush for compulsory universal general education, as we have been doing, nothing but unemployment on an unprecedented scale and consequent discontent and misery would be the result. India is a poor country and cannot afford the cost of a universal general educational system and an equally universal special agricultural educational system. The only solution seems to be the agriculturalisation of the former as far as possible. It appears to be necessary to set up a Joint Board of general educationists and agricultural educationists, if the great task of agriculturalising the text books and curricula of general educational institutions is to be accomplished as rapidly as possible.

QUESTION 24.—ATTRACTING CAPITAL.—As the system of general education becomes more and more agriculturalised, as the instruction and training in technical agricultural schools and colleges tends more and more to turn their students into skilled agricultural businessmen, as experts discover more and more profit-producing improvements, and as the dignity of agricultural pursuits enhances in the country, men of capital and enterprise will in increasing numbers take to agriculture.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(1) In many areas portions of old cart tracks owing to lack of repair and constant use, have become deepened and thus unserviceable. These tracks may be repaired or new tracks laid out, with provision for their regular repair. Further, a scheme for the development of road communications in such areas may be suggested.

(2) A scheme for providing drinking water wells in villages, suffering from scarcity, may be recommended.

(3) Prickly pear is a nuisance in many village sites. It leads to insanitation and disease. Prickly pear in thick clumps provides abodes for pigs which damage crops. Consequently, ryots have to watch their crops overnight and their health suffers. A campaign for the destruction of prickly pear may be initiated everywhere. The results achieved in the III Division of Dharwar district during the period of 1923, 1924 and 1925, when I was in charge of that tract, have been satisfactory.

(4) Congestion in village sites is appalling. A scheme for encouraging villagers to build houses on suitable plots outside village sites may be recommended.

(5) Most villages have got *chavdis*. These may be improved and extended so as to make them a sort of village halls for the holding of rural social functions.

(6) Faction is the bane of village life. Village officers—*patil* (headman) and *kulkarni* (accountant) having not got enough official work to do, sometimes participate in factiousness. Training classes for *kulkarnis* have been held for some years. But a training class for *patils* was held this year in Bijapur district with success. I suggest that village officers may be trained in agriculture. The active interest of the *patil* and the *kulkarni* in improved agriculture will mean a new factor, tending towards the peace and prosperity of the village.

(7) If trained village officers are entrusted with agricultural work on a small extra remuneration, they will form a vast body of agricultural propagandists in rural areas.

QUESTION 26.—STATISTICS.—*Other suggestions.*—(1) The Secretary of State in Council, in virtue of section 26 of the Government of India Act, is under a statutory obligation to lay before both Houses of Parliament an annual account, exhibiting the moral and material progress and condition of India. The implication of this obligation is that the Secretary of State in Council is responsible for initiating measures for the moral and material progress of the vast agricultural classes of the country, and for gauging the improvement effected from year to year. The Collector may be charged with the general oversight of execution of these measures in his district.

The Deputy Director of Agriculture, though subordinate to the Director for technical control, may be subordinated to the Collector, in respect of introduction of approved agricultural improvements in the district. There may be no practical difficulty in the way of the Deputy Director in charge of several districts, operating under the Collectors of all those districts. Under such arrangement, the Deputy Director and his staff may turn out more work in each district than at present. Similarly, the Assistant Registrar of Co-operative Societies may function in the district under the Collector, in respect of co-operative agricultural organisation. Even the existing staff of Circle Inspectors under the Collector may be brought within the scope of this co-ordination. The Collector may also have the assistance of District officers, such as the Executive Engineer for irrigation, the Executive Engineer for roads the Deputy Educational Inspector, etc. For working out such a district scheme of centralisation for the purpose of rapidly improving agriculture and bringing about rural prosperity, the Collector's office at the headquarters may be strengthened by the creation of a separate agricultural branch.

Approved agricultural improvements, such as, iron ploughs, selected Kumpta cotton seed, treatment of *jowari* seed with copper sulphate, etc., may from time to time be notified by the Director of Agriculture to the Collector; energetic action may be taken to introduce those improvements and incorporate them into the routine of husbandry in the district; and the Collector may submit an annual return as to each improvement, showing the acreage, etc., covered by it in the year. Similar annual returns may also be furnished by the Collector, in respect of construction of wads (field embankments), excavation of irrigation wells, construction of minor irrigation tanks, construction of irrigation canals, extension of road communications, expansion

of agricultural bias education, etc. A summary of these annual district returns may be incorporated in the report of moral and material progress of the country to be submitted every year to Parliament. A district with the Collector at the head is a territorial unit of sufficient size for the introduction of agricultural improvements and the measurement of their progress from year to year. Different activities, tending to promote the agricultural and rural development of a district may all be carried on intensively in the district, and their progress marked and appraised every year from the stand point of that district.

(2) A statute for the better development of agriculture in India, embodying various provisions, may be passed by Parliament.

Oral Evidence.

4193. *The Chairman:* Mr. Naik, we are very much obliged to you for the written evidence you have submitted. Have you got anything special to say before we proceed to question and answer?—No, nothing.

4194. You say that there is a specific problem in your district and in order to investigate this problem and carry on experiments a research station is required for the district? Is that a special problem peculiar to the district?—That problem is a very difficult one and is peculiar to that tract.

4195. You mention that it is a famine tract and you want investigation in conservation of moisture. Are you familiar with such experiments and research as are being carried on at this moment at Poona in this particular problem?—Yes, I think some experiments have been started recently.

4196. I want to know on what you founded the view that the setting up of a special research station in a particular district was to be justified?—The reason is this. The whole district is liable to frequent famine whereas only parts of other districts are so liable to famine at long intervals. The Bijapur district is supposed to be liable to famine frequently so far as the whole area is concerned.

4197. Provided the particular problems of the district were being adequately dealt with by existing institutions, you would not advocate the creation of a new one, would you?—No.

4198. You say that Bijapur is in urgent need of an agricultural school. What kind of agricultural school were you thinking of? Either of the Loni type or agricultural bias schools?—This is under the serious consideration of Government now.

4199. On page 137 you say that for providing long term credit, special land mortgage banks with State aid may be established. What do you mean by special land mortgage banks?—I mean a bank which will advance long term loans for the purpose of redemption of debts and financing costly land improvements.

4200. But do you contemplate these loans being made through the co-operative credit societies?—No, not through the existing short-term co-operative credit societies.

4201. On page 137 you describe a method by which the State, that means the general body of tax-payers (and it is as well to remember that the two things are identical) might come to the assistance of cultivators to relieve them of part of the interest on their debt?—Yes, at low rates of interest.

4202. I take it, if I have understood your plan aright, that the amount of easement which the cultivator would enjoy as the result of the adoption of your scheme would be the difference between the interest he pays now and the interest that he would have to pay to Government, that is the full extent of the relief, is it not?—Yes, and help in other directions.

4203. But financially that is the sum total?—Yes.

4204. What rate of interest are cultivators paying in the district with which you are familiar?—From 15 to 20 per cent.

4205. At what interest do you anticipate Government would lend?—They lend now at 7·29 per cent.

4206. So that the difference between the 15—20 per cent. and 7·29 per cent. would be borne by the general tax-payers. That is the scheme, is it?—No. The State raises money at a lower rate than 7·29 per cent. Suppose the State were to provide a part of the funds of a mortgage bank; that would not mean a burden on the general tax-payer. All the funds of a mortgage bank will not come from Government.

4207. Have the local candidates in the elections adopted that platform?—Not specifically, but they are all keen agricultural reformers in my part of the country.

4208. I am very interested in your note on animal husbandry. On page 138 you state: "The Government scheme of storage of *kadbi* for saving cattle in a year of fodder famine was working out in Bijapur district this year with success." What exactly do the words "work out" mean?—Government agents in the district have actually stored *kadbi* in the course of this year.

4209. They have carried out the whole experiment successfully?—Yes.

4210. There was no famine, was there?—No. As a matter of fact we shall be storing in good years in order to have a store for bad years. Experts say that *kadbi* can be kept for four or five years if properly stored.

4211. What is the proposal that has to be carried out under the scheme?—In my district 6,500,000 pounds have been stored. We hold this for a bad year and we are not issuing it this year because this is a good year.

4212. Do you know whether the decision has been taken to repeat this experiment next year?—Yes, Government have been pleased to sanction Rs. 1,50,000 for operation in the coming agricultural harvest season.

4213. On page 139 you advance a very understandable complaint on the part of local fruit-growers; they are discouraged by the non-existence of a fruit-consuming centre at a reasonable distance?—Yes.

4214. Of course, better transport would bring the consuming districts nearer?—It would, but local peculiarities and local convenience are a factor.

4215. The only alternative is the creation *ad hoc* of an important consuming centre for the benefit of those who are growing fruit; you do not contemplate that, I am sure. But do you think that by better communication something might be done to bring your fruit cultivators into closer touch with the market?—Yes, something could be done.

4216. On page 140 you state: "As the system of general education becomes more and more agriculturalised, as the instruction and training in technical agricultural schools and colleges tends more and more to turn their students into skilled agricultural businessmen" and so on. Have you any personal knowledge on which you base this view that the products of these colleges are turning to agriculture as a profession?—I know a few of them but not many.

4217. You will agree with me when I say what attracts business men is the prospect of security for their capital and attractive returns on their investments?—Yes.

4218. Businessmen have a curious knack of finding out these things without the assistance of agricultural schools or anybody else?—Yes.

4219. On page 142 you state that a statute for the better development of agriculture in India, embodying various provisions, may be passed by Parliament. You contemplate there an All-India Act?—It would be an amplification of section 26 of the Government of India Act.

4220. Do you think that the provincial administration would welcome a statutory provision of that sort from a central authority?—The Government of India Act specifically lays down an implied duty on the Secretary of State for India and I should say anything like an amplifying act would naturally follow.

4221. I think you are on firm ground there as far as it goes?—Yes.

The Commission then adjourned till 2-30 p.m. on Tuesday, the 26th October, 1926.

(Mr. Naik gave further oral evidence on the 27th October, 1926, see page 181.)

Tuesday, October 26th, 1926.

POONA.

PRESENT:

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

Sir HENRY STAVELEY LAWRENCE, K.C.S.I., I.C.S.	Mr. H. CALVERT, C.I.E., I.C.S.
Sir THOMAS MIDDLETON, K.B.E., C.B.	Professor N. GANGULEE.
Rai Bahadur Sir GANGA RAM, KT., C.I.E., M.V.O.	Dr. L. K. HYDER.
Sir JAMES MACKENNA, KT., C.I.E., I.C.S.	Mr. B. S. KAMAT.

The Hon'ble Sir CHUNILAL V. MEHTA.	} (<i>Co-opted Members.</i>)
Dewan Bahadur A. U. MALJI.	
Mr. J. A. MADAN, I.C.S.	} (<i>Joint Secretaries.</i>)
Mr. F. W. H. SMITH.	

Mr. A. G. EDIE, Chief Conservator of Forests, Bombay Presidency.

Replies to the Questionnaire.

QUESTION 9.—(a) (i) The soil in the neighbourhood of bare hills in the Deccan is usually very poor sandy murum, washed down by the torrents from the bare hills. This state of things would be improved if the hills were covered with tree growth, which would prevent the erosion of the soil from the hills.

(a) (iii) Lessen the floods by increasing the tree growth on the hills.

QUESTION 10.—(f) The use of wood instead of cowdung for fuel should be encouraged. Owing to its bulk the transport of fuel is expensive, and it is not possible profitably to exploit fuel from the forests to places beyond the immediate neighbourhood at a low cost, which increases rapidly with the distance from the forest. In areas remote from forest the remedy would seem to be to plant strips of trees along the banks of streams and on the borders of the fields, preferably quick growing fuel-producing trees.

QUESTION 11.—(a) (iv) This matter was investigated by a committee some years ago. From my own experience I can say that the only sure method of preventing damage to crops by wild animals is the erection of stone walls or stout fencing. The eradication of prickly pear and lantana, which generally grow near villages and fields, would lessen the amount of cover available for wild animals.

QUESTION 16.—(b) (i) Owing to the very low rate of grazing fee charged for cattle grazing in forest, many cattle are kept which are useless except to yield a little manure.

(b) (ii) In areas of thick forest a belt of land around the fields has been handed over to the cultivators with permission to clear it if they so wish and use it for the growth of grass and leaf manure and other purposes subsidiary to agriculture.

(d) Up till recently the forest area has been divided into two parts, one of which is open and the other closed to grazing throughout the year. Experi-

ments are now being carried out in accordance with which areas will be closed for part of the year only, with a view to determine whether by this means the total output of grazing and fodder grass will be increased.

QUESTION 17.—(b) In forest districts cultivators are employed on forest works during the slack season of agriculture, and on the whole it can be said that the demand for such labour is greater than the supply.

QUESTION 19.—(a) Yes, as far as this can be done on a communal basis, Grazing is allowed on payment of nominal fees (usually annas 4 and sometimes less per head for agricultural cattle), and fuel, bamboos, small timber, leaf manure and other essentials for agriculture are allowed free or at low rates. In thickly populated areas the demand on the forests for these purposes is very heavy, whereas in forest areas remote from the centres of population the contrary is the case. With reference to the remark "on a communal basis" above it should be pointed out that in most cases the forests are open to all the cultivators of a village or group of villages as a whole, and this undoubtedly leads to waste and ill-usage, much of which might be avoided if areas of forest were allotted to individuals, as is occasionally done; this however can only be arranged in rare instances.

(b) The supply of firewood and fodder in rural areas might be increased by improvement in communications, thus facilitating transport, and by protection of land suitable for their growth within the areas themselves. This protection would entail a curtailment of the grazing and other facilities, and in each case it must be decided separately whether such curtailment is likely to be justified by results.

(c) Deterioration of forests on hillsides and on the banks of streams has led to soil erosion. This can be seen at its worst in the case of "Kumri" or shifting cultivation, which entails the cutting and burning of all forest growth on steep hillsides, resulting finally in the complete disappearance of the soil. The only preventive is the preservation of the forest growth in such places; there is no cure within a reasonable period of time once the damage has been done.

(d) The presence of large areas of forest may lead to a small increase in the rainfall, but this is a point on which we have no definite information, and it is not likely that the increase in the rainfall is at all considerable.

But undoubtedly the presence of forests helps to retain moisture in the soil, and thus regulates the flow of water in streams, which usually contain water throughout the year in forest clad areas, whereas in open areas they are raging torrents in the rainy season and quite dry during the rest of the year. It is an axiom which admits of no doubt that the denser the forest growth the more constant is the flow of water in the streams of the area.

(Agricultural land in the neighbourhood of bare hillsides is liable to be flooded by the torrents which flow from the hills during the periods of heavy rain, which coincide with the period during which the land is under crop, and heavy damage is caused by the floods. Where the hillsides are covered with forest growth this damage is averted.)

(e) (As a rule it is not advisable to create forest in the neighbourhood of villages. It is desirable that the land around a village should be open and not densely clad with trees. If the idea is to increase the supply of forest produce available for the people it would be better to afforest areas at a reasonable distance from the village (say a mile or so), or better still for the villagers themselves to plant trees in their holdings.) It will take years of educating to get them to do this, but is worth trying.

(f) Forests subjected to excessive grazing suffer deterioration. Animals eat the young plants and browse the older growth, and damage the young trees by trampling and rubbing and thus prevent the regeneration and proper growth of the forest crop. Excessive trampling of the soil during the rainy season, when the incidence of grazing is heaviest, renders it unsuitable for the production of tree growth. Where grazing is very heavy the forest growth quickly deteriorates and eventually disappears, and this is followed by erosion of the soil.

The incidence of grazing should be limited to an amount which the forest can fairly bear, and areas containing young growth should be closed to grazing.

Owing to the very low rate of grazing fee charged the number of cattle grazing in forest is excessive. If higher fees were charged the people in all probability would restrict the number of cattle somewhat.

Oral Evidence.

4222. *The Chairman*: Mr. Edie, you are the Chief Conservator of Forests, Bombay Presidency?—Yes.

4223. You have put in a note of your evidence, and we have had an opportunity of reading it through. Would you care to make any statement amplifying what you have written, or would you like to proceed at once to question and answer?—I do not think I want to make any further statement.

4224. You agree with me, I take it, that the conduct of forests in India is very important from the angle of agriculture?—Yes.

4225. Do you think that the relations between the Forest Department and the Agricultural Department are as close and sympathetic as they might be?—We are not really in very close and direct touch with the Agricultural Department. We are more in touch with the Revenue Department through the Collectors.

4226. Do you think that it might be in the interest of agriculture in the Presidency, if you were in closer touch?—I have not thought about it very much. We are in close touch with the Collectors, the Revenue Department; and anything which has to do with the rights and privileges of the people is dealt with between the Revenue Department and ourselves. We do not come much in touch with the Agricultural Department.

4227. Has it ever occurred to you that it might be to the advantage of the cultivators if your officers had a short course of instructions on the means by which forests may render assistance to agriculture?—I had not thought of that, but I should think it would be a good thing.

4228. It would not take very much time?—No.

4229. Do you think it might be useful also, if certain of your officers were attached for a longer or shorter time to the Agricultural Department, so as to have an opportunity of seeing the forests from the agricultural viewpoint?—I think that might be tried, yes.

4230. In answer to question 9 (a) (i) on page 145 you say "The soil in the neighbourhood of bare hills in the Deccan is usually very poor sandy murum, washed down by the torrents from the bare hills. This state of things would be improved if the hills were covered with tree growth, which would prevent the erosion of the soil from the hills." Have you already had experience of that operation in the Presidency?—Yes.

4231. How about the expense? Is it a costly operation?—We could not plant these hills. The only means of getting tree growth on them would be protection from fire and cutting, and a certain amount of protection from grazing would be necessary. We could not think of planting them.

4232. How long, as a rule, does it take in the Deccan to establish a growth of trees? Is it trees or shrubs?—Mostly thorny shrubs.

4233. How long does it take to establish that?—On some hills the soil is almost completely gone. I think it would, as a rule, take 10 years before there will be any appreciable difference.

4234. You would have to have protective measures in force for 10 years?—Yes, I think so.

4235. Would that be expensive?—If we had to put on forest staff to protect these hills, it would become fairly expensive, unless the villagers did it themselves.

4236. You know India very well. Is it likely that they will do it themselves?—There is a good deal of teaching required, as things are at present. I have known of cases, where they have done it themselves, in Kanara, but it is very rare.

4237. I am trying to get from you whether you think, from your experience, this is an expedient which might be adopted for wide areas, or whether you think it would be too expensive to carry out on an important

scale?—I am afraid it would be too expensive, unless we can show them examples which they would follow.

4238. You have no rodent in this country such as the rabbit, which attacks young trees?—We have no rabbits, but porcupines, hares and rats still do a lot of damage.

4239. Can you protect young trees against them?—We do, to a certain extent, in our plantations. We put stones round the plants.

4240. Fencing would be out of the question?—Yes.

4241. In answer to question 16 (b) (i) on page 145, you say "Owing to the very low rate of grazing fee charged for cattle grazing in forest, many cattle are kept which are useless except to yield a little manure." Are you advocating any change there?—If the number of cattle which graze in forests is excessive and it is desirable to keep down their numbers, I think the only thing would be to raise the fee. In some places there is more grazing than the forests can stand.

4242. Raising the fee would have a selective tendency?—It might, but I think the fee would have to be raised a great deal. The fee has been raised of late years, and there is very little difference in the number of cattle. It has been raised from 2 annas to 4 annas, but the number of cattle grazing is just the same now as before, so that merely raising the fee like that has not had any effect.

4243. In the next answer that you have given, you point out that in areas of thick forest, a belt of land around the fields has been handed over to the cultivators with permission to clear it if they so wish and use it for the growth of grass and leaf manure and other purposes subsidiary to agriculture. Do the cultivators take advantage of that permission?—Not always, but frequently they do. Chiefly this is done in heavy forest districts like Kanara and Belgaum, and it is done to a certain extent in other places, but often the cultivators are annual tenants, and they do not know whether they will be cultivating that bit of land next year. It demands a lot of labour to clear this belt all round the fields. If they do not know how long they will be cultivating that little bit of land, they cannot afford to do it; but I have seen a good deal of it done.

4244. In answer to the next question, you outline an experiment which has been carried out, with a view to the increase in the total output of grazing and fodder grass, by the closing of certain areas for part of the year only?—Yes.

4245. Is that a new experiment in this Presidency?—It has been going on for two or three years only.

4246. Are there indications as to whether it is going to prove a success?—We think it is. What we are doing is to close an area towards the end of the monsoon season, allow the grass to seed, and keep the same area closed in the early part of the next monsoon, so that the young grass grows up from the seed.

4247. You close it for two periods, the period of seeding and the period of germination?—Yes.

4248. Until the grass gets established?—Yes, and I think I can say that it is leading to an improvement. With the help of the Agricultural Department we have taken some small areas, and we are making accurate tests of the output of grass.

4249. Do you allow grazing between seeding and the growth of the young grass, or do you keep the cattle out of it?—We keep that closed.

4250. How about grass cutting as opposed to grazing? Is that prohibited in the same period in these areas?—No; I do not think it would be, as a rule.

4251. You have three classes of forests here, have you not? You have forests where both grazing and grass-cutting are allowed, forests where grass-cutting only is allowed, and forests where neither grass-cutting nor grazing

is allowed?—Yes, but there are very few forests where grass-cutting is prohibited. Those closed to grazing are mostly open to the cutting of grass.

4252. In answer to question 17 (b) on page 146, you have stated "In forest districts cultivators are employed on forest works during the slack season of agriculture, and on the whole it can be said that the demand for such labour is greater than the supply." In spite of the fact that you call for such labour in the slack agricultural season, you cannot get enough labour to do the work. Is that the position?—That is very common. In real forest districts, the labour supply is a good deal less than we want.

4253. How do you account for the fact that you are not able to attract the labour during a season when that labour is not engaged in cultivation?—Most of our big works are in areas where the population is small, and to come to these works they have to go long distances. Also, our forest districts are mostly unhealthy. That is one of the reasons why they do not come.

4254. How are the wages fixed?—In the open market. Most of our work is really piece-work.

4255. You do not think that it is failure to pay sufficiently attractive wages that prevents them from coming?—I do not think so. We pay good wages.

4256. Can you give the Commission any idea of what the average wage is? You have told us that the wages are determined by competition in the open market. I suppose that is competition with the other employers? (A man on felling work, timber work, will make a rupee a day easily. A cartman with his cart will make at least Rs. 2 a day, or something more than that.)

4257. Are these average figures?—Yes. I am talking about work in our big forests.

4258. (Apart from the felling and the carting, there may be a certain amount of unskilled labour required for the carrying of brushwood, etc.?—There is a good deal of that in the way of burning fire lines, plantation work, etc. A good deal of it is done on daily wages.

4259. What do you pay?—8 annas to 12 annas for unskilled labour of that sort.)

4260. Is it in the category of the daily wage earners that you have this shortage, or in the category of the piece-work earners?—Both.

4261. Are you, as a department, carrying out any experiments in the preservation of fodder against famine?—We store fodder against famine. We bale hay and store it.

4262. Are you making any silage at all?—We have tried it on a small scale at different times, but it was never gone on with. We were told that silage cannot be moved long distances. If you are storing it in one place as insurance against famine, it must be used there; it will not stand a long journey, whereas the hay which we bale may be sent hundreds of miles to the famine districts.

4263. I suppose you make it year by year and store it?—Yes. We store hay for 3 to 4 years.

4264. And then you sell it?—As we get the opportunity.

4265. It is some time since you had a famine in this Presidency?—This year we have sold off nearly the whole of our stock, because the rains came very late.

4266. By "stock" what you mean is the stock in its 4th year, and not the whole stock?—What we have been storing for the last three years. We have sold most of it.

4267. Was there a famine this year?—There was great scarcity in the months of May, June and July. The rains came in very late.

4268. Was it scarcity amounting to anything in the nature of fodder famine?—Practically a fodder famine up in Gujarat and Kathiawar. They wanted grass very badly.

4269. So that your reserves have been seriously depleted against the possibility of a famine coming next year?—There will not be a famine this year.

4270. Against the failure of the next monsoon?—We have now got one year's stock left. We will add one year's and we will have nearly two years' stock by the end of next year's monsoon. We will not be badly off.

4271. What does it amount to in 2 years?—We have cut it down of late on account of the expenditure. We store now each year about 100 lakhs, that is, 4,500 tons, and we store that for three years, and then if a famine year comes we cut and bale much more in the areas where there is grass. I think, in a famine year, we ought to be able to supply 500 lakhs, or 20,000 tons.

4272. Does that quantity that you mention as being your normal store for 2 years represent an important proportion of the grass which is reasonably near a railway, or can you do more?—We could do a good deal more than that.

4273. You could, if you were financed, store a great deal more than that?—Yes.

4274. Of the same quality?—Pretty much the same quality.

4275. When you come to sell at the end of 4 years, do you find a ready demand?—No; not as a rule. Of course, if there is scarcity, we sell it to the local people in the famine districts; otherwise, if it is a good year we have to sell in the open market, and we have to sell at a loss.

4276. You cannot cover the cost of cutting and storing?—I do not think so. We are bound to lose a good deal in a year which is not a year of scarcity.

4277. *Sir Henry Lawrence*: How much would you lose on a ton?—I think we might lose Rs. 8 to Rs. 10 a ton.

4278. *The Chairman*: On this matter of shifting cultivation, *kumri* cultivation, do you think that a sufficiently firm control of *kumri* cultivation is being maintained, in the interests of agriculture as a whole?—We have a fair control. It is always bound to be very destructive, but we are trying to make it as little destructive as possible, by lengthening the period of rotation. They use to crop it for 2 years and leave it fallow for 6 years, and hoped to get another crop by that time; but there was nothing to cut then. We are now making it 2 years' cropping and 14 years fallow, by which time we hope that there will be a certain amount of regrowth left for them to cut and burn and get another crop.

4279. Have you any suggestions to offer for the further control of this practice?—We want to get rid of it as soon as we can.

4280. Is there any hope of that?—It will die out very gradually.

4281. (It is a question of settling the population which is accustomed to live by these methods of cultivation on a more permanent basis. Have you anything to say on that?—That could only be done by sending them away, which we do not want to do.)

4282. Is it in fact being done at all at the moment?—Yes, in the south of the Presidency; some in Satara, some in Belgaum and Kanara.

4283. Can you give the Commission any idea as to the rate at which this settlement of these *kumri* cultivation tribes is being effected?—It is very slow.

4284. A few villages a year?—Yes, if that.

4285. How many acres of actual *kumri* cultivation are there in the Presidency every year?—I am afraid I could not say off-hand.

4286. Could you give us any ideas at all?—There must be some thousands of acres. It is not an enormous area; I think a few thousand acres.

4287. In relation to soil denudation or soil erosion, is it a really important problem in this Presidency?—I think so. It is very desirable to stop it if we can, but I cannot say it is absolutely essential.

4288. I suppose if the first erosion begins on higher levels, on an important water system, the damage may progress without any further *kumri* cultivation at all? The denudation proceeds?—Yes. We get a little regrowth coming up, which partly covers the soil.

4289. *Sir Henry Lawrence*: Is the question of *kumri* cultivation of small importance in this Presidency compared with other Presidencies?—I do not know how it would compare with other Presidencies. It is not a very big matter in this Presidency. The area is not very large.

4290. What is the extent of your forest area?—15,000 square miles.

4291. How many acres of *kumri* cultivation do you deal within a year?—It would not be anything like 15,000 acres.

4292. At any rate, it is not one of your major forest problems?—No.

4293. *Sir Ganga Ram*: What is the percentage of total forest area, as compared with the whole area of the Presidency?—About 12½ per cent. It is about one-eighth of the total area.

4294. With regard to grazing fees, do you mean the rate is 4 annas a month or 4 annas a year?—The rate is 4 annas per year.

4295. Is it true that you allow them a pair of bullocks for ploughing free, and charge for everything else?—All the so-called village cattle are paid for at the rate of 4 annas.

4296. Do you allow a man a pair of plough bullocks free?—Not as a rule. In a few districts that is done, but the normal rate is 4 annas.

4297. Do you charge for milch cows?—Yes. That is the general rule. In a few districts it is free, but as a rule they pay for it.

4298. The Inspector General of Forests advocates the terracing of the hillsides inwards so as to intercept the quick flow of rain water. Have you tried it in any of your forests?—We have not done anything like that in our forests.

4299. What is the area of this belt of land around fields that has been given to the people free?—It is from 44 to 100 yards wide, with a minimum of 44 yards.

4300. Do they make use of it?—In some places they do. They do not do so in some places. The labour difficulty is very great in these heavy forest areas.

4301. You say that the increase of trees may attract rainfall. Why is it "may"? Why not "must"? It is a well-known fact now?—I do not think it affects it much. I do not think the presence of trees increases the rainfall very much.

4302. It has been proved now in the Punjab. There was almost no rainfall in Lyallpur before?—It may make a small difference. It may make a difference of 5 per cent. I do not think it would make much more than that.

4303. You say that the forest conditions can be improved by planting fast-growing trees. Is it due to lack of funds that you have not made experiments?—That was on private land, was it not, to increase the supply of fuel for the people, and not in forest areas?

4304. Can you give us the names of the trees which will grow on the edge of fields but not cast any injurious shadow on the crops?—They will cast a certain amount of shadow.

4305. But it may not be injurious?—*Babul* is the commonest tree that we see in the fields.

4306. But *babul* is the old tree of this country. What are the new ones?—We had better stick to the old; we know they will grow.

4307. Do the zamindars regard the vicinity of forests as a benefit, or do they consider it as a torture? In our Province the zamindars consider them as a torture machine. Do not your forest guards torture the zamindars?—I do not think so.

4308. Are the forest guards generally honest?—They are fairly honest, I think. Their pay is small, of course.

4309. How do they make it up? What is the pay of a forest guard?—He begins on Rs. 15 and goes on to Rs. 25. I think they are reasonably honest.

4310. *Sir Thomas Middleton*: Your total reserve for famine you say amounts to 20,000 tons. That was the estimate you gave us of the total reserve of grass. This quantity would suffice for about 20,000 animals for a famine period, if there was a total failure?—It would be sufficient for about that number.

4311. It would only allow 10 lbs. per head?—Yes. It is a supplementary supply, of course.

4312. If we take the whole supply, it is obvious that the amount of fodder that you are able to store is infinitesimal as compared with the needs of the cattle in the Presidency?—There is one thing to remember. In a famine year, we cut a very great deal more than that.

I understood you to say that you have 20,000 tons accumulated against a famine year.

4313. *Sir Henry Lawrence*: No; that is the reserve?—And there are certain areas where even in a famine year there is a supply of grass, and we could cut a good deal more than that.

4314. *Sir Thomas Middleton*: You might have much more than 20,000 tons available?—Yes, I think we can do a little more than that; I do not say very much more than that, because the railway wagon question comes in. It has got to be conveyed a long way by rail. It has got to be stored a long way off from the famine districts, and the transport difficulty comes in.

4315. The greater proportion of your forests are open forests? Open for grazing?—Yes. I think out of 15,000 square miles of forests 2,500 square miles are closed to grazing and the rest are open.

4316. And you told us that you have had success by closing and re-seeding?—We have been trying that of late years and we think it has become a success.

4317. Have you ever tried to regulate grazing, not by fencing, but by grazing stock at a certain place for three weeks or a month and then moving them on?—The people do that a good deal themselves. They graze them in one place for a few days and then shift them to another.

4318. Do you think that is quite sufficient?—Of course, you will always find that near the village the land is much more heavily grazed than farther away. They will not take the trouble to go far, but within easy reach they have a rough sort of rotation.

4319. *Dr. Hyder*: The major portion of your forest property is under your control and a part is under the Land Revenue Department?—About a fifth is under the Land Revenue Department and the rest is under our control.

4320. Besides being forest officers you have got to be excise officers? Your functions are mixed up?—It is only in one or two districts that the forest officer is an excise officer. In a number of districts we do some land revenue work, but in only two or three cases is the area administered extensive.

4321. In answer to question 10 (f) you say, "Owing to its bulk the transport of fuel is expensive, and it is not possible profitably to exploit fuel from the forests to places beyond the immediate neighbourhood at a low cost, which increases rapidly with the distance from the forest." You will admit that no forest property can be a valuable asset unless it is made accessible?—Yes.

4322. Have you any active policy of constructing roads so as to open up your forests?—Yes, we are doing as much as we possibly can.

4323. I find from your report that you are losing money on this account, because it is stated that on certain portions of the road which were constructed but which were not metalled, you lost heavily on account of the absence of metalling?—Yes; we do that in several places.

4324. You have an active programme of road work?—We have a regular programme: we do a good deal of road work now.

4325. What is the total value of the grazing that you provide both at concession rates and free?—We reckon the value at full rates at about 21 lakhs. I think we realise in cash something like 5 or 6 lakhs.

4326. That is the value at full rates?—Yes. The full rate is what we call the one rupee rate. It is about 21 lakhs, I think.

4327. And you charge only 6 lakhs?—Our charge is between 5 and 6 lakhs.

4328. And the value of the grazing you give is about 21 lakhs?—Yes.

4329. *Sir Chunilal Mehta*: Mr. Edie, it must be very comforting for you to hear from Sir Ganga Ram that in an advanced Province like the Punjab there is agitation against the Forest Department by the cultivators. It seems to be common all over India, apparently?—I suppose it is.

4330. Then this question of *kumri* cultivation has often been under the consideration of the Forest Department. You have tried to control *kumri* cultivation and you have made certain concessions to the cultivators, and arrived at what you think is a satisfactory compromise?—Satisfactory for the time being. Whether it will last I do not know; the question will probably crop up again after 10 or 12 years. At present I think it is satisfactory.

4331. *Dr. Hyder*: How many years do you allow the cultivator to cultivate and after how many years do you allow him to take it up again?—At present it is a 16-year rotation. They cultivate for two years and they allow it to lie fallow for 14 years. This is the system which we brought into being two or three years ago.

4332. *Sir Chunilal Mehta*: As regards the question of keeping in touch with the Agricultural Department, you have not really any settled co-ordination, but you often come in contact with them; for instance, in Kanara, where the question of agriculture and forests is very acute, your officers examine what is being done on the Kumpta farm, for instance?—Yes.

4333. And examine what kind of leaf manure would be profitable for rice cultivation, and what concession ought to be given and so on?—Yes.

4334. So that you are in some kind of touch with the Agricultural Department?—Yes, we are to that extent.

4335. With regard to the labour charges that the Forest Department have to pay in high forests, you have explained to the Commission the extreme difficulty of getting labour?—Yes.

4336. And you said that you could do with any amount of labour?—With a good deal more than we have.

4337. And the high cost of labour would not be a matter of great consideration for you?—No; we can afford to pay good wages.

4338. And you are in fact losing good revenue by the absence of labour?—Yes. By paying out Rs. 10 we would probably make Rs. 30.

4339. You have tried to attract labour not only by your own official efforts but you have also given out contracts for the purpose?—Yes, a lot of our work is done by contract.

4340. And those contractors provide their own labour?—Yes.

4341. And they too find it difficult to get labour?—Yes.

4342. Still, in the high forest area (say, in Kanara) you have attempted to get settlements of cultivators?—We tried; we got a few, but it does not seem to prosper very much.

4343. You even tried to get a society of milkmen to come into your Kanara forests?—That has done rather better.

4344. So that you do want to give as much facility as possible to the cultivator?—We want the people there; we want to get them if we can.

4345. Consistent with your duties to the Forest Department?—Certainly. The forest is of no use to us if it is empty; we must get some people there, because we want labourers to work there.

4346. Would you mind expanding a little your answer to the question about fodder and grass storage that was put to you by the Chairman? Was it the intention of Government when the scheme was started, or even under the extended scheme that is now in operation, to provide for all the cattle that would suffer in a famine?—I should not think so: that would be impossible.

4347. In fact, Government simply thought that in famine times they would supplement in this way other efforts to supply grass and fodder?—Yes. We could not do more than that.

4348. The present storage of both grass under your department and of *kadbi* under the Revenue Department and through the agency of the District Local Boards was based on the understanding that Government would take the figures of imports into the Presidency in the worst famine year and try to provide the same quantity by means of both *kadbi* and grass?—Yes.

4349. Your grass varies considerably in quality?—A good deal.

4350. Navapur grass is not very much liked by the cattle?—It may not be liked by the cattle, but we sold every stick of it this year.

4351. At concession rates?—At a loss, yes.

4352. There is plenty of scope in the Navapur forest for the further cutting of grass if it was required in famine time?—Yes, there is a big supply there. It will not be touched now, except possibly in a big famine year; we have given up cutting there.

4353. Do you know the quantities of *kadbi* that are proposed to be stocked in the Central and Southern Divisions?—No.

4354. It is very much more than the grass that is stocked by the Forest Department?—I believe so.

4355. And *kadbi* is about twice as nutritious as ordinary forest grass?—Yes.

4356. Now, would you mind enlightening the Commission on the question of charcoal-making? Is that not a very important industry which the Forest Department should undertake?—We are now going in for that as much as we can, because to me it seems to be the only way of getting fuel carted a long distance at a low rate. It takes about 3½ tons of wood to get 1 ton of charcoal, which means that there is a very considerable saving in transport either by road or by rail.

4357. How are the requirements of charcoal, say at Poona, met?—A good deal of that is brought from the forests by contractors. Some of it comes to Poona even from the north of the Belgaum district.

4358. How many miles away would that be?—Nearly 200 miles by rail. It also comes from the Thana and Kolaba districts.

4359. And from the Mahabeshwar hills?—From Mahabeshwar and Panchgani; but only a little of it.

4360. Do you consider that charcoal will at any time take the place of cowdung as fuel? Can the Forest Department make fuel, both wood and charcoal, so cheap as to be able to stop this waste of cowdung manure?—That is a question of price. We cannot sell charcoal much under Rs. 40 a ton. I think it will cost Rs. 28 a ton at the very lowest.

4361. What is the average?—I do not think we could fix the average at less than Rs. 40.

4362. That is not your timber ton?—It is the ton weight.

4363. Have you made any experiments to see whether charcoal as you make it now could be compressed into briquettes?—We have not tried it. To do so would mean crushing it into powder, I am afraid.

4364. I heard that some such thing was being done. Government have not considered the question of losing on charcoal?—We have prepared charcoal to sell and sold it at cost price, and even had a loss by advertising it, and the sale of it has spread considerably in the Deccan and to a certain extent in

Satara, Khandesh and other districts. A good deal that is made in Thana and Kolaba goes to Bombay.

4365. Do you think there is any prospect of its displacing cowdung as fuel?—I think it is a very distant prospect in places far from the forests. There is still the transport question.

4366. For instance, in your Kanara forests you have 80 per cent of the wood which is not of much value?—Yes.

4367. Much of it goes absolutely to waste at present?—A great deal of it does.

4368. Have you ever considered having, or do you have any research either here or at Dehra Dun for seeing whether any use of it could be made for the purpose of cheap fuel or charcoal?—Actually we have made charcoal on a small scale, but it never paid its way. It is too far from any market. A few of our contractors have actually prepared charcoal for sale in places like Hubli, Dharwar and Belgaum, but the market seemed to be very limited.

4369. *Professor Gangulee*: With regard to fodder grass, have you undertaken any systematic study of the different varieties of fodder grass grown in your forests?—No, we have not.

4370. Do you not think it is rather important from the point of view of assisting the cultivator to increase the fodder supply of the country?—Yes; it would be beneficial, of course, if we could increase the proportion of good kinds of grass.

4371. With regard to the suggestion you make in the last page about increasing the fee for grazing to stop excessive damage by grazing, have you been able to decrease grazing by raising the charge from two to four annas?—No. The number remains about the same.

4372. What would be the increase you would suggest to decrease grazing to the necessary limit?—I am afraid we will have to make it pretty heavy. We do not want to overdo it.

4373. Then, that is not the solution?—No. After I wrote that, I went into the figures carefully and found that since the rates were doubled there has been no decrease in the number of animals grazing.

4374. With regard to fodder supply you make an interesting observation here that improved communications would help the supply of firewood. Do you consider that the existing transport facilities are inadequate?—We do. We are going in for various forms of mechanical traction in a small way. We will probably increase it a good deal as time goes on.

4375. When you speak of improved communications, have you actually anything concrete in mind?—Yes. Roads and railways.

4376. Roads in forest areas?—Yes, and extension of railways to the forest boundaries where possible.

4377. Are the railway rates for timber and fuel satisfactory?—No. They are very high.

4378. You consider them very heavy?—Yes. The cost of bringing timber from Kanara (in the south of the Presidency) to Bombay (a distance of a little over 400 miles by rail) is much more than the cost of bringing timber by sea from Rangoon to Bombay. Therefore, Kanara timber cannot compete with Burma timber in Bombay because it is so much cheaper to bring it from Rangoon.

4379. As regards afforestation, can you give us an idea of the area that will be available for increased afforestation in your Presidency?—Do you mean which is not under forests at present?

4380. Yes, land that can be put under forests?—There are vast areas of uncultivated land, but we do not want to have much of that under forests. Really we have as much under our control as we can manage.

4381. But do you agree that the waste land available in the country could be utilised for afforestation?—It might be; but it is mostly grazing land.

and the question will arise whether the demand for grazing would allow any of that land being given up. To turn it into forest means closing it to grazing for a few years, to allow the natural forests to come up. It is a question whether the graziers can afford to let that amount of land go out of their control for the requisite number of years.

4382. You do not hold out any prospect of increasing the forest area in this Presidency for some years to come?—I do not think so. I think we have got as much as we can manage now.

4383. No further extension is possible?—It is possible, but I hardly think it is desirable.

4384. Do you follow any definite programme in your work, that is to say, do you chart out a forest policy programme for five or ten years ahead?—We have got working plans of all important forests for periods varying from 10 to 20 years, and in some cases for longer periods, and we follow a regular programme.

4385. *Mr. Calvert*: Do I understand that you are not attempting in this Presidency to reclaim ravine land by afforestation?—We are not doing that.

4386. Nothing on the lines of the Talwar plan is being tried here?—No. Not at present.

4387. Is it because it is not a paying proposition?—We have not thought of it. As a matter of fact we are very short of funds at present. It would be an expensive thing, this ravine reclamation.

4388. It would not be a paying proposition here?—We have not gone into it carefully.

4389. *Dr. Hyder*: Have you large areas of ravine lands?—Not very large. I do not think we get anything like what you have in the United Provinces.

4390. *Mr. Calvert*: And the Punjab?—We have nothing to compare with that here. There is a little in the vicinity of some of our big rivers and the streams running into them, but it cannot be said there is a big area in this Presidency.

4391. Has your department tried to supply fuel to cultivators with the object of inducing them to keep their cowdung for manure?—Not with that special object in view. We open depôts in villages and towns outside the forests for the cheap sale of firewood, but the idea of that is to prevent the looting of our own forests and to regularise the cutting. We have never gone in for it to stop the burning of cowdung.

4392. Do you find them willing to buy wood fuel?—They do buy it, yes.

4393. *Dr. Hyder*: With regard to the question of a substitute for cowdung as fuel, do you know that the people who eat rice and *bajri* have an objection to the use of coal or other fuel as a substitute for cowdung because they say that to do so makes the food taste of the smoke? If you can invent any type of *choola* in which we can use charcoal or other fuel we might get over this difficulty?—Charcoal should not smoke the food; it does not give out much smoke.

4394. They say ordinary coal does?—Ordinary coal does. The use of charcoal will prevent the smoking of the food. It would be a very good thing to use: it gives out very little smoke.

4395. *Mr. Calvert*: With regard to this question of limiting grazing to the amount which the forest can bear, has any proposal to increase the fees been turned down by the Bombay Government?—No. We put up proposals two or three years ago to increase the normal rate of grazing from 2 annas to 4 annas, and Government agreed. We have not had any proposal for raising the fee turned down.

4396. In your forest grazing lands, apart from the cultivators, do you suffer from having people who are purely cattle-breeders?—We have got professional graziers or cattle-breeders in some districts.

4397. Are they migratory?—Yes.

4398. Do they pay a higher rate?—Yes, they pay one rupee.

4399. Would you tax them out of existence?—No. The cultivators buy their cattle from these breeders, and it would be a hardship to the cultivator if we drove these people away.

4400. Do you think in the interests of the present cultivators themselves and of future generations you should restrict the present rights in the forests?—I think on the whole we restrict them sufficiently. I think the forests in our own charge are being sufficiently well looked after to be able to meet the needs of future generations.

4401. You were discussing with Sir Chunilal the question of charcoal. Are you trying those new methods of carbonisation in retorts and so on to minimise waste of combustion?—We have got a man now who wants to start a big scale industry. But we have done nothing ourselves up to now. We simply burn the charcoal in an overground kiln.

4402. You are not trying to make briquettes out of the dust?—No.

4403. Is not that a practicable proposition?—It might be considered. We have never tried it.

4404. Is the Dehra Dun Institute helping you in the economic utilisation of your products?—They are. We send them enquiries and they help in the way of timber testing, testing timber suitable for sleepers and various other purposes.

4405. Do you think there is a possibility of working up minor industries based on forest products? Charcoal is one, and there is lac cultivation, sericulture, etc.?—Yes.

4406. Is there any opening here for those?—There are a good many minor products like *myrobalans* in which there is a certain amount of industry now but which have not been worked up.

4407. I gather the impression that you do not contemplate any large scale plantations in this Presidency?—No. We replant what we cut down.

4408. No fresh plantations in new areas?—Very little.

4409. You do not think there is any need or scope for that?—I do not think we have ever thought seriously about that, because we have neither the staff nor the funds. I do not think there is very much scope for it. The only new plantations we make is to do a little with the planting of casuarina trees on the sea shore. Otherwise we only replant what we cut down.

4410. There is no need to have special fuel plantations near the large towns?—Our large towns are generally on the railways, and they get fuel at moderately reasonable prices.

4411. *Mr. Kamat*: In answer to question 9 (a) (i) on page 145 you say that the soil in the neighbourhood of bare hills in the Deccan could be improved if the hills were covered with tree growth. Have you made any experiment with sowing seeds of a hardy type so as to cover the hillsides with shrubs?—That was done years ago in the Deccan. There were attempts to plant them. So far as I know, however, that was very spasmodic, and was not followed up with precautionary steps to protect the young plants, and I think it resulted in nothing.

4412. No systematic experiments have been made?—No, not in that kind of way.

4413. In answer to Sir Ganga Ram you expressed your doubts as to whether the presence of forests had much effect on rainfall. Have any experiments been made on that subject?—There have been experiments all over the world in that direction, but we have not made any here.

4414. In that line nothing new is necessary?—I do not think so.

4415. Replying to question 19 (a) on page 146, you say that if areas of forest were allotted to individuals rather than to cultivators as a whole in a village or group of villages much waste could be avoided?—I think it would to a certain extent.

4416. In pursuance of this policy, do you auction off forest areas which are grass-bearing to certain individuals?—Yes; grass, for instance, we sell to individuals.

4417. By auction?—By auction or tender, yes.

4418. And the man who buys by auction as a middleman makes a profit from the villagers?—He may.

4419. Have you reason to believe the profit he makes is very high?—I have heard complaints of that, and in the case of grass, which the local people buy from him, we are thinking of fixing a maximum price at which he should be allowed to retail it. At present he can make the best bargain he can.

4420. Do you not think that the system of auction is detrimental to the interest of the villagers and their cattle?—Wherever the villagers as a body will pay a fair price for grass we prefer to let them have it. They are taking to that now and are clubbing together and buying an area.

4421. You say the Bombay Government sanctioned raising the grazing fees from 2 to 4 annas. Was that in order to prevent waste or simply from a commercial desire to get as much money as possible out of the grass?—We felt that 2 annas was such a very small sum in proportion to the value of the grazing that it would not be a hardship if the people were asked to pay a little more.

4422. On the whole, by raising the grazing fees from 2 to 4 annas how much has the Bombay Government made?—I think, from a lakh and a half to two lakhs from the village cattle.

4423. The total extra income to the Bombay Government was only a couple of lakhs?—We do not talk of two lakhs as “only.”

4424. On the other hand, the inconvenience to thousands, and perhaps millions, of cattle must have been rather great?—That one and a half or two lakhs of rupees is distributed amongst 12 or 14 lakhs of cattle.

4425. *Dr. Hyder*: Has this increase in the grazing fee restricted the number of cattle?—The number of cattle grazing now is just the same as it was before.

4426. *Sir Ganga Ram*: Have you got the same rate for bullocks, sheep and goats?—Sheep and goats are charged a different rate. The fee varies in different districts. The fee for goats, I think, is 2 annas; for sheep 1 anna and for horned cattle, 4 annas.

4427. *Mr. Kamat*: Even supposing that the number of cattle has not decreased, still the general dissatisfaction amongst the cultivating community was rather great, and that was not worth having at the cost of 1½ to 2 lakhs of rupees?—I do not think that we heard very much dissatisfaction. When I went round with a Forest Grievances Committee last season we heard a good deal about it, but at the time the fees were raised there were very few complaints.

4428. Do you ever meet groups of villagers, and ask them if they have complaints or grievances?—Yes.

4429. Apart from your contractors and others?—Yes; frequently.

4430. You say that the dissatisfaction was not very serious?—I do not think so.

4431. *Dewan Bahadur Malji*: You have nothing to do with non-forest districts?—Very little; practically nothing, in fact.

4432. Do such non-forest districts consult you about disposing of odd pieces of land here and there which can supply good pasture and grazing?—A question like that came before me not long ago. It was from one such district in Gujarat. They asked my advice.

4433. Are there any separate Government rules for the disposal of such lands in consultation with you?—I do not know of any for waste lands in non-forest districts.

4434. You told Sir Chunilal Mehta that if more wages were paid more return could be had in the shape of timber cutting and so on. If that is so, from a business point of view why not go in for it?—Because of scarcity of funds. Our funds are very much cut down nowadays.

4435. It is only a question of temporary accommodation?—It is difficult to get funds for expenditure as the general budget is being cut down, and so ours has been cut down too.

4436. Was this matter ever mentioned to Government?—Yes, every year when I send in my budget.

Sir Chunilal Mehta: My question, to which the witness replied in the negative, was whether the Forest Department would mind paying higher wages because they would get more profit. The difficulty was to attract labour. They could not get labour.

4437. *Dewan Bahadur Malji:* If more labour can be had with such payment would you go in for it?—Yes, we would.

4438. Are there any records of charcoal experiments made by Government in forest areas under your charge?—We have been making experiments on charcoal for the last 6 or 8 years and they are being continued both by us and our contractors.

4439. Do you think that there are any chances of success?—I think so. It is gradually getting better, I think.

4440. *Sir Ganga Ram:* Do you keep the reserve hay in open stacks or in bales?—In bales.

4441. Hand bales?—Steam pressed bales.

4442. Do you tie it with rope?—With wire.

4443. What does it cost you per bale?—It is usually done by contract. It costs us about Rs. 12 per 1,000 pounds, Rs. 27 per ton.

4444. *Sir Henry Lawrence:* Including the grass?—Yes.

4445. *Sir Ganga Ram:* A rupee a maund?—Yes.

4446. We do it in the Punjab for 4 annas and including the hoop iron we get 8 annas for the whole thing. We supply to the Military Department and the grass is of exceedingly good density. What is your density? How many cubic feet per ton do you get?—We get bales of 250 pounds. It is about 12 pounds per cubic foot.

4447. At what rate do you sell this when famine comes?—That is fixed by Government. Government try to sell it at cost price.

4448. Zamindars have no money in times of famine. Does not Government give it for nothing?—We have nothing to do with the selling. Government does that.

4449. They give your department some credit for it?—We do it as agents for the famine relief. It does not come out of the forest budget; it is famine relief work. We do it because we are there and the grass is in our forests.

4450. Have you got any timber in your forests suitable for railway sleepers?—We sell a lot of teak sleepers.

4451. You have got teak?—Yes.

4452. Is it inferior to Burma teak?—We think it is just as good, but we have not got so many of the bigger trees.

4453. What do you charge per sleeper?—We charge Rs 4-40 per sleeper for metre gauge.

4454. And for broad gauge?—We do not make them for broad gauge; our big forests are all down south, where the railways are metre gauge.

4455. Still, they can be transferred to the broad gauge. The *kutch* roads in the forests are all bridged and can be used by motor cars?—We have got some roads with bridges.

4456. Are they all bridged properly?—Some of them are bridged and some not.

4457. Is any attempt being made to bridge all of them?—We are building bridges.

4458. *Sir Henry Lawrence*: You know that experiments in charcoal were made 10 or 12 years ago by Mr. Hodgson in the Belgaum forests?—Yes.

4459. Are they being carried on now?—They were dropped towards the end of the war, I think.

4460. But they promised success about 10 years ago?—Yes. Experiments are being actually carried on on the same lines in Khandesh and Satara now.

4461. What is your forest budget, what is roughly your income and what is your expenditure?—The income is about 73 lakhs and expenditure about 40 lakhs.

4462. You remember the days when your income was 20 lakhs and your expenditure 25 lakhs?—I never knew it quite as bad as that, but certainly our income was a great deal less than it is now.

4463. Your budget shows a much better appearance now than it did 30 years ago?—Very much better.

4464. *Professor Gangulee*: With regard to the question of villagers planting trees in their holdings, I should like to ask you whether your department encourages that sort of thing?—In a small way we have done it in Kanara. We have got people to do it a little, but I cannot say we have done much in that direction.

4465. Is there any scope for it?—It requires a good deal of teaching but it would be a very good thing if we could get them to do it.

4466. You have a suitable forest nursery where they could buy suitable plants?—They do it directly from seed.

4467. Do they come to you for seed?—Yes. They are quite free to go in and collect the seed themselves if they like.

4468. They do not come to you for assistance?—They do occasionally.

4469. *Sir Ganga Ram*: One of the cultivators complained that the forest is a source of misfortune for them because wild pigs shelter in the forest, come out to feed and damage the crops?—Yes; wild animals do. That is true to a certain extent.

4470. *Mr. Calvert*: (Is it a fact that in the forest areas people live very largely on forest products?—We have wild tribes like Bhils. They feed on forest fruits, etc.)

4471. Have your cultivators very valuable rights in the forest?—They have very valuable privileges; they have very few rights.

4472. *The Chairman*: Have you commenced recruiting for the new superior Provincial Service?—No.

4473. When will that commence?—I think we shall have to start next year.

4474. Do you anticipate any difficulty in engaging a sufficient number of officers under that system?—It is very hard to tell. Up to now we have recruited for our old Provincial Service; we do not know whether we shall get the same type of men or possibly men with a little better education for the new Provincialised Service.

4475. That service is taking the place of the old Imperial Service?—Yes.

4476. There is one central training Institute at Dehra Dun?—Yes, they are just starting the new training there.

4477. Will you tell the Commission about that? Have you any views?—The Bombay Government have made no rules yet about recruitment or training, but I presume that our men are to be recruited in this country and that they will be sent to Dehra Dun for training. I do not know whether they will be better than the old provincial men.

4478. If you have any views as to the relative suitability of central training stations and provincial training stations, we should like to hear them?—We only recruit one or two men per year and we could not keep up a training class for that.

4479. There would not be enough to train?—No, there are only one or two per year.

4480. You must have a definite training centre? You could not train them by attachment to your existing staff?—Naturally they would have to go to a college for 2 years' training; that would have to be Dehra Dun as far as I can see.

4481. So that on the whole I gather you are in favour of the Central institute at Dehra Dun?—Yes.

(The witness withdrew.)

Mr. OTTO ROTHFIELD, Khairpur Mir, Khairpur State, Sind.

Replies to the Questionnaire.

QUESTION 3.—(a) I should rank easily first—putting the right man in the right place and leaving him there. Personal influence has done more than anything else to influence the practice of cultivators.

(b) My main suggestion is that full accounts showing all expenses must be kept, published and explained. The cultivator is interested in the business side.

(c) Concentration and intensive work in small areas.

(d) Successes.—(1) Introduction of cotton-growing among the wildest people in one of the wildest tracts of the Presidency—cause—personal influence of Mr. Trikamlal Lakhia.

(2) Improvement of Khandesh cotton—cause—chiefly, I think, Dr. Mann's personal interest.

(3) Renaissance of good Surat cotton—cause—the personal influence of Mr. Bhimbhai under Mr. Keatinge and Dr. Mann *plus* the good selling arrangements made.

(4) The popularisation of Spanish ground-nut first in the Deccan and now also in Prantij and other parts of Gujarat—cause—not specially known.

(5) The increase in fruit-growing and handling, *e.g.*, in Khandesh—cause—the teaching of the Agricultural Department.

(6) The popularisation of iron-ploughs, especially in the Deccan—cause—constant display by the Agricultural Department and the discovery of a good and pushing firm to make and sell them.

QUESTION 4.—(c) (i) The outstanding defects of the Agricultural Department in the past have been **(a)** that the officials were too apt to want volume in their results and would therefore go to the big landlords and neglect the small holders, **(b)** that the officials were too much bureaucrats and too little public servants, **(c)** that the department was not co-ordinated with the kindred departments, especially the Co-operative, and it was not part of a separate homogeneous Ministry.

The Veterinary Service has been too small—and too neglected—to count at all.

I should note that in Bombay the defects noted above in the Agricultural Department have been remedied to a great extent in the last five years.

But a thorough administrative improvement cannot be expected till the now obsolete "Secretariat system" is replaced by a system of Ministries like that in vogue in other countries.

(c) (ii) The Railways sometimes manipulate rates to the prejudice of the agriculturists. (Of course the wagon trouble hits the agriculturists too.)

At present there is still no method of putting popular pressure on the administration of railways.

QUESTION 6.—(a) (i) The main cause of borrowing is that the cultivator needs money while the owner of money looks for investments. There were until lately—there are even now—few reasonably safe methods of investment in this country.

(ii) The sources of credit are **(a)** the village shopkeeper, **(b)** the taluka town *sowcar*, and **(c)** the co-operative movement.

(iii) In the majority of cases the main cause of failure to repay is that agriculture is a losing business to the defaulter. Sometimes the cause is temporary depression, *e.g.*, famine. The main trouble about the Indian cultivator is not that he repays too little but that he repays too much.

(b) No special measures of the kind suggested are in my opinion of any use whatever. If the law is bad, it should be amended as a whole: if it is good, it should apply to the agriculturist as to every other citizen.

The general measure which is necessary is to do all that is possible to see that the cultivator is allowed a decent profit for his work, not merely by securing better and fairer marketing, punishing fraud and so on, but also by securing that there is no more dodging with protective duties, cotton excises or exchange against his consent and agreement. A strong and enlightened "Country Party" is a necessity of the agricultural situation in India. At present cultivators (or the co-operative movement which is their best representative) have too often no voice on those questions of finance, taxation and administration which concern them even more acutely than the leaders of "big business." The burden of debt will be lightened as soon as cultivators obtain a larger say in Imperial policy and thereby increase their profits.

The only special measure that I recommend is education and propaganda to explain the uses of the Insolvency Act to the cultivator. Incidentally, co-operative schemes of debt-redemption can never be successful till much more use is made of that Act.

(c) The right to mortgage and sale should be restricted and controlled in backward areas for limited periods but not generally. Non-terminable mortgages appear to be used only for fraudulent purposes—if so, they should be prohibited like every other form of fraud.

QUESTION 7.—Yes. I should like to develop this in my oral examination, if allowed.

QUESTION 8.—(b) No one is satisfied with the existing methods. The main defect is payment by area and not by water. Co-operative methods of distribution and control should be introduced. By-laws for this purpose were drafted in the Bombay Presidency in 1923 at suggestion of special committee of 1923 but have been turned down after three years' incubation by Government because the Irrigation Department stated that some different and unorganised schemes worked on rather different methods had not "caught on" though as a matter of fact two out of four were successful.

QUESTION 11.—(a) (iv) The fencing (or rather "walling-in") of cultivators' fields on a co-operative basis has proved successful in this Presidency. In order to make these schemes more successful and more just Government should contribute its share to the expenses in proportion to the waste land in the village. At present Government stands to derive the greatest immediate pecuniary advantage with no direct outlay.

QUESTION 18.—(a) No special measures are needed in the parts of India with which I am familiar.

Better wages and better housing would be the most effective methods of attracting labour. But of course in all countries people find the country "dull" and are attracted by the vices and glitter of towns.

The causes of shortage of labour are many, e.g., high death-rate; preference for trading; caste impediments and so on; but they are causes which will only gradually be removed.

QUESTION 20.—(a) Not very satisfactory. I cannot, however, give the details required.

(b) No. I am not satisfied.

(c) By co-operative marketing with the aid of agricultural experts.

(d) Yes.

QUESTION 22.—(a) and (b) These are matters on which I would request permission to make my remarks orally. Generally I would say that I should like to see a great deal more money spent by Government in putting experts at the command of co-operative societies for technical advice and work, and also in assisting propagandist and educational institutions. On the other hand, speaking for India generally, I should like to see official control removed as far as possible, which in my opinion is somewhere about the point reached in France and in the Bombay Presidency. Further I should like to dwell on the capital importance in India at this stage of its development

of the field of banking being occupied to the utmost by the co-operative movement.

(c) Yes. Certainly.

(d) In the main, yes. But there are many qualifications.

QUESTION 24.—(a) None in my opinion.

(b) Expensiveness of money is probably the main cause. How can any improvement be successful when the interest on capital is seldom less than 10 per cent? But the extreme difficulty of obtaining technical advice is also a great impediment. The other discouraging factors are obvious.

QUESTION 25.—(a) Housing, water-supply, and birth-control are probably the three main needs.

(b) Such enquiries are needed; but I should prefer to see them done by non-official agencies, though Government may reasonably be asked to pay for them at least in part. The methods followed by Dr. Mann, Professor Gilbert Slater, Mr. Patwardhan for the Registrar, Co-operative Societies, Bombay, and the Central Co-operative Institute, Bombay, are each good in their way. The ideal may perhaps be found in an amalgamation of these methods.

(c) I should prefer to answer this orally if permitted.

Oral Evidence.

4482. *The Chairman:* Mr. Rothfield, you are a retired officer of the Indian Civil Service?—Yes.

4483. You have been good enough to put in a series of answers to the Questionnaire for which the Commission is greatly obliged to you and which we have all read with much interest. I should like to take you through that document, unless you wish to make any general statement; I shall give you an opportunity of amplifying any particular points?—I only wish to apologise for the shortness of the replies and the fact that it is not very carefully done, but I only arrived in India on Friday and only got the Questionnaire when I came up here on Saturday; I was not able to do it as well as I should have liked to have done it.

4484. I do not think the Commission will complain of short answers. Your answer to question 3 (b) on page 163 is: "My main suggestion is that full accounts showing all expenses must be kept, published and explained. The cultivator is interested in the business side." I take it that what you mean there is that accurate costing on all operations on demonstration plots, and so on, should be kept?—Yes.

4485. So as to disabuse the cultivator's mind of the idea that all the resources of Government have been put into the crop?—That is what the cultivator usually says.

4486. And he is sometimes right, is he not?—I am afraid so, yes.

4487. There is a rather more formidable proposal on page 163: "But a thorough administrative improvement cannot be expected till the now obsolete 'Secretariat system' is replaced by a system of Ministries like that in vogue in other countries." Do you care to develop that at all?—One of the great drawbacks of the present system is that the heads of departments have to work officially, or should I say on paper, with the political heads of the departments, the Ministers, through the Secretariat, which was devised before the reform scheme came in and is no longer appropriate. Take, for instance, the particular departments with which the Royal Commission is concerned: the Agricultural, Co-operative and Veterinary Departments. I will leave the rest aside for the moment. Agriculture and co-operation are under the same Minister, but interposed between them and the Minister is a Secretary who is really the Secretary of the Revenue Department. Usually, I admit, there is also a Deputy Secretary, whose attentions are more devoted to the Transferred subject but who works definitely under the Revenue Secretary, and who naturally cannot assume the responsibilities which depend on the Secretary. Now the way that works in practice is that, for instance, the Registrar, let us say, or the Director brings up to the Minister certain proposals for a change in policy for discussion and approval. He goes up to him as the permanent head of a department naturally would in any country. The Minister approves of the proposals. They are then drawn up in detail. They are then submitted through the Revenue Secretary, and, in conformity with the old Secretariat system, the Revenue Secretary naturally thinks himself entitled not merely to criticise the form of the proposals and to see that they are put up in a correct form, but also to start revising the matter of the proposals already approved by the Minister. In other words, the head of the department and the Minister find between them a person whose primary duties are, after all, concerned with another subject, but who, all the same, under the prevailing system is sufficiently in authority to control not merely the form but also the matter.

4488. Was the origin of that method of working which you describe as the Secretariat method founded in the conception of finance as the vital matter in all administration?—No, I wish to guard myself against any confusion on that subject. No one for a minute can complain of the interference of the Finance Department; there must necessarily be a strong Finance Secretariat, and no head of a department in this or any other country could possibly object to his proposals, as far as they involve finance, being subjected to a

Finance Department. That is not the origin of what I have called the Secretariat system. As far as I can trace it, its origin lies in the fact that the Government used to consist of a perfectly united body consisting of His Excellency the Governor and two Members of Council, corresponding with district officers in the various districts and necessarily having to have some one, who was originally little more than a clerk, to convey the rather rare letters to their agents in the districts, receive the answers, file them and collate them. While the departments grew the central conception remained for a long time as it was, centred on two official Members of Council and the Governor, and the same system fitted in perfectly well, except that the clerical staff, filing arrangements and so on had to be extended to meet the increasing work. But the point has been reached now when there has been really a complete change of the Governmental system as you may say, while on the other hand, the Secretariat system still remains as it was when it was introduced under very different circumstances.

4489. What experience have you of these matters yourself? I am not quite clear what branch of the service you were in?—During my last 3½ years I was Registrar; I was also a member of the Legislative Council for 3 years.

4490. Turning to a very different subject, on page 163 of your memorandum, question 4 (c) (ii): "The railways sometimes manipulate rates to the prejudice of the agriculturists." That is a charge of some substance?—When I used the word "manipulate" I did not necessarily mean dishonest manipulation; I mean that they use the rates to benefit dealers in certain centres and actually to hit the agriculturists. I did not intend to imply anything otherwise disparaging. There are instances where it told very severely against agriculturists. For instance, in 1911-12 there was a very severe scarcity, I hardly like to call it famine, in the Broach district. In consequence, grass had to be brought by cultivators from Central India to the Broach district. But the railway, in consequence of a certain rate-war they were then carrying on, fixed the rates in such a way that, for instance, it was actually cheaper for a cultivator to fetch his grass from Central India to the town of Broach, which is fairly in the south of the district, unload it, re-load it on a train or on a cart, and take it up to the next station or the second next station to the north rather than book it to those stations directly.

4491. From your experience and looking at things from the broadest possible angle, do you think the railways fail in their service to Indian agriculture?—No, I do not think I should be justified in saying that.

4492. On page 163 you say: "The main trouble about the Indian cultivator is not that he repays too little but that he repays too much." That is a little cryptic; would you care to expand that at all?—There is such a very strong feeling of honour amongst the Indian cultivators in regard to debts incurred, say, by their father or even by their grandfather, that they will go on crippling themselves generation after generation in repaying the interest on those debts rather than take any steps to be done with them once and for all either by the Insolvency Act or by giving up the land and buying other land again if necessary.

4493. You mean the debt grows out of all proportion to the security; where the security is land, the cultivator might well part with the land, clear himself of his debt, create a little more debt and buy some more land?—Almost always.

4494. Would you publicly advocate that step?—I have advocated it in co-operative societies.

4495. What proportion of cultivators in this Presidency are aware of the existence of the All-India statute called the Insolvency Act?—I have no idea; I could not give a figure.

4496. Question 7 on page 164: you answer in the affirmative and say you would like to develop that answer. Will you kindly do so?—The point I made in dealing with this question which exercised my attention with the Hon'ble Minister for a considerable part of my service as Registrar was to make a distinction between sub-division properly so-called and fragmentation. By

sub-division I understand sub-division on inheritance and succession. By fragmentation I mean the dividing up of fields into very small fragments from whatever cause it may be. I personally am not convinced that sub-division by inheritance has directly caused so very much injury; but, whether it has or not, I am certainly convinced that any direct interference with it by legislation would be a very grave political error. On the other hand, I am certainly of opinion that fragmentation ought to be remedied as far as possible by what appears to me to be not particularly difficult legislation or by voluntary effort where possible in the way of re-stripping, and consolidation. Actually I proposed certain lines of legislation, after a study of the legislation in other countries, to try and effect this in this Presidency, and I understand that a draft of a Bill very much on those lines is at present being circulated by the Government of Bombay. Of course, I am also well aware of the excellent voluntary work done in at least two districts of the Punjab to consolidate fragmented holdings, largely due, of course, to the personal influence of Mr. Calvert. In those parts of India where it is possible, I should strongly advocate all co-operative measures being taken to ensure a voluntary effort in that direction. I must add that I think we are all of us rather apt to assume facts in regard to increase of fragmentation and sub-division of which there is remarkably little proof. As far as this Presidency is concerned I went into the figures as well as I could, with, I admit, a bias from my experience in favour of thinking that there was an increasing amount of fragmentation; but I must honestly confess that the figures I was able to obtain, though they may have been corrected since, did not go very far to prove it.

4497. You think there is a point where the normal means of consolidation counterbalance the natural tendency to further fragmentation?—I have never been satisfied as to what the cause is, but that is what I had to surmise was the case.

4498. Did your proposals include any principle of compulsion at all?—Yes, I think if you are going to legislate at all you must introduce compulsion. The basis of my proposals, and I think the basis of the present proposals, is option to move for a scheme of consolidation, and majority compulsion once the scheme has been drawn up.

4499. More than 50 per cent being a sufficient majority?—The original proposal was two-thirds, but I notice it has been pointed out by various officers since, and probably with justice, that in India a majority of two-thirds would be too much to ask, and 50 per cent has been suggested by several officers.

4500. 50 per cent of cultivators or 50 per cent of the land?—50 per cent of acreage I think is the basis; I cannot be quite certain.

4501. On page 164, in questions 22 (a) and (b), you have given us a short note and I understand there is more which you would like to give us?—Generally speaking, I think that Government might do more by spending more money on propaganda and by ensuring a more thorough audit where there is a system of official audit, by increasing the number of auditors.

4502. Has it been your experience that the audit has been definitely faulty?—No, I think the audit done by the Government auditors on the whole was an excellent one, but there was always a tendency to ask them to do more than they could do, and in consequence there was a tendency for audits to fall into arrear. Looking at the figures which I have now seen in this year's report, the same thing appears to me generally to be still the case; but of course, the present Registrar can deal with that better than I can.

4503. You are concerned with an extension of the facilities?—Yes, but I certainly consider that the actual founding of more societies, the encouragement to found more societies and the guidance to societies should be done by non-official agencies. I do think that on the whole the relationship of the Government official to the movement should more and more rapidly tend to be that of confining himself to his statutory duties, and that the Government effort should be in the way of giving money to be spent on

propaganda as far as possible by a non-official agency, and also in supplying expert aid to societies. /

4504. That is to say advice as regards constitution and conduct as well as propaganda in favour of the initiation of societies?—I was not thinking so much of advice in regard to constitution and conduct *qua* co-operators, but, for instance, if they have a dam to build for irrigation purposes, to ensure that engineering advice should be given to them gratis if possible, or at a very small charge.

4505. That is for minor improvements of that sort?—Yes.

4506. When you say irrigation works, what are you thinking of?—I mean minor irrigation works done by co-operative effort.

4507. I take it from your experience you do advocate the provision of skilled advisers in the earlier stages of the society's life, do you not?—Do you mean official advisers by your question?

4508. I was careful not to say which I meant?—Certainly, some advisers there must be.

4509. Ultimately do you contemplate the withdrawal of those crutches, and the society being able to manage itself?—Hardly; I think there will always be need of advice, supervision and inspection from outside; but I should like the advice to be outside the society but within the movement.

4510. In other words, you think the Central Co-operative Organisation should provide it?—Yes, it and the financing agencies.

4511. And not Government?—No, except to the extent of audit; in the conditions of India certainly I am personally of opinion that an official Government audit is necessary.

4512. But otherwise, non-official assistance and advice?—I think so, except to the extent that the Registrar at the top through his statutory duties necessarily must exercise to some extent strong advice in the framing of policy; the very fact that he performs those statutory duties gives him great weight with the non-official bodies.

4513. Why do you despair of these societies reaching a stage in development when they might be able to find from within the members of the society a sufficient managerial capacity to carry them on?—Because I despair of human nature to that extent and do not think that people anywhere are able to do without higher authority and control.

4514. Do you think that under no conditions is the primary society capable of providing efficient management without supervision over and above audit from above?—I cannot go so far as to say that; I think there might be instances in which the primary society may manage itself very well, but that would not to my mind alter the fact that supervision is required. May I suggest an analogy? There may be towns and villages which are so peaceful and law-abiding that the police force has nothing to do, but I would not suggest withdrawing the police.

4515. At the end of your note of evidence you say you are prepared to answer question 25 (c) orally. Will you do so?—It is extremely difficult to give any generalisation at all; that is really the first and last broad conclusion I have arrived at in this connection. The conditions in this Presidency alone, for instance, vary so enormously that to my mind the great thing one has to guard against is generalisation. I have no doubt whatever that there are certain districts and certain classes of cultivators and even agricultural labourers, perhaps, who have attained considerably higher prosperity now, for instance, than they had 20 or 30 years ago. I must at the same time say that I am equally convinced that there are large tracts and very large percentages of cultivators whose conditions have become appreciably worse in the same time. We are dealing in Bombay, anyhow, with extremely complicated and extremely difficult economic conditions, and I should doubt if there is any single man, Indian or Englishman, official or non-official, who can really give a thoroughly sound opinion outside the limits of a very small area. We have in the Deccan roughly 750,000 cultivating owners. On refreshing

my memory with the papers, I saw that 66 per cent of the holdings in the Deccan, 332,000 holdings, are less than 5 acres, and that is in a plateau which at the best is very infertile and arid. It is quite obvious that those people are not making a profitable business out of agriculture. But one cannot go on and draw the logical conclusion that the land is going out of cultivation and out of ownership. It does not seem to be so; on the contrary, you have the very remarkable fact that in the Deccan a very much larger percentage of cultivable land is actually cultivated than you have in the fertile districts of Gujarat. I am not quite sure of the figures, but I think I am right in saying that in one of the Gujarat districts the proportion of cultivable land which is in fact cultivated is about 60 to 70 per cent while in the Deccan it is somewhere about 90 per cent. A fact like that at once causes one to pause in drawing any conclusions. Then you have conditions like those of the Konkan where the number of tenants is enormously larger than that of the cultivating owners, and where only about 45 per cent. of the cultivable land is cultivated, although there is actually no rain-failure and no possibility of rain-failure one may almost say. What I personally am inclined to think is that the average small cultivator in the Deccan finds it not only sentimentally agreeable but also expedient to him to retain a small holding and work elsewhere as well, because, although he is very often, I believe, paying for the luxury of having it, it gives him a holiday and it gives him a certain amount of produce which he likes to eat.

4516. And some prestige?—Also prestige, I certainly think it is politically extremely healthy that there should be this attachment to the soil and that they should be kept there.

4517. Statistics seem to show quite plainly that there has been an enhancement in the number of small owner cultivators at the expense of the purely agricultural, often landowning labourer?—I think they do, but I would not have said the statistics which I have obtained show that quite plainly. Are you speaking of the last census?

4518. I think so; it has been given in evidence before the Commission and was founded, I think, on the last census?—I have got the figures of the last census here as far as they bear on that, and I do not find them very plain, but I admit the figures are extremely difficult to distinguish. The general tendency I think has been that of distinct migration from the small towns to the large cities, but remarkably little migration from the villages to either.

4519. There was a suggestion that although agricultural wages had risen, there had been no tendency for that fact to attract more of the rural population to work purely as labourers, but that rather in fact there had been during the period of rise in agricultural wages an increase in the numbers of small cultivators?—Yes, I should say if anything there is an increase in the number of small cultivators, and I think there is very little to show that labour has increased. I think labour is more or less stationary and the cultivator has increased.

4520. Can you account for the fact at all?—I think probably it is due largely to sub-division and probably also I think to greater prosperity. I think that must be so, but it is very difficult to fit in with the facts, I admit. If one takes the Presidency as a whole, the cultivator I suppose has been more prosperous, which is shown I think by the fact that his womenkind work less than formerly. I suppose that prosperity has tended to make people buy land if they could, but that is the only suggestion I can make about it.

4521. I take it you agree that probably the small cultivator might be able to improve his cash position in life by giving up a small and uneconomical holding with which he is struggling and definitely taking up work as an agricultural labourer?—One would think so. There may be things attaching to the cultivator which the labourer has not. I overlooked question 5, which is more or less connected with co-operation; if you would like to ask me any questions about it, I should be very pleased to deal with it. I

happened to have to deal with the subject of *taccavi* just before leaving, and the policy to be adopted by the Bombay Government.

4522. Will you tell us about that?—I personally am entirely against going on with the Government system of *taccavi* under the Agriculturist Loans Act and would also prefer to see it dropped under the Land Improvement Act except so far as it is given through co-operative societies. I must confess that I consider *taccavi* to be a system which is now absolutely obsolete, and, moreover, one which however much it is given within the means available to any Government can only just touch the fringe of the requirements of credit. In this Presidency it has been estimated, I think fairly correctly, that the cultivators need every year between 20 and 25 crores of rupees. It is inconceivable that any Government, however large its revenues, would give anything much over one crore as *taccavi*, so that at the best it could only just touch the fringe of the matter; while, on the other hand, I consider the evils done by lending Government money under the Agriculturist Loans Act in the present economic state of India are very great and have practically no counterbalancing advantages. I would like to see *taccavi* given, if at all, only in specified backward tracts or in a famine year. But in a famine year, if assistance is to be given under *Taccavi* Acts, even then I think it should be under the Land Improvement Act rather than the Agriculturist Loans Act, under which money is always wasted. Certainly in the more advanced parts of India, here in this Presidency and I should think in Madras, the cultivator can now be very well left to the co-operative movement and other indigenous banks in so far as he is not a member of the co-operative movement. Naturally, I should prefer the co-operative movement.

4523. I can understand the virtue of confining Government loans to the avenues of co-operation, where co-operation exists, but where you have large areas where there is no co-operative credit, would you withhold all Government loans?—Even there I think so. I cannot think that a few doles of Government loans are really going to help them very much towards the solution of the problem of their credit in such areas whereas it is certainly going to retard the growth of the co-operative movement in those areas. I think the sooner they learn self-help the better for them. The only exceptions I regard as worth considering are those of one or two wild tribes or one or two castes holding on special tenures where for one reason or another the tenure itself makes it almost impossible for them to obtain credit in the ordinary way.

4524. There is no basis of credit?—Yes. As to the question of long-term credit, the real difficulty, of course, in the co-operative movement is the provision of long-term credit, not only here but in every country. Although co-operative banks do and will do their best to meet the difficulty by getting people to take up shares and make as many long-term deposits as possible, yet it is and will for a considerable period to come be very difficult for them to obtain enough long-term money to be able to lend to cultivators for periods of between 10 and 20 years. There I think it is inevitable and necessary that Government should step in and assist, but not necessarily in the form of *taccavi* under the *Taccavi* Acts. What we are doing in this Presidency is that Government puts money into the Provincial Co-operative Bank in the name of the Registrar, that money is distributed by the Provincial Bank in conjunction with the Registrar to District Banks, and through them to primary societies for the purpose of land improvement on schemes drawn up and approved.

4525. Is the commercial and industrial community interested in land mortgage as a basis of security? Are they inclined to lend on the security of land mortgages?—The idea has been taken up here after I left and I would rather not express an opinion about it.

4526. Sir James MacKenna: On page 164 of your note on the point on which the Chairman has just been examining you, you say: "On the other hand, speaking for India generally, I should like to see official control removed as far as possible, which in my opinion is somewhere about the point reached in France and in the Bombay Presidency." What stage have you reached in

the relaxation of official control in Bombay?—We do an official audit; we provide advisers like the people who advise in regard to cotton, and the Registrar and Assistants inspect; they give such advice as they can either directly or through the controlling agencies, and the Registrar, of course, exercises the statutory powers of registration and cancellation. But even in regard to inspection the remarks are confined to a minimum and are almost invariably communicated to the self-governing body immediately over the society inspected.

4527. Do I understand you are of opinion that audit should remain official?—I am strongly of that opinion.

4528. How far down in the co-operative scale would you carry it?—To the primary society.

4529. Do you not think it would be better and would encourage business training and method if that audit could be done by societies themselves?—I do not think it would do very much to encourage their business capacity; I think it would only result probably in a slipshod audit. As a matter of fact, in this Presidency that suggestion has been seriously made, but after consideration it was rejected by non-officials as well as officials. The suggestion was that an inferior non-official agency under the guidance of the Institute or some similar body should be substituted for the existing official agency.

4530. You are afraid that the audit by the agency suggested would be slipshod?—I am almost certain of it.

4531. You would not limit it to super-audit?—I do not think so, because I think the importance of the first audit is so very great, both for public credit and for the society itself, that I think a mere super-audit is not enough.

4532. Who audits the accounts of the Provincial Central Co-operative Bank?—They are audited by our department and also by a private firm of Chartered Accountants.

4533. There is a delicate point on the question of administration. Did I understand you correctly to say that when a scheme has been put up by a departmental Head and approved by a Minister, it is subject to criticism and amendment in the Secretariat?—Yes, certainly. It is subject to criticism during the process of going up to the Minister for the subsequent issue of his official approval. The official order of approval, the so-called Government resolution, is issued by the Revenue Secretariat, not by the permanent Head of the department who works with and under its political Head. If the Secretary of a Reserved department takes the matter up for discussion to the Member in charge and it is initialled, the Secretary then issues the orders; there is no other intermediary. When, however, the Head of one of the Transferred subjects (who is not at present classed as a Secretary) takes a proposal to the Minister and it is approved, it is not initialled in that sense, and the Head of the department cannot issue the orders himself. He has then to send it to a Secretary not belonging in any real sense to his own department or ministry, and this Secretary then starts treating the whole thing *de novo*.

4534. You do not know whether that system is peculiar to Bombay or not?—No, I do not.

4535. *Professor Gangulee*: On page 163 you point out defects in the Agricultural Department, and you say that in the past "officials were too apt to want volume in their results and would therefore go to the big landlords and neglect the small holders." Do you not think that is an inevitable process?—I think it was inevitable, but I do not know that it need go on.

4536. Agricultural improvements will percolate through from the big landlords to the small cultivators, will they not?—We have not in this Presidency any big landowners who cultivate themselves, and nothing passes through them to the small cultivators. All the cultivation in this Presidency is done by small cultivators, whether tenants or owners.

4537. Granting that this is a serious defect, can you suggest how the Agricultural Department can bring the results of its experiments directly to

the notice of the small holders?—Certainly; by what we are doing here, through the co-operative movement.

4538. Precisely how? Supposing better seed of some kind, or a new variety of cotton, has been produced by the Agricultural Department, how would you proceed to introduce that and give it to the small cultivator without taking any steps to interest the big landlords?—I may say at once that in most districts that grow cotton there are no big landlords. What we do is this. The Director of Agriculture and the Registrar of Co-operative Societies, if something quite new has to be considered, meet together and arrange jointly the programme to be followed. The directions issued go to the Taluka Development Associations, on which the Assistant Registrar and Deputy Director will sit. Then we have various Cotton Organisers, men who belong to the Agricultural Department who are working under the Co-operative Department and who are controlled by the two officers jointly to a large extent. These men go amongst the villagers preaching the virtues of the new seed. They show it and get the societies to agree to buy it and distribute it, or to sort it and sell it, as the case may be. Officials on both departments go amongst the villagers in the co-operative societies and talk about it, and make it their business to see that the cultivators thoroughly understand the thing.

4539. But there is no actual demonstration of the value of using the seed; you simply talk about it?—There is very often a demonstration, and I think I am correct in saying that nowadays plots are obtained as a rule through the co-operative society (from, of course, some member of the village) and the experiment, or demonstration, is made on such plots.

4540. Referring to another defect, you point out that the department was not co-ordinated with the kindred departments. Have you any definite idea how the desired co-ordination might be brought about?—I have. As a matter of fact, we have in this Presidency in the last few years gone a very long way towards securing it by the fact that both Agricultural and Co-operative Departments work under one Minister. That has enabled us to make arrangements, perhaps, not of a very rigid nature, by which the two officers concerned work together on all important questions. If necessary, joint cases were submitted to the Minister. Departmental Joint Boards were instituted, and that process was carried right down. I think that as far as it goes the system now existing in this Presidency is very satisfactory. My only objection to it is that which I have already mentioned in answering the Chairman's question in regard to having a Ministry or continuing under the present Secretariat system. The drawback to my mind was not in the work of the two officers concerned, but that in the case of a difference of opinion between them there was no recognised channel of approach to the Minister for the issue of official orders.

4541. You refer to kindred departments. Do you mean the Co-operative and Irrigation Departments?—I was thinking of those which come under one Minister. Irrigation presents very great difficulty. It might be put under the same Minister, but there are great difficulties in the way. It belongs more to Public Works.

4542. Veterinary?—Veterinary, certainly, and I think Forests.

4543. Education?—No, I think that is separate.

4544. Not primary education?—I think not.

4545. In what you say about railway rates, do you refer to the rates for agricultural produce or manure, implements, etc., or to all rates?—I do not know enough of the details now to be able to say. I used the word "manipulation" but what I had in mind was this. Latterly rates have been raised owing to the cost to the railway of some of their material, the price of which has been increased by putting protective duties on steel without the agriculturist being consulted. After all, he is the person who has to pay the duties, and in my opinion he should have been consulted in an organised way before the duties were imposed.

4546. On page 164 you say "A strong and enlightened 'Country Party' is a necessity of the agricultural situation in India." Are you referring to the

formation of an agrarian party in this country?—I was thinking of the political parties under the new reformed Government in this country. At the present moment there is no party which is specially interested in agriculture and I think the sooner there is a 'Country Party' the better it will be for the country's development.

4547. With regard to the control of the co-operative movement by non-official agencies, are there sufficient non-official agencies in the country?—I would rather not speak for other Presidencies. At the present moment there are enough in this Presidency to do the work which I suggest.

4548. Would you find such agencies in village areas, for instance?—Yes, we have our organisers and the district branches of the Institute.

4549. These organisers belong to the particular village area?—Yes.

4550. *Mr. Calvert*: In your experience as Registrar did you find the Usurious Loans Act was much availed of in the courts?—I have never heard of its use in this Presidency.

4551. Is it your experience that the right to mortgage land is utilised to obtain funds for productive purposes such as land improvement?—Very seldom for land improvement.

4552. Would not there be a little difficulty in preserving discipline in co-operative irrigation societies, in that you could not very well expel an irrigator who was entitled to participate from the same outlet?—It is a very difficult problem. It can only be met by being arbitrary and investing them with powers, I think.

4553. Why do you think official control is necessary? Why not educate a society to manage its own affairs?—I find it very difficult to put what I mean into words. I have not that trust in human nature, and I know of no countries, except Denmark and England, which have been able to carry on the co-operative movement without a good deal of official control. The circumstances of certain intensely individualist countries like Denmark and England are very different from those of India, and to my mind the analogy appears to be rather with the practice in France and practically every other European country. Another point is that if the co-operative movement is ever going to do what, after all, we as co-operators look forward to as the ideal, and that is, almost to be the State itself in all its economic aspects, it appears to me essential that the State in its political aspects should also to some extent control the co-operative movement inasmuch as it will also be controlled by it.

4554. From your experience of this Presidency you do not think the co-operative movement is going to be able to do without control?—May I ask if you are asking me whether I think the primary society will ever be able to do without control from above?

4555. The two points of difference are that whereas in the Punjab we try to educate the members to manage their own affairs entirely, you envisage control from outside?—From outside the primary society, certainly.

4556. You have not tried educating the members to do without control?—Yes, I think we are trying to do it the whole time. We are trying to make them entirely self-managing, and I believe I am right in saying that as a matter of fact there is a very much larger percentage of our societies which are entirely self-managing (which write out their own accounts, and conduct their whole business very well) than is the case in the Punjab or in any other Province. We have never suggested to them, however, that the time would come when they would be free from inspection by, for instance, the financing agency, or from audit by the Government auditor or from guidance.

4557. Who controls your District Banks?—They are controlled by the Directors, who are mostly chosen by the primary societies; but happily the District Banks are now brought into what amount to disciplinary relations with the Provincial Bank. The Provincial Bank supervises them.

4558. Has not Bombay gone further than any other Province in India in its legislative control over societies?—I suppose so. We have more definitely

stated in our legislation the points where we consider that control by the Registrar must continue than any other Province has done, but we confine ourselves strictly to those.

4559. And to circulars from the Registrar's office?—Yes, certainly.

4560. To an extent unknown in other Provinces?—That I am unable to say.

4561. Is not your non-official agency largely drawn from the non-cultivating classes?—Largely, yes; but not in the majority.

4562. What exactly is your objection to the co-operative leaders being actual cultivators who may be born leaders of men even though they may not be what we call "educated"?—I have no objection at all; we welcome them, if we can find them.

4563. Would not that be a better ideal, to find cultivators with the gift of leadership rather than non-cultivating outsiders?—Yes, but in this Presidency there is no sharp distinction between the two classes. We have a great many people who are both professional men and landowners interested in cultivation.

4564. I am speaking not of landowners but of cultivators?—The small landholder in this Presidency, whether he be a professional gentleman or not, does not actually plough himself, but he does look after the cultivation to some extent.

4565. I am referring to the man who guides the plough?—That would be the ideal state of things, to get the actual ploughman who has studied Marshall and books on banking generally.

4566. No, who has been taught by a highly trained staff for a period of years. You have applied to non-official audit the terms "inferior" and "slipshod." Is that based on comparison with your own?—No, on what it would have been had it been done here as it would have been done if the idea had been carried out of encouraging a rather cheaper audit by a non-official agency.

4567. You were not referring to Provinces where the audit is non-official?—No, to the scheme which was put forward here.

4568. Have you ever attempted to work out the proportions between secured and unsecured debt?—No, I have not.

4569. I gather from your note you are opposed to further amendments of existing Acts in order to protect the cultivator from exploitation?—I am not at all in favour of any special amendments or special legislation, but if the law is bad (and it is primarily for lawyers to say that) then it should be changed for all. I am not fond of the idea of special privileges.

4570. You have given a figure for cost of cultivation which works out at about Rs. 9 an acre. Is not by far the larger part of the cost of cultivation borne either by the labour of the cultivator's family or by labour paid in kind out of the harvest?—I am not sure what proportion it would be; I cannot remember the figures well enough. I have not had time to look up the basis on which these figures were arrived at.

4571. Have you in Bombay a new class of moneylending landlords?—Yes.

4572. Are they an evil?—They are usually even more unbearable than the old fashioned *sowcar*.

4573. *Mr. Kamat*: With regard to agricultural indebtedness, you have advocated the teaching of the uses of the Insolvency Act to the cultivators. Do you think the present cultivators are showing too much sense of honour in the repayment of their debts?—Too much ignorance, and largely too much sense of honour, yes.

4574. Do you not think the teaching of the Insolvency Act to the cultivators would be an extraordinary measure, demoralising the whole countryside?—More than the capitalist system?

4575. Do you know that in the olden days (from which time, of course, they have inherited their sense of honour) there was a counterbalancing factor.

namely, the law of *damdotat*, by which the moneylender could not exact more than twice the amount of the original debt?—Theoretically.

4576. Even in practice?—I have always been given to understand that was not the case.

4577. Do you not think the present tendency of the moneylender and the cultivator, by which each tries to defraud the other and, as it were, dodge the other, will be increased if you teach the uses of the Insolvency Act?—I think you are asking me to answer two questions at the same time: Is it an evil tendency? And would it be increased? It can be called an evil tendency, as every step forward is called. One is always told that the past was the moral age and the future will be the immoral one. The present phase seems to me an economic transition, such as you had during the thirteenth and fourteenth centuries in Europe, which is inevitable, and I do not see why the uses of Acts (which you can stigmatise as dishonest if you like) which are on the statute book should be confined to one side.

4578. You have referred to the sub-division of holdings and said there is no clear and conclusive proof that the evil is growing?—Yes.

4579. And that therefore you were against any legislation to interfere with succession and sub-division as such?—That is not the main ground, but one of them.

4580. When you say there is no clear proof, what period have you taken into consideration?—The period from 1900 onwards, with the important proviso that one must not be misled, as people often have been, by the figures previous to the Record of Rights Act. Only the other day I again saw statistics for 1903-04 compared with statistics of to-day. That is a useless comparison, but periods since the Act can be compared.

4581. You think there is no tendency for further sub-division?—It is very slight, if it exists at all. Perhaps it would be more correct to say it is not a serious tendency. There is a slight tendency, but not a serious one.

4582. If there is a slight tendency, as a preventive measure, would you not take into consideration the fact that if such legislation is passed in these days it means it will be passed by a majority of the people's representatives, and therefore the legislation would be justifiable?—I would not, because I think to talk of the people's representatives is begging the question. The legislation would be passed by people of a rather doctrinaire cast of mind belonging to the intelligentsia, and not by representatives of the villagers whom it is going to hit. Moreover, I feel sure that with normal conditions of development the tendency will correct itself, as it has done in France.

4583. Automatically?—By human action, of course.

4584. *Dr. Hyder*: How?—By birth control and later marriage.

4585. You are in favour of this course?—Of the control of sub-division? I am strongly in favour of the consolidation of fragmented holdings.

4586. I mean, you would advocate propaganda for birth control to check this evil rather than legislation?—It would be a much smaller evil than legislation at this stage, I think.

4587. Would you take cognisance of the fact that if such legislation were passed it would have to be more or less permissive; 75 per cent, or some such percentage, of the holders would have to be amenable?—In that case I think it would be useless. At one time I suggested, without pressing it, the possibility of constituting the so-called impartible family estate on the lines followed in France and Italy. That is the utmost extent to which I personally would be inclined to recommend action in regard to sub-division.

4588. *Dewan Bahadur Malji*: You were formerly Collector of various districts in Gujarat?—Yes.

4589. From your experience during that period, would you subscribe to the view that the result of education as given to-day is, unfortunately, that it tends to denude the countryside and add to the army of unemployed in the towns and cities?—I think so.

4590. Do you think agricultural education should be a *sine qua non* in the interior, where the majority of the people are agriculturists?—I would rather not answer that question; I have never gone into the technical side of it. I confess my first bias is against it, but I do not know enough about it to express any real opinion.

4591. After a certain stage is reached in primary education, would you permit agricultural education to be added?—Certainly.

4592. Do you know about the bias classes lately introduced?—No; I have only just heard of them.

4593. Perhaps one of the reasons why people are forsaking a country life is the possibility of getting higher wages in the industrial centres?—Seemingly higher wages, higher money wages; and also in this as in every other country the desire for cheap pleasures.

4594. If agricultural labour is organised with regulated wages and period of service (while at the same time not being turned into slavery) do you think people would stick to the villages?—Yes, to a much greater extent. I think the attachment to the village is greater here than in European countries.

4595. In the syllabus of rural schools, is it not necessary that the merit of labour should be taught by actual practice?—That again is a thing I have not really thought about.

4596. You told Mr. Calvert you would not advocate any exemptions to societies in business matters, or something like that; you would not afford them special protection?—I was not thinking of societies when I answered.

4597. Protection for the weak generally?—Protection is given by the special Co-operative Act, of course.

4598. Particularly in reference to the consumers' movement, where consumers' societies are found in the mofussil to control market rates and so on, would you not exempt them from such local taxation as the municipal octroi or terminal taxes?—To that extent I would be prepared to agree, but I do not like the principle very much even there. I would like to see competition on an equality; but when it has proved itself the co-operative society should be given control over markets, for instance, which in my opinion should always be with the co-operative society.

4599. Such exemptions are often allowed in Japan?—Yes.

4600. Development Associations were originated during your regime?—Yes.

4601. And the idea, I may take it, was that they should be registered under the Co-operative Societies Act?—Yes.

4602. The idea underlying that was to bring about better co-operation between the Agricultural and Co-operative Departments?—Yes. There was some discussion to start with as to the advisability of this registration, but it was eventually decided on.

4603. Do you not think registration under the Co-operative Societies Act gives a greater guarantee of continuity?—Yes.

4604. Otherwise they are only associations of individuals who have paid a rupee each and who can drop out at any time?—Yes. I am strongly of that view.

4605. Do you remember the Broach Agricultural Association?—Yes; it began very well and dwindled to nothing. We had a similar experience in East Khandesh.

4606. There is also the advantage of co-operative audit?—Yes.

4607. If these associations are not registered we lose that advantage?—Yes.

4608. With regard to your remarks on railway rates, during your time at Broach as Collector I believe the Bombay Steam Navigation Company introduced a system of steam launches which were of great advantage to the cultivators and enabled them to get their produce to market more easily?—Yes.

4609. The Railway Company then reduced their freights to offset the steamer competition?—Yes; they introduced “cut” rates to Broach and raised them against Broach.

4610. This matter was specifically mentioned to the Viceroy’s Council?—Yes. It went right up to the Government of India and was watched by the Bombay Government on behalf of the Government of India for 2 years. The Bombay Government recommended certain action, but the Government of India favoured the policy known as “wait and see” and in the end we waited and saw.

4611. In the result the shipping company had to go away?—Yes.

4612. *Dr. Hyder*: With regard to the distribution of water by quantity, have you personal knowledge of such distribution in Spain, Italy and France?—None.

4613. You think it is practicable in India?—I have been advised by officers of the Irrigation Department that it is, and see no particular reason why it should not be.

4614. There is not only the technical side of installing the modules but the social, psychological side as well?—Yes, but in that direction I see no difficulty.

4615. Have you read Sir Valentine Chirol’s book on Egypt?—No.

4616. Do you know whether there was any tendency for crime to increase there at the time of the distribution of water?—I did not know it, but I can imagine it. Was it co-operative?

4617. No. You attributed shortage of labour to the high death-rate. Do you think the death-rate among the rural population is higher than in any other class?—No, I do not think that, but it is much higher than it ought to be.

4618. The birth-rate is also higher?—That is partly why the death-rate is so high.

4619. But if the birth-rate is high and the death-rate is high, the result of those two influences on the population would be to keep it stationary?—But it does not follow that it does not add to the shortage of labour.

4620. But how has this shortage of labour arisen?—There is a very great waste; the process of bringing a lot of human beings into the world to be killed is very wasteful of human effort.

4621. I quite agree, but I want to know the causes of this?—I am afraid I am not making myself clear. Let us assume that women in the labouring classes work in the fields, that every woman in the working classes loses every year two months on account of the birth of a child, and again a certain period in nursing that child till its death and looking after it while it dies, she anyhow loses time and the country thereby loses labour which might be saved to it if that process had not been gone through.

4622. But this state of affairs existed, let us say, in 1880?—Yes.

4623. There was then a high birth-rate and a high death-rate?—Yes, but I did not say there was an increasing shortage of labour. We spoke merely of shortage of labour.

4624. There has been an increase in the number of holdings?—Yes, there has been an increase, certainly, but not a very large one.

4625. If the total area has been constant, then an increase in the number of holdings would indicate a decrease in the size of the average holding?—In the average, yes, it must.

4626. That being so, do you think the condition of the rural population is improving or getting worse?—Would you mind telling me the figures underlying your question?

4627. In reply to Members of the Commission I understood you to say there was an increase in the number of holdings?—I am certainly under the impression that there is a slight increase, but I am not sure of the figures. Assuming there is a slight increase, what is your question?

4628. That the size of the average holdings must be diminishing?—Yes, the average.

4629. *The Chairmain*: Unless more land is coming into cultivation?—Yes.

4630. *Dr. Hyder*: Would that indicate prosperity?—I think it is one of those cases where figures can be interpreted both ways. It may indicate prosperity in this sense, that more people are acquiring land; or it may indicate adversity in that none of them has got enough to live on. It may indicate prosperity in that they have got better cultivation and are able to get more out of 5 acres, or it may indicate that they are starving or not getting enough.

4631. Which is the true view?—I honestly cannot express a general opinion.

4632. You are of opinion that sub-division and fragmentation do not necessarily go together. If the land is of uniform quality, fragmentation need not follow sub-division?—It need not follow to the same extent. It would be perfectly possible to have sub-division without added fragmentation if the cultivators were sensible enough not to preserve superstitious observances with regard to their fields.

4633. *Sir Chunilal Mehta*: You would not rule out the giving of *taccavi* by the Government in famine areas?—No.

4634. You also make a reservation in favour of backward people like the Bhils?—Yes.

4635. Then I may tell you the Bombay Government have accepted your proposals?—Thank you very much.

4636. On this sub-division question, you recognise that, whatever your views may be, there is something to be said on the other side also?—Certainly; it is a very difficult and complicated question.

4637. And many officers of considerable experience hold that some kind of legislation is necessary?—Yes. I have, as a matter of fact, just read Part 1 of the proposed Bill dealing with fragmentation which certainly proposes to deal with sub-division in what appears to me to be a very reasonable way and in a way which would not be likely to arouse political discontent. I have not been able to go through the whole of the details of it, but I do not think the objections which I mentioned would apply to Part 1 of the proposed Bill.

4638. You have had time to look at Part 1?—I have just seen it.

4639. That appears to you to be the best way of tackling this very important question?—Yes, I think so.

4640. Your experience of the Taluka Development Associations leads you to feel that they are doing good work?—Yes.

4641. On the whole they have worked very well?—Yes.

4642. And that is the best agency, in your opinion and that of the Director of Agriculture of the Bombay Government, for propaganda work?—Yes.

4643. Do you think Taluka Development Associations organised with reference to a smaller area would be desirable if the right type of men could be secured for such organisations?—I would really have preferred to have Supervising Unions, if we could be sure of their being well run, in preference to the Taluka Development Associations; but I was so certain that we should not be able to find enough organisers, that I jumped at the idea of the Taluka Development Association when it was first mooted, and I think in the actual existing circumstances, whatever the future may produce, the Taluka Development Association is the best method we can adopt.

4644. Do you think in the very near future the time will come when it will be desirable to organise the Taluka Development Associations on a smaller basis, that is to say, in groups of, say, 10 villages instead of in groups of 100 or 200 villages?—I certainly hope so in the future, but I should not say it would be very soon.

4645. In order to get the best results out of these associations, whether they be on the larger or the smaller basis, is it in your opinion desirable that

there should be people in the villages preaching the gospel of rural development generally?—Staying in the area, yes.

4646. In every area of 20 or 30 villages?—Yes, I think so certainly, if it can possibly be arranged.

4647. One ought to work in that direction?—I certainly think so.

4648. And organise a body of such people, preferably non-officials, to carry on the work of general rural development?—That is certainly what I should like to see.

(The witness withdrew.)

The Commission then adjourned till 10 o'clock on Wednesday, the 27th October 1926.

Wednesday, October 27th, 1926.

POONA.

PRESENT:

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

Sir HENRY STAVELEY LAWRENCE, K.C.S.I., I.C.S.	Mr. H. CALVERT, C.I.E., I.C.S.
Sir THOMAS MIDDLETON, K.B.E., C.B.	Raja Sri KRISHNA CHANDRA GAJAPATI NARAYANA DEO of Parlakimedi.
Rai Bahadur Sir GANGA RAM, Kt., C.I.E., M.V.O.	Professor N. GANGULEE.
Sir JAMES MACKENNA, Kt., C.I.E., I.C.S.	Dr. L. K. HYDER.
	Mr. B. S. KAMAT.

The Hon'ble Sir CHUNILAL V. MEHTA. } (*Co-opted Members.*)
Dewan Bahadur A. U. MALJI }

Mr. J. A. MADAN, I.C.S. } (*Joint Secretaries.*)
Mr. F. W. H. SMITH. }

Mr. V. H. NAIK.

FURTHER ORAL EVIDENCE.

4649. *Sir Ganga Ram*: On page 137 you give a number of irrigation schemes. May I know the reason why they have not been taken up? Is it for want of funds?—Government has taken up bigger schemes in other districts.

4650.—Are they estimated to pay a return of 4 or 5 per cent?—These schemes have still to be investigated.

4651. They have not been investigated?—Not entirely. There may have been preliminary surveys.

4652. According to the Irrigation Commission, no scheme which pays less than 6 per cent. is regarded as paying its way. I understand that in Bijapur, of which you are Collector, there are frequent famines?—Yes.

4653. During the last 20 years, how many famines have there been?—There was a famine in 1899, one in 1911-12, one in 1918-19, one in 1920-21, and one in 1923-24.

4654. Five famines altogether?—Four in the last 15 years.

4655. And yet, Government has not awakened to the necessity of taking up these irrigation schemes?—These are smaller schemes which are now being suggested. Government has taken up bigger schemes commanding larger areas in other districts, equally liable to famine.

4656. How great an area would be commanded by all these schemes that you mention?—I understand that each will command about 10,000 acres, at a cost of about Rs. 10 lakhs. That is what I have been told by a competent engineer.

4657. Do you think it will not pay if you can cover an area of 10,000 acres for 10 lakhs?—It is understood that these smaller schemes will provide only water for *rabi* crops and not for perennial irrigation.

4658. For these 10,000 acres, what would you charge for the water?—The ordinary *rabi* rate for 4 months is Rs. 4 to Rs. 6; not more.

4659. Say, Rs. 5. It ought to pay anyhow about 5 per cent.—It will pay about 4 per cent., I think.

4660. Government has not taken it up as yet?—The matter is under consideration now. It has been submitted to the Commissioner and the higher authorities.

4661. Then you say that there are tanks also for irrigation, and that the Superintending Engineer has got a number of suitable sites for such work?—He is investigating them.

4662. Would they not command any land?—It has yet to be seen. He is investigating the sites.

4663. When you refer to wells for irrigation, how many acres would each well command?—It would depend upon the well. It might command only 4 to 5 acres.

4664. What would the wells be worked by?—Bullock power.

4665. How can a well be made to pay which only covers 4 or 5 acres?—It does pay; these are not very deep wells.

4666. At what depth is the water from the surface?—It all depends on the locality. It will be 25 feet, 30 feet, 40 feet, and so on. It will not be more than 40 feet.

4667. Four to five acres can be covered by a well like that?—It depends on the crops. If you put in crops requiring less water, you will have more area.

4668. What do they put in?—In certain parts cotton is irrigated; that is *neglectum roseum* cotton.

4669. You say that the use of cowdung as a fuel should be penalised, with proper safeguards. If you penalise it, what are the people to do? Is there no other remedy? We ask you to propose remedies which would stop the evil, not to penalise it?—You can pass legislation not to burn cowdung as fuel.

4670. What are they to do, if there is no cheap fuel?—We have firewood.

4671. But they have to buy firewood?—It does not matter. They can buy it. They can also collect it from their own fields.

4672. Can they afford to buy?—They can collect it from their own fields.

4673. What do they do with the cotton stalks, when they reap the cotton?—They use it for fuel.

4674. You say that this year the total quantity of fodder stored is 65 lakhs of lbs.?—Yes.

4675. That is not very much; about 80,000 maunds. Is that the Government scheme?—Yes.

4676. What kaddi do they store? Kadbi of bajri?—Kadbi of juar; what you call sorghum.

4677. In the Northern Punjab, where the produce of the land is not enough to provide a livelihood to the landholders, they supplement their income from agriculture by service in the army. Do not the people from your district go into the army?—Only a few, not many, from the Karnatak.

4678. Are they considered unfit for service in the army?—No. There is a certain amount of recruitment in Bijapur for the Mahratta battalion.

4679. History teaches us that the Mahrattas were a very warlike people?—Bijapur is not altogether Mahratta. It is Karnatak. But a few Mahrattas and Deccani Mahommedans are recruited.

4680. If some of them go into the army, will not that be a subsidiary occupation for them?—I do not know about that!

4681. *Dr. Hyder*: How many people are in your charge in Bijapur?—Nearly 8 lakhs.

4682. That would mean 200,000 families?—About 2 lakhs of families.

4683. You want to penalise the use of cowdung as fuel?—Yes.

4684. How many police would you require for it?—We do not require police for that. I would penalise it under the Village Police Act. The village *patel* might punish the offender.

4685. Will the village *patel* go round the houses?—He can go round and advise the people not to use cowdung as fuel.

4686. Can you name any agricultural countries which have, to use your phrase, agriculturalised their educational system?—I cannot give you any instance of that, but I think in Denmark the education is very much agricultural in every way. If general education is not altogether agriculturalised there is at least supplementary education in the form of what are called people's high schools, and so on.

4687. That is very general?—Yes, but there is a very strong agricultural bias there.

4688. *The Raja of Parlakimedi*: Is Bijapur entirely an agricultural district?—Yes.

4689. What is the population, roughly?—About 8 lakhs.

4690. Out of that, what percentage would you put down as cultivators?—Most people are cultivators there, and agricultural labourers.

4691. Are all of them cultivators?—Most, I said. There is a certain proportion of people carrying on different professions, but most people are agriculturists or agricultural labourers.

4692. Are there many Government agricultural farms spread over the district?—There is no Government farm in the Bijapur district.

4693. Is the department doing something in any other way for the improvement of agriculture in the district?—They have got 3 agricultural Overseers, who carry on propaganda, and recently the department has also appointed for the district an officer called a bunding officer. I think they have also got a Cotton Assistant. That is all the agricultural organisation that exists there.

4694. Can you tell us what work the Overseers actually do?—They supply seed to ryots, carry out experiments on ryots' fields, and hold demonstrations at central villages. Recently, they have also been helping the Collector and his staff in investigating schemes for field embankments and preparing plans and sketches and so on. That is, of course, in connection with the development of the *taccari* policy which Government have sanctioned for the Bijapur district very recently.

4695. What are the important crops of the district?—Half the area, 14 lakhs out of 28, is *jowari*.

4696. Is that the staple food of the people?—Yes.

4697. What other crops are there?—Then comes cotton, about 8½ lakhs.

4698. Do they grow tobacco?—No.

4699. As regards irrigation, how do you fix the charges? Is it according to the number of crops, or the nature of crops, or what?—At present there is not much irrigation in the Bijapur district.

4700. Are there no tanks at all?—There is only one tank, which does not fill in a year of scarcity of rainfall, and there is practically nothing in the way of canal irrigation at all.

4701. How do the people manage to get money for carrying on their agricultural operations?—They borrow from *sowcars*. There is a certain number of co-operative credit societies; and thirdly, there is the *taccavi* system.

4702. Have the co-operative societies made any progress in that area?—Yes; they are making fairly good progress.

4703. Do the moneylenders charge almost as much as the co-operative societies?—The moneylenders' rates are higher than the co-operative societies' rates.

4704. In that case, why should not the cultivators go to the co-operative societies?—They should. But cultivators do not always understand their own

interest. They have not organised societies everywhere, and the societies that have been established are not all fully developed. Thus ryots still go to *sowcars* for money.

4705. Is the movement not very popular?—I said it was fairly satisfactory. There are other neighbouring districts which have made more progress than Bijapur. We have got, in Bijapur, one society for every 8 villages, whereas in the neighbouring district of Dharwar there is one society for every two villages.

4706. *Professor Gangulee*: You want to penalise the use of cowdung for fuel. Have you any draft Bill prepared for the purpose?—If you want me to make a specific suggestion in the matter, I would penalise it under an Act called, in the Bombay Presidency, the Village Police Act. I would give power to the village headman to fine the person who uses cowdung for fuel purposes. Matters kindred to this sort of thing are penalised in that way, and the village *patel* takes cognisance of such offences and inflicts a small fine, or detention for a short period of time.

4707. Are you of opinion that such a method would work?—It may not bring about immediately all the success that we want, but I think in the end it will work.

4708. With regard to animal husbandry, is the indigenous method of storing *kaddi* quite successful?—In Bijapur district, my staff was able to import the method from a neighbouring district.

4709. You describe here the method known as *Kilbanavi*. I take it that is indigenous?—It is indigenous in the neighbouring district, which is a more advanced district.

4710. It is not indigenous to the district to which you belong?—It is not indigenous to the district in which I work.

4711. Have they any other method of ensilage?—No.

4712. With regard to co-operation, I want to ask you one or two questions. Please refer to page 139. Have you taken any active part in the co-operative movement?—I have.

4713. You say here that honorary organisers of co-operative societies may be replaced by a paid staff of Government officials. Why?—A body of honorary organisers was more essential in the early days, when the movement had to be brought home to the people, and the suspicions, if any, removed by non-officials. But now, of course, co-operative work is becoming very technical. Supervision is very necessary, and the organisation of long-term credit and other societies is very complex. I am afraid this work cannot be done by laymen who cannot devote their whole time to the work. I have, I may say, some experience of this sort of work.

4714. Are you aware of the developments of co-operative societies abroad?—Yes, I am.

4715. Are there any Taluka Development Associations in your district?—There are two.

4716. What can you tell us of their success or failure, as the case may be?—One outstanding feature of these societies is that they are very small and their operations are on a very minute scale; and if agriculture is to be improved, their work has to be on a good scale. That is the reason why I have tried to outline a district organisation for the purpose of supplying agricultural requisites, such as manure, seed, implements, and so on.

4717. Do you think that these Taluka Development Associations could be the unit of organisation in a village area?—They may be in some places; not everywhere. Personally, I would like to have a district organisation in my district to command sufficient capital, to enlist the energy of the best men in the district, and to have a better status for the whole thing.

4718. Do you personally take an interest in the Taluka Development Associations?—I do to a certain extent.

4719. Have you attended any of their meetings?—Yes.

4720. Do they come to you for any suggestions?—I am very much in touch with these people, and either I go to them or they come to me. There has been an exchange of ideas between us.

4721. Do not the organisers come to you for any specific help, direction, or guidance?—They come to me for help, and I secured some help from the Director of Agriculture in the case of one society.

4722. On page 137, with regard to irrigation, you make a few suggestions, and you give 6 sites which are suitable for investigation. Do you mean to suggest that these sites have been overlooked by the irrigation officer?—It is not that they have been overlooked. Some years ago all the suitable sites were investigated and recorded, but I believe that priority was given to more promising and bigger schemes in other equally deserving areas.

4723. With regard to *taccavi* loans, you say a great deal about them, and you suggest the development of the Government system of *taccavi*. Have you any definite idea how that development could be brought about?—Yes, I have. In fact, in my own district, I have recently got a *taccavi* scheme of development which has been sanctioned by Government. Government have been pleased to allot Rs. 2 lakhs this year for financing the construction of wells and the construction of field embankments, what are called “Thals” or “Wads” in this part of the country.

4724. Are *taccavi* loans popular among the cultivators in your district?—Yes.

4724a. The management of the *taccavi* loans is now in the hands of the Revenue Department?—Yes.

4725. You suggest here that it should be in the hands of the Collector. Do you think that system would enhance its popularity?—Yes; in my district, at any rate, it is popular.

4726. With regard to the general trend of the whole memorandum, you suggest that the Collector should be able to control a great deal of the work?—In my opinion, the Collector should be organically connected with the agricultural organisation and improvement of the district.

4727. Do you think, in addition to his other duties the Collector is able to interest himself in the work of rural development?—Of course, he will require special staff for it. He will require another branch of his office. Collectors are able to turn their hands to anything in an emergency.

4728. Is it your idea to centralise in the hands of the Collector all the work of the district?—Yes, with sufficient staff to help him.

4729. You think he can do that in addition to his other duties?—I think he can bestow the necessary oversight.

4730. *Mr. Calvert*: On page 137, on the subject of finance, you suggest a plan for land mortgage banks. Were you thinking of any very special model?—Not any special model, but I have suggested one or two special things, which seem to me to be essential if the land mortgage bank system is to be developed as an efficient organisation.

4731. You have no objection to the co-operative land mortgage bank?—I have no objection to the land mortgage bank being registered as a co-operative society.

4732. Have you any objection to a land mortgage bank organised on co-operative principles?—No objection whatever.

4733. In this little note, were you thinking of the agricultural land banks of Egypt?—No.

4734. Please refer to page 137, indebtedness. In your district, is the Usurious Loans Act made full use of?—No, it is not much used.

4735. Is it known to the people?—That Act does not seem to have much effect in my part of the country, on account of the Deccan Agriculturists' Relief Act. That comes in the way, and with that Act taken together with

the Hindu law, under which interest equal to principal only can be claimed, I think the Usurious Loans Act, which is an All-India Act, has not much application.

4736. Do I gather that in your district moneylenders do not actually take more interest than the equivalent of the principal?—He may take more, but when he goes to the courts, he cannot claim more than that.

4737. Does he not take more than that in the course of a life-time?—He may take more, but he cannot claim more than that when he goes to court. That is the rule of *damdopat*.

4738. On page 139, co-operation, you suggest a paid staff for organising co-operative societies. Would you also use that paid staff for educating the people in the principles of self-help, thrift and other economic matters?—Yes, for the whole work. I want to have paid men. Incidentally, they will do all sorts of duties.

4739. I understand at present there is no organisation for teaching the villagers to manage their own affairs entirely by themselves, without any outside help?—Propaganda, according to our present organisation, is the function of the Institute; but the paid staff, in addition to organising difficult types of societies or societies in backward areas and supervising them, will also do all they can to teach managing committees and so on.

4740. Could members of societies answer a question as to the meaning of the word credit?—If you put it in an intelligible form, I think they could answer it. It would depend upon the way in which the question was put.

4741. *Mr. Kamat*: On page 136 of your note you state that there is no major port of international importance on the whole coast between Bombay and Colombo and you suggest that Bhatkal in North Kanara would be a suitable port for development. It is a far cry from Bijapur to Bhatkal. I do not see what bearing the opening of a port at Bhatkal has on the agricultural development of Bijapur and the Eastern Deccan?—I have not taken Bijapur alone into consideration in making that suggestion; I have taken the whole Karnatak area of which Bijapur is part. Bhatkal has a bearing on the whole of the Karnatak and also the tract round the Karnatak.

4742. Is not there a port at Marmagoa?—Yes.

4743. And another down the coast at Cochin which is big enough?—They say Bhatkal would be better.

4744. At page 137 of your note, under the heading "agricultural indebtedness" you make a suggestion that the best way to help agriculture is to investigate the liabilities of the ryots and to pay off the same with an advance carrying a lower rate of interest, the funds required coming either from Government direct or from land mortgage banks?—Yes.

4745. Have you got any rough idea as to how much Government will have to find if they were to make advances like this and investigate the liabilities of all the people in the district?—That suggestion may be considered along with my suggestion about land mortgage banks. The Bombay Government may start the work in certain areas and the banks will take it over.

4746. Have you considered the feasibility of that suggestion?—Yes. If Government was to take over the whole thing themselves it would mean an enormous amount of money.

4747. Would it be possible?—No; the finances of the country would not be able to bear it, but Government finance would be able to help in the beginning, at any rate in the formation of the banks.

4748. What roughly would be the indebtedness of the Bijapur district?—I could not tell you. I have made no estimate.

4749. Do you think it is a feasible proposition?—Government can help the banks in the beginning to a certain extent.

4750. In how many years would they be able to recover their advances, 30 or 40 years?—30 or 40.

4751. Could Government possibly do it?—Not the whole business. They can help in the beginning to a certain extent and see that the work is started; then the banks may take it over. You must not take that suggestion as separate from my proposal as to the banks. Government will help the special land banks. Government itself does some land mortgage business now, in the shape of *taccavi* loans and the extension of *taccavi* loans from land improvements to redemption of debt is only a matter of change in the method. Government may do it in the beginning and then get the banks do it.

4752. Do you take any personal interest as Collector of the district in the welfare of the rural population and rural reconstruction?—Yes. I took a lot of interest in the removal of prickly pear in the four talukas of the Dharwar district. I have not been a long time in Bijapur, but all the same I have taken an interest in tackling the problem of providing drinking water in scarcity villages.

4753. Do you think, from your experience as Collector, that if Collectors take a personal interest in the question of rural reconstruction they can bring about reform in the villages by getting influential people in the talukas or villages to take the initiative?—I would even go as far as to say that the personal interest of the Collector in the whole scheme is an absolute necessity if the work is to be accelerated.

4754. But the motive power ought to rest with the non-officials?—The Collector can stimulate that motive power.

4755. That is to say, he should lend his influence to get things done by the non-official agency?—Yes.

4756. Or would you like to have your official agency to do the work of reconstruction?—The non-official agency should be helped by the official agency.

4757. The non-official agency should do it?—Yes, the non-official agency should be stimulated by the Collector.

4758. If the Collector takes a personal interest, then things can be improved?—Yes.

4759. *Devan Bahadur Malji*: Mr. Naik, how old are the Taluka Development Associations in your district?—They are three or four years old.

4760. They are registered under the Co-operative Societies Act?—Yes. There are only two of them.

4761. Both of them are registered?—Yes.

4762. Have you had any occasion to attend any of the managing committee meetings or annual meetings of these associations?—I attended the meeting of one society.

4763. Who are the driving force of these associations?—A few leading ryots.

4764. Assisted by?—The local *mamlatdar* to a certain extent.

4765. Do you not think that the Registrar's department also helps them?—Yes, both the Agricultural and Co-operative Departments; both the Deputy Director and the Assistant Registrar.

4766. Have they taken to supplying loans in kind instead of in cash to credit societies?—No.

4767. Do you think that sort of thing would considerably help the societies and there would be less chance of misappropriation?—If it could be done, I think it would be a splendid thing.

4768. Have you got an efficient supervisor for these associations?—No. They have not got any yet. As a matter of fact there is one society at a place called Indi which has got a fieldman who goes round the villages.

4769. What does he draw?—I think he draws about Rs. 40.

4770. Do you not think an efficient man at the top is quite necessary; a man holding a B.Ag. or something like that?—Yes. If you could afford that, that would be a very good thing.

4771. You can supply better seeds also through these agricultural associations?—Yes.

4772. Do you not regard these associations as having in the back ground potentialities for conducting export and import business if properly developed?—In fact the bye-laws provide for that sort of work. The purchase of agricultural requisites and the sale of agricultural produce are allowed by the bye-laws.

4773. May I take it then that that work has not properly commenced in these associations? They are yet in their infancy?—Yes, but some years have passed since they were started.

4774. Has any attempt been made in this direction up to now?—No. Nothing has been done.

4775. You said the training classes were conducted by the Institute?—Yes.

4776. Is there no district branch of the Institute in Bijapur?—Yes; there is one.

4777. Is not the district branch interesting itself in this training work?—Yes; in fact the training is done by it.

4778. They are holding some secretaries' classes also?—Yes.

4779. And managing committee training classes?—I do not know whether they have held managing committee training classes in Bijapur, but I did attend a meeting of the secretaries' training class at one place.

4780. This is arranged through the district branches?—It is always done through the district branches.

4781. I think you were personally responsible for helping the Institute in the very beginning?—I tried to help it as far as I could.

4782. And if the district branches could be run properly there would be no difficulty in training officials as well as non-officials?—There should be no difficulty. The Institute could do it all.

4783. You say that honorary organisers should be replaced by paid ones?—As the work becomes more complicated the necessity for better supervision increases.

4784. But you limit it to backward areas?—Yes, especially to backward areas.

4785. As regards urban areas you do not think it so necessary?—For our urban banks there is no necessity of paid or honorary organisers.

4786. As regards the complicated work of auditing and organising societies, the business ought to be undertaken by the paid agency of such an institution?—That would be a matter of detail. It should be a paid agency, either Government or non-official.

4787. You do not require a paid agency for each district?—It will depend upon the amount of work. If there is plenty of work in the district you will require it.

4788. You say that the Assistant Registrar and the Deputy Director should be partially subordinated to the Collector?—Yes.

4789. Is not the Collector a very busy person?—Very busy.

4790. Will he find time to look after this work?—Provided he is given assistance, yes.

4791. Do you not think he will have to maintain a small secretariat?—The Collector's work will not be one of giving attention to details: he will have a general oversight.

4792. Otherwise, nothing better than passing instructions over the telephone could be done. If the Assistant Registrar is to receive instructions from the Collector, that is what it will amount to?—It is not my idea that the Collector should issue instructions to these people.

4793. So far as that matter is concerned that is what it will amount to?—My idea is that all these different movements for the rapid advancement of the district should be under the general supervision of the Collector.

4794. Perhaps what you mean is this; that the Collector should not be ignored in such matters?—You may take it in that sense.

4795. One question about these village *chavdis*. Whose property are they?—Government's.

4796. Are they used for public meetings?—Yes.

4797. Are they not used as residences by village officers like headmen, etc.?—No, not as residences, but if officers of lower grade come to the village they put up there.

4798. Do marriage parties from outside stations make use of the village *chavdis*?—I do not know.

4799. Are there any restrictions on the use of these *chavdis* which have led you to make the suggestion you have made?—My suggestion is simply that the village *chavdis* might be improved and made more decent.

4800. Who repairs them?—The cost of repairs is borne by three bodies: one-third by Government, one-third by the villagers and one-third by the Local Board.

4801. Is it not your experience that in many cases the annual repairs are neglected?—Yes, on account of lack of funds and on account of contributions not forthcoming.

4802. In some places the village *chavdis* have been razed to the ground?—Some are in a very bad way. That is why I am trying to do something for them.

4803. *Sir James MacKenna*: I am told that you originally belonged to the Agricultural Department, and that you went to England as a member of the Agricultural Department?—I was sent as a scholar.

4804. As an agricultural scholar?—Yes.

4805. And wisely while in England you studied also for the bar at the same time?—I became a barrister after I had put in 10 years' service in the Agricultural and Co-operative Departments, and not before.

4806. You took advantage of being in England to add another string to your bow by studying law?—I went to England on furlough, and while I was in England I interested myself in various branches of study and I got myself enrolled as a barrister.

4807. And then you became a member of the Civil Service from the Agricultural Department?—Yes: I was transferred to the Civil Service.

4808. Do you not think it is a most excellent training for a Collector to have this agricultural experience?—I beg to support you.

4809. It would be of great benefit if all members of the Civil Service had similar advantages?—I think it would be.

4810. That is to say, in an agricultural country like India a Collector with an agricultural training is in better touch with his district?—Yes.

4811. Have you any agricultural demonstration farms in your district?—No.

4812. Do you think they are desirable or necessary?—I think there should be at least one farm in the Bijapur district.

4813. Have you represented that to the Director of Agriculture?—Yes, and the matter is now under consideration.

4814. Have you much time to keep in touch with what is going on at present in agricultural matters, since you became a Collector?—Yes: I find some time. At any rate I hope I am keeping myself abreast of the general activities of the Agricultural Department.

4815. Do you discuss agricultural problems with the cultivators when on tour?—I do, so far as I can. As a result of our activities recently we got a *taccavi* scheme sanctioned which I have brought to the notice of the Commission.

4816. *Sir Henry Lawrence*: In addition to what *Sir James MacKenna* elicited from you about your agricultural training, had you any opportunity

to study agriculture in the Continent?—I went to Denmark, and there I studied the organisation of the agricultural co-operation system.

4817. You suggest that the use of cowdung for fuel should be penalised?—Yes.

4818. Do you know that cowdung was at one time used in England for fuel?—I do not think I have come across such a statement.

4819. And its use as fuel was stopped by penalisation?—I do not know, Sir.

4820. You should look up your text-books for the Cambridge course again?—This is a suggestion which I put forward and I suggest it can be worked if it is made an offence under the Village Police Act under the charge of the village headman or police *patel*.

4821. What is the total area which could be irrigated by the schemes of irrigation you suggest?—The Irrigation Engineer's estimate was that at a cost of 10 lakhs each scheme could irrigate at least a *rabi* area of 10,000 acres.

4822. Sixty thousand acres in all?—Yes.

4823. What is the total area cropped in your district?—About 28 lakhs of acres.

4824. Still, it would be of material assistance to have 60,000 acres irrigated?—It would be of very great assistance, in my opinion.

4825. At the end of your note you suggest that the Parliament should pass some statute. Have you any definite view as to what the various provisions for the better development of agriculture that Parliament might decree should be?—I have one or two ideas about that matter. I have referred to section 26 of the Government of India Act, and of course the statute would be in the way of amplification of that statutory obligation which rests upon the Secretary of State for India.

4826. Could you tell us what special provisions you have in view?—At present the Act only lays down that there should be a report, an annual report on the material and moral progress of India. The specific lines of that report may be laid down. The duty of developing different lines of improvement may be imposed upon the Government of India and also upon the Local Governments, and if possible certain broad lines of financial assistance also may be indicated.

4827. Any statute made by Parliament would be in very broad terms, just as section 26 itself is?—I do not know whether it would be possible to expect the Imperial Parliament to extend any financial aid to Indian agriculture.

4828. Are you a member of the cultivating classes yourself?—Yes, Sir.

4829. Your family hold land?—We hold some land.

4830. In what district?—In Kanara.

4831. Irrigated land?—Yes: we have got shallow wells in Kanara.

4832. *Sir Ganga Ram*: I find from statistics that your district stands at the top of the Presidency in the matter of cultivable area per head; you have 3.37 acres per head?—Yes.

4833. How much of your area is well-irrigated and how much canal-irrigated?—There are no canals in Bijapur: there are minor tanks, called second class irrigation tanks. The area they cover is about 1,100 acres.

4834. And well-irrigated?—That is about 24,000 acres.

4835. That is about 25,000 acres of irrigated land, that is to say, land not depending on rainfall?—It would not mean that, because in a year of famine, even these wells and second class irrigation tanks will not be filled and even when they are filled it would not be perennial irrigation in most of them and it is difficult to state what the actual protection is.

4836. Do you know the formula which the Famine Commission has laid down, that 4 acre was enough to make one adult's food if it is well irrigated?—I had not heard it before, but I can understand it.

4837. I cannot understand, then, why you cannot produce food enough for the people in this area?—If the Bijapur area produced a proper crop in one year it would suffice for three.

4838. Do you never get a proper crop?—When the rains are good we grow the best crops in the southern part of the Presidency.

4839. Is there any commercial population in your district?—There are two towns.

4840. They are engaged in commerce?—Yes.

4841. Are you President of the District Board?—No, I am not.

4842. He is a non-official?—There is a non-official President.

4843. Are your roads and communications very good?—Fairly good.

4844. Metalled or unmetalled?—Our main roads are metalled; the others are just *kutch*a roads—mere tracks.

4845. Are these *kutch*a roads bridged all right?—Yes.

4846. Motor cars can go over the unmetalled roads?—Yes, in the fair season.

4847. There is no difficulty of cross channels?—Motor cars can go over these cart roads, although they are not metalled.

4848. For how many years have you been a Collector?—I have been Collector only for a year; I was promoted only a year ago.

4849. How many years have you been in Bijapur?—Only a year.

4850. You advocate the burning of prickly pear. I read an article published by the Agricultural Department in which prickly pear was highly recommended as cattle food?—I am aware that the department recommends it.

4851. If you burn it, you destroy something which might be useful in time of famine?—Government have a more important alternative, *i.e.*, storing *kadbi*.

4852. Storing of *kadbi* would be very expensive. That would cost money. If you burn your prickly pear, you destroy a source of food in famine time. Do you not think that should be avoided?—Prickly pear has many other drawbacks. It is the cause of a lot of insanitation in the village sites.

4853. In your district there is no fruit growing?—Only a small quantity.

4854. What is your level above the sea?—I could not give it you exactly at this moment.

4855. Have you no industry of fish-curing in your district? You are near the sea?—We cannot get any fish in Bijapur. There is no fish in Bijapur district.

4856. You talk about land mortgage banks. At what rate of interest will you lend money?—All that has to be worked out in detail.

4857. I want to know the rate of interest?—Government *taccavi* loans are advanced at the rate of 7-29 per cent.

4858. Do the people who take the money ever repay it?—They do repay in good years.

4859. What rate of interest would you suggest for the land mortgage banks? That is a matter of detail.

4860. Would it be something like 8 per cent.?—Yes. Even that would be profitable to the ryots.

4861. What rate do moneylenders demand?—12, 15 or 18 per cent.

4862. Can they ever pay it back?—They can.

4863. *Dr. Hyder*: Your district is an insecure one from the point of view of rainfall?—Yes.

4864. You mentioned in reply to Sir Henry Lawrence that 60,000 acres of land are waiting for irrigation?—I have been assured by the Engineer of my district that if these six irrigation schemes are carried out at a cost of 60 lakhs they will irrigate 60,000 acres, at least in the *rabi* season.

4865. Have you worked out any figures as to the cost of the scheme and the annual return as compared with the cost to the tax-payer of famine relief and so on?—We have not as yet made any headway. The matter is under consideration.

4866. You have no definite figures?—We have not made any headway. We are only at the beginning. The irrigation branch of the P. W. D. has yet to work out the figures, but the matter has been placed before the proper authority.

4867. The Irrigation Department will work out these figures?—Yes. They will have to survey the whole area, prepare a project and if it is really suitable it will go forward.

4868. *Sir Chunilal Mehta* : Apart from the six irrigation schemes that you have mentioned there are possibilities of small irrigation schemes of the nature of bunding streams and so on?—Yes. The Superintending Engineer is investigating them.

4869. Have you any idea as to the possible acreage which may be covered in that way?—We have not as yet arrived at that stage.

4870. Roughly how many acres does a well irrigate?—It is rather difficult to answer. If the crop is a perennial one it will irrigate 4 to 5 acres. If it is only for *rabi* or maturing *juari* crops by giving them a watering it may irrigate 20 to 30 acres.

4871. Is there any scope for the extension of well-irrigation in your district?—There is scope in three or four well-defined parts of the district, *i.e.* in the northern part, but not elsewhere.

4872. On page 139, you say that there are weavers of coarse cotton cloth in your district. Have you studied their method of marketing?—Not in any detail.

4873. I suppose there is a Taluka Development Association in the Inditaluka which you mention on page 137?—Yes.

4874. Has that association been of any assistance to you or to the Superintending Engineer in matters like small irrigation works, village water-supply, irrigation wells and so on?—Of course, in an informal way I have consulted them on all matters concerning them, but not officially. They are alive to the work. They are keen about it.

4875. They are very much interested?—Yes.

4876. Consequently they may have been of assistance both to you and the Superintending Engineer?—Yes.

4877. I suppose your preference for a larger organisation, a district organisation, is in consonance with your scheme of making the Collector responsible for all good things to be done in the district?—More or less.

4878. Would you like to go lower down than the taluka for these development associations?—My idea is this. There may be one district association with taluka branches, but somehow they ought to be organised into one. Of course the district society with branches should open seed depôts, etc., in all big villages of the district.

(The witness withdrew.)

**Mr. G. F. S. COLLINS, I.C.S., Registrar, Co-operative Societies,
Bombay Presidency.**

Replies to the Questionnaire.

QUESTION 4.—(c) (i) I think that considerable development in Veterinary Services is needed.

(iii) I should like to see more roads in forest areas which provide grazing and produce grass for storage against famine, e.g., the Satpudas.

QUESTION 5.—(a) The main step must, in my opinion, continue to be the spread of the co-operative movement both as regards short term and long term credit.

Regarding the progress made in financing agriculture through co-operative credit societies as regards short term loans, there are now 239,134 members of agricultural primary credit societies, which is about 12 per cent. of agriculturists occupying land. The loans made to them may be calculated at slightly over 1/3rd of what they require (total loans in 1925-26, Rs. 2,04,92,604 or an increase of 40 lakhs over last year. Total requirements say nearly 3 crores). The best means of satisfying the total demand is by an orderly system of assessing the credit of each agriculturist by normal credit system. The increase in finance this year is chiefly due to the progress made in this line. At present the movement is getting all the funds it requires and technically the only limits to financing every member of a society—and they are serious ones—are the efficiency of the society (bad ones cannot be financed) and the financial position of each member (some have heavy overdues). The other general condition which at present makes against complete and efficient finance is the incompleteness of the link between the Central Banks and primary societies. The banks must employ a larger and more efficient staff especially of Inspectors and open more branches, the societies must universally adopt the normal credit system, and there must be an intermediate link between the two in the form of Supervising Unions (or possibly Taluka Development Associations).

The development of upcountry banking, chiefly through co-operative banks and branches of them will also be a means of improving the financing of agriculturists, whether members of co-operative societies or not. In this connection the everpresent menace of facile credit must be guarded against (discussed under question 6).

As regards long term credit there can, I think, be no better system than land mortgage banks. A few of the A and B societies with large reserve funds have taken up the system of reducing the debt of their members but the amount so far advanced is insignificant. A scheme of land mortgage banks is now before Government. The main points for consideration in this connection seem to be; the pace at which we should proceed; the question as to how far Government should make direct provision of finance for the present; whether the system should be controlled entirely from Bombay or partly through district banks; whether separate district banks should be formed for the purpose or whether we can utilise the existing District Central Banks.

There is undoubtedly a demand for institutions to provide long term credit, whether for debt redemption or long term improvements. Often the first question asked in a credit society is when shall we be able to get money to redeem debts. Land mortgage banks are open to the criticism that they are only to a very limited extent co-operative. Granted this, the system is very much superior to the *taccavi* system, and in my opinion, the only one to guard against the dangers of spoon-feeding and facile credit.

Another line in which fuller financing is required is to enable agriculturists to retain their crops till the best time for selling. This is in my opinion one of the great needs of agriculture. It applies to almost every crop and especially to crops like cotton, ground-nut, etc.

(b) I am not in favour of extending the system of *taccavi* advanced through the Revenue Department direct. The development of the system of *taccavi* through co-operative societies should be continued. The exceptions should be, areas where co-operation has not developed, and special forms of improvement such as development of irrigation in famine tracts. I should like to see a time when ordinary loans through societies will altogether supersede *taccavi*. The main objection to *taccavi* is the danger of facile credit.

✓ QUESTION 6.—(a) The chief causes are—

(i) Inherited debt.

(ii) Lack of education combined with mental inertia.

(iii) Usury with the accompaniment of lack of credit and finance.

✓ (iv) Casts, religious, and social customs.

✓ (v) High and ever-increasing rents.

Lesser causes are—

✓ (vi) In some cases facile credit.

✓ (vii) Lack of market facilities.

As regards (v) I think that agriculture will not be safely established until there is tenancy legislation. A simple Act based on the new English one is required, providing for limits to the enhancement of rent and for proper notice to quit.

As regards (iii) the enormously increased value of land since the first revenue survey and settlement has to some extent given more scope for the accumulation of debt. At the present day the increasing desire to buy land at fancy prices does not make for an improvement in rural economy and should be discouraged.

✓ (vi) needs some explanation. As far as criticism can be levelled against the co-operative movement the chief one is that in the more prosperous areas it has afforded too facile credit. The chief objection to State banks and joint stock banks and to the *taccavi* system is facile credit, and it was hoped that the co-operative movement would provide finance and at the same time minimise this objection, but it is to be feared that in some parts of the Presidency the burden of debt has been increased. The chief of these are the Nira and Godavari canal areas. The matter has been discussed in the Sugar-cane Committee's Report of 1920. There it was noticed that the out-standings at that time in the Nira Societies were 4 lakhs. They are now unfortunately greater, and it is to be feared that some agriculturists will find it difficult to extricate themselves from their present position. It is true that these societies began with a large accumulation of Government debts which were taken over by the societies but even so the finance since then has been made available on a somewhat exaggerated scale to individuals who were not suitable for the scheme. Where as an agriculturist of that area used to think in hundreds of rupees he now thinks in thousands. The same causes have operated in the case of the bad societies near Poona which are now causing so much anxiety. These half-educated agriculturists have, it is feared, been financed beyond their means and they are now in danger of losing their lands.

Too facile credit must always therefore be guarded against.

(b) Some of the remedies have been indicated in stating the causes. It must be assumed in applying remedies that productive debt is not by any means an evil.

Apart from the general spread of the co-operative movement the institution of land mortgage banks, the improvement of market conditions, the development of subsidiary occupations and the spread of education are in my opinion the most promising remedies.

I do not advocate any stricter application of the Usurious Loans Act or the Deccan Agriculturists' Relief Act or the passing of any further Acts of this description.

(c) No further restrictions than those regarding transfer already in existence should be introduced. I do not think that non-terminable mortgages should be prohibited.

QUESTION 7.—(a) I think that the prevention or the regulation of the sub-division of holdings by law is undesirable as it is contrary to public opinion and involved too much interference with present customs and conditions. Measures should be undertaken to remedy the fragmentation of holdings through schemes for voluntary consolidation by restriping whether undertaken by Revenue Officers or by co-operative societies formed for the purpose on the analogy of the Punjab societies. The latter is preferable as Revenue Officers cannot give sufficient attention to the matter. Consolidation of this description has been supported by non-official opinion as represented by the Provincial Conference held by the Co-operative Institute in 1923, and by local meetings of co-operators. A scheme for voluntary consolidation by a co-operative society has been started at Umbergaon in Thana on the recommendation of the Konkan Divisional Board but the work has not yet begun. There 232 persons hold 1,877 acres in 1,640 fragments. The Joint Committee consisting of the Director of Agriculture and the Registrar has agreed to most of the conditions proposed by the people as follows (i) free survey by Government, (ii) grant of Rs. 200 for preliminary expenses, and (iii) disputes to be referred to an Arbitrator.

(b) The chief obstacles are:—

- (a) the variations in the kinds and qualities of lands found in most villages (compared with, *e.g.*, the Punjab),
- (b) the diversities in castes and types of people,
- (c) how far a small minority which holds out against the scheme should be coerced by law,
- (d) whether similar legislation should be undertaken to provide for the cases of mortgages, minors and widows, etc.

(c) The Provincial Conference decided that an enabling law was necessary but this is not the universal opinion of co-operators.

A beginning may be made by trying to work societies without enabling legislation but I consider that it would be inevitable in the end.

QUESTION 11.—(a) (iv) It has now been definitely decided after years of enquiry that the only permanent form of protecting crops against the majority of wild animals is permanent fencing. There should therefore be no relaxation or variation in an established policy for encouraging the erection of fences and walls, whether by communal or individual effort. It has rightly been decided that Government cannot undertake the financing of such schemes but the provision of easy loans should be the policy for some years to come.

There is also perhaps room for a further relaxation of the game laws such as has been adopted in Kanara.

The granting of gun licenses should be systematised. There is probably room for a larger number of licenses if every area is to be properly provided for.

QUESTION 17.—MARKET GARDENING AND POULTRY-KEEPING.—These seem to me to be two of the most promising secondary occupations which need developing. They are specially suitable for co-operative effort, but as regards the former the chief difficulty would be the provision of land as generally the formation of a society which included persons as yet without any permanent occupation would mean the provision of land for them. An endeavour is being made by the Co-operative Institute to start a poultry breeding society in the Satara district near Sangli.

QUESTION 18.—(a) The areas to which this problem applies of which I have had personal experience are the forest areas of Kanara, and the semi-forest Mallad tracts of Kanara, Dharwar, Belgaum and Mysore, where there is a large though insufficient yearly temporary migration of labour to the spice gardens of Kanara and Mysore, and where everywhere there are large areas

of uncultivated land; and Khandesh where there is an aggravated shortage of labour at harvest times. As regards the uncultivated areas of the Mallad tracts the best measures for attracting labour seem to be the grant of big areas to single persons of large means on favourable terms, which is a better scheme than trying to attract small cultivators by similar concessions (an attempt to attract them by such concessions and by loans and monetary grants has signally failed in Mysore); and campaigns against malaria and pig evil. The seasonable shortage of labour in other areas will not usually, I think, be remedied by migrations whether permanent or temporary. It must, I consider, be remedied by an ordinary readjustment of conditions the chief part of which would be better and more intensive farming, the use of more economical and labour-saving implements and an increase in the skill, energy and endeavour of the ordinary cultivator.

(h) There is a general shortage, and it appears to be due mainly to the undoubted improvement in the status, and a decrease in the poverty (if not increase in prosperity) of the labouring classes since the War, the influenza epidemic and migration to towns.

One of the causes why in my opinion it is difficult at present to tackle the labour question is the insufficiency of knowledge and statistics on the subject. A recent inquiry by the Labour Office on certain main features, e.g., how many days in the month an agricultural labourer worked, how often he was unemployed, the movement of labourers into or between districts, the proportion of work done by agricultural labourers only and by cultivators who work as labourer in their spare time, revealed, I believe, much ignorance on the part of local officers on the subject. We want a systematic collection of data before we can decide whether action should be taken and whether in fact the chief solution is not a readjustment of conditions or better and more intensive farming.

QUESTION 19.—(a) I think that, speaking generally, forests are being put to their fullest use in this Presidency for the purposes of agriculture. There is in fact evidence that they are being drained in some areas.

(The question is largely one of privileges. I think that almost everywhere the privileges are as liberal as they can be, and in Kanara they are probably more liberal than anywhere in India. Where they fail to achieve their object it is generally not because the privileges do not exist on paper but because they are imperfectly understood or exercised in practice, whether on the part of the people themselves or the Forest and Revenue Officers. The establishment of village committees which will advise and work with the Forest Department is a suggestion worth consideration.)

As regards policy the question as to how far the forests immediately adjoining cultivation should be controlled by the Revenue or Forest Department so as to ensure the greatest benefit to agriculture is often under discussion. I think that except for outlying portions they should invariably be retained under the Forest Department and the placing of them under the Revenue Department as Revenue Forests is usually false economy. Supervision by the Revenue Department invariably means imperfect management or no management at all. Outlying portions should be disforested and turned into revenue waste. Another question is that of payment for forest produce. The policy is apt to err on the side of liberality, and this leads to waste, not to say imperfect appreciation, and is economically bad for agriculture.

An instance where forests could be developed is in the case of good grazing areas adjoining intensively cultivated or famine tracts which are only particularly accessible owing to the absence of communications. I think money could be usefully spent in developing these.

(b) As regards fodder the matter largely depends on the attitude adopted towards the question of communal grazing *versus* private grazing or grazing land held by co-operative societies and other organised bodies. The Cattle Committee of two or three years ago decided for the latter and I am unreservedly in favour of it. I think it is the only solution of the economic evil of surplus half-fed cattle, and for the improvement of grazing as a

whole. It must of course be limited according to areas. Where there is a heavy agricultural population or a large surplus of semi-agricultural or non-agricultural population, as in the Konkan or on the Kanara coast, it is usually impracticable as likely to cause undue hardship. Elsewhere it should be put forward as an established policy. Village forests form a possible remedy in some cases. Thus on the Kanara coast, I as Settlement Officer, proposed this as the solution. They have up to now been started on a limited scale only because there is too much opposition on the part of people, mostly non-agriculturists, who have from time immemorial been used to a system of uninterrupted enjoyment of forests by the individual each for himself. This is also to some extent a solution for the increase of fuel in rural areas. Please also see my answer under (e).

In East Khandesh the preparation of a working plan of outlying forests interspersed between intensively cultivated areas which will regulate both grazing and supply of fuel is under preparation. It may meet with local opposition, but it is, I think, a sure method of increasing the supply of both in the near future.

(c) This is more a question for Forest Officers to decide, but I think soil erosion has resulted. I think the curtailment or better regulation of the disforestation and giving out of land in the foot-hills is a remedy. Another is better regulation of forest grazing in such areas.

(d) The answer has been indicated above.

(e) I have not personally seen any areas where there is scope for such afforestation except in so far as outlying portions of revenue forests or revenue waste lands can be taken into working plans introduced for the better regulation of agricultural supply as indicated under (b).

I have noticed small private plantations springing up in some parts of the Kanara coast. In Madras it is the accepted policy that plantations near villages are usually better left to private endeavour. I think there is scope for the introduction of such plantations, such as *babul* or *casuarina* plantations in waste lands near villages, and that the people should be encouraged to do this by the advice and help of both the Forest and Revenue Officers.

(f) The answer has been indicated above.

QUESTION 20.—The report on marketing made to Government for the purpose of the Royal Commission by the Director of Agriculture was made in consultation with me and I am generally in agreement with it. This answer consists of any additions or variations I wish to make.

(a) I think that the improvement of the market facilities is one of the chief necessities for rural development. The bulk of the agricultural produce is at present marketed through small dealers at small local markets or shops or sold to them by the cultivator on the spot. These markets leave everything to be desired in fairness of dealing, information about prices, grading, competition and market facilities in general. Instances are some of the smaller cotton markets in the Dharwar district. I would advocate the system of open markets for the chief forms of produce as suggested by the Cotton Committee of 1920, and the improvement of local markets whether through Government or local agencies. The other main line of improvement is through co-operative sale societies [*vide* answer to question 22 (b) (iii)]. It is not strictly accurate to say that all such societies have been failures except some for cotton and *gul*. One line of possible development is in fruit marketing. Thus in the case of mangoes it is calculated that the producer gets only 25 per cent. of the ultimate price.

(d) One of the things most to be desired is a complete study and complete statistical information on the marketing of every form of produce in all its stages as indicated under sub-head (b) of this question. The information is now sadly lacking. It could be undertaken by the Agricultural Department or through the Professor of Economics or possibly by the branches of the Provincial Co-operative Institute. There would have to be division of labour.

QUESTION 21.—The sea freights and railway tariffs are in many cases unduly high. Cases have been brought to notice by the Divisional Boards of Agriculture. The question would probably best be tackled by the Commerce Department of the Government of India.

QUESTION 22.—(a) (i) The general policy must be one of decentralisation, that is of encouraging the non-official control of the movement. The consummation of this policy is however still at a great distance. Distinction should be made between the credit and non-credit sides of the movement so far as it affects agriculture.

As regards the credit side I think Government's chief duty is to see that the staff for supervision, audit, and to a lesser extent propaganda, increases with the growth in the number of societies. Standards were suggested in the Co-operation Committee of 1915, though these are to some extent out of date, the staff is generally insufficient. The other direction in which Government aid seems to be necessary on the credit side is the increased provision for banking facilities in outlying towns. An instance would be the system of payment by taluka sub-treasuries to approved banks or branches of banks against demand drafts.

As regards the non-credit side Government aid will still be necessary for some time to come. The suggestions of the Cotton and Sugar-cane Committees for the aid of expert Government Agricultural Officers for sale and other non-credit societies still hold good. Some of our cotton societies are reaching their most critical stage when they are beginning to compete seriously with the middlemen and *dalals* and they therefore need special sympathy and help from Government. Government give special grants for the development of the non-credit movement, *e.g.*,

Grants to sale and insurance society.

Loans to irrigation societies.

These should be continued and if necessary increased.

(ii) By these agencies I understand Local Boards. I consider that these bodies should feel it their duty to subscribe to the local branches of the Co-operative Institute and to non-credit societies such as Taluka Development Associations, cattle breeding and dairy societies.

(b) (i) *Credit Societies*.—The policy of allowing their growth to be spontaneous except in special cases has been successful and should be continued. Special cases should be societies for depressed classes and in areas where the movement has not yet reached. The main needs for the development of credit societies are education in management and in co-operative principles and closer touch with the Central Banks.

(ii) *Purchase Societies*.—By these I understand societies for the purchase and distribution of seed, implements and manure. The general experience has been that these cannot be run in single villages with success and the unit must be a larger one, *i.e.*, a taluka or a group of villages. Exceptions have been some manure societies, a few seed societies in Sind, and societies for the purchase and hire of implements in Ahmednagar. Another point for consideration is how far the demand is being or can be met through other forms of co-operative agency so as to avoid overlapping. Such other forms are (i) Central Banks. Some of them can undertake the work under their bye-laws, but this has not been done except by the Provincial Bank which has distributed oil-cake and other manure and implements and seed with conspicuous success the sales being more than all those of other agencies together. (ii) Sale societies, *e.g.*, cotton sale societies which have distributed pure cotton seed. (iii) Taluka Development Associations and Supervising Unions which usually supervise a single taluka. The bye-laws of both provide for this form of work. (iv) Primary credit societies might adopt this as another side of their work as is done in Madras. This would be by the indent system. Some of the primary societies in Khandesh have undertaken the distribution of seed.

(iii) Sale societies are both the most important of the non-credit societies and most difficult to manage. They have been developed to a considerable extent in the Bombay Presidency. Although the cotton and *gul* (including the shops run by the Provincial Bank) sale societies represent about 80 per cent of the successes, societies for the sale of produce in general and one for arecanut in Kanara have done well.

The societies may be divided into—

- (a) those for the sale of a particular commodity,
 - (b) those for the sale of produce in general,
- and again into,
- (i) Societies standing by themselves,
 - (ii) Societies formed by the Union of Primary Societies, *i.e.*, Sale Unions.

As regards the first division those for a particular commodity are likely to be most successful. Those for produce in general are most likely to succeed in the form of Sale Unions and Sale Unions are probably best in all cases.

The difficulties in connection with the Sale Societies are, firstly and chiefly that as soon as they reach a considerable size a struggle with the existing trade agencies are represented by the middlemen, who can afford to disregard them in their early stages; is inevitable, and a greater degree of education than what is now found amongst agriculturists is required to win through. Secondly that, although expert agricultural help and advice, which is necessary in all cases, is sufficient in the early stages, later on they need expert trade experience. Until more non-official help is received State aid and sympathy will be necessary in this respect.

(iv) This is a line in which considerable success has been achieved and in which much development is possible. There are societies for the erection of walls and of dams. Schemes for co-operative excavation or repair of tanks are pending. The chief difficulties connected with these societies are (i) finance, and (ii) expert advice. As regards (i) the schemes are not always simple enough or the visible security sufficient for Central Banks to undertake the finance and Government have to undertake the responsibility which need not however be considerable. As regards (ii) it is reported by local officers that for some of the schemes, *e.g.*, erection of bunds, excavation of tanks the ordinary local engineering staff is not sufficient to be available. There is also the difficulty of introducing some form of compulsion to bring in the small percentage of unwilling landowners.

(v) The formation of a society at Umbergaon in Thana district is under consideration. Please see answer to question 7.

(vi) There are a few power-pump societies in Gujarat, one ginning society in Gujarat and one in Khandesh. My predecessor was of opinion that the former kind tend to be unco-operative. They are apt to result in the selfish appropriation of water rights, it is often a case of each member for himself, and sometimes the society is merely a means to obtain cheap capital rather than a co-operative venture. It is for consideration whether the introduction of larger agricultural machinery is not rather a question for District Agricultural Associations and Taluka Development Associations than for societies formed for that purpose only.

(vii) *Joint Farming Societies* in their present form are not in my opinion likely to succeed at present. That is to say, societies in which the land belongs to the society representing all the members, the produce is marketed as a whole and the profits proportionately divided. Two such societies have failed (Bhambora, Arjunsonda) and one of them was entirely a one man business. A joint cultivation society by which some Waddars in Dharwar have brought a large area of waste land under cultivation has been a success to that extent, but the members cultivate separate areas and keep the produce separate and later on will take over as their own the areas each has been cultivating. Societies for a definite part of agricultural operations, *e.g.*,

for reclaiming salt land, removing silt, erecting a dam or wall, can succeed but the success of those in which the object is merely farming as a whole is in my opinion unlikely. The former kind are grouped together in the Punjab under the comprehensive term of "Better Farming Societies."

(viii) *Cattle Breeding Societies*.—Although these have not succeeded to any extent in this Presidency I think they should be developed. Their institution must depend largely on (a) the policy adopted as regards communal *versus* ordinary grazing land. (The chief criticism against them is that they are schemes for appropriating the village grazing land.) (b) The development of the Veterinary and Live-stock Expert's Departments.

(ix) Schemes for the formation of a milk supply and poultry society are in contemplation. Any form of society which will develop industries subsidiary to cultivation is desirable.

(c) Yes. But it should be sparingly used and persuasion should be the chief method. My predecessor has made proposals on the subject.

(d) Credit Societies have achieved their main object.

In making a comparison between the *sowcar's* rate and the society's rate distinction should be made between big agriculturists with substantial assets, those with limited assets, i.e., ordinary agriculturists, and those with few or no assets. Credit societies are comprised ordinarily of the second class only with a few of the last class in some cases. The *sowcar's* rate for big agriculturists with large assets is usually slightly less than the societies' rates. In the case of the second class of ordinary agriculturists with which we are chiefly concerned the *sowcars'* rate used to be abnormally high thirty years ago before the coming of co-operation. For instance in the Karnatak it used to be about 24 per cent. At the present time it is generally slightly higher than the Societies' rate (an average of 12-15 compared with 9½ to 12½ per cent.) and in a few cases it approximates. For the lowest class it is considerably higher. Where the rate approximates the members of societies profit by better dealing, as there are of course other incidental charges in *sowcar's* dealings. It may be explained that societies' rates vary in different districts and parts of districts. Thus in famine areas such as Nagar, Sholapur, parts of Poona, etc., it is two pies, in some parts of Gujarat and of Khandesh, Dharwar and Belgaum it is generally 1½ pies, and in parts of Broach where the *sowcars'* rates are very low 1½ pies. The following are typical instances for comparison:—

Area.	Sowcars' rate.	Societies' rate.
Dharwar	12 to 15 per cent.	9½ to 11 per cent.
Belgaum	12 to 18 "	9½ to 11 "
Kanara (Coast)	9 to 12 "	9½ to 11 "
Surat and Broach	12 to 18 "	9½ to 12½ "
Kaira and Ahmedabad (in general)	12 to 25 "	9½ to 12½ "
Parts of Broach, Kaira and Ahme- dabad.	9 to 12 "	9½ "
Thana	12 to 15 "	about 11 "
	(more for hilly areas)	
East and West Khandesh	12 to 18 per cent.	" 11 "
Sholapur. Satara, Poona	12 to 18 "	" 11 "
Do. Famine parts	18½ "	12½ "

Another noticeable feature is that in many districts *sowcars* are depositing their money in credit societies on a large scale preferring to get a safe 7 per cent. Much money is thus brought into the movement. In some cases *sowcars* have been enabled to recover their long-standing debts by transferring their dues to societies.

The question as to how far it will be possible to reduce the ordinary rates in societies in the future is now coming up for consideration. The general

policy is that well-run societies with large reserve funds can be allowed to reduce their rates by $\frac{1}{4}$ or $\frac{1}{2}$ pie. See paragraph 16 of the Punjab Report on the working of Co-operative Societies for the year ending 31st July 1925.

QUESTION 24.—(b) One of the chief factors is the absence of any limit by which the landlord can raise the rents, and the extent to which the system of tenancy at will obtains.

QUESTION 26.—(a) (i) (iv) and (v). Owing to the heavy cost of the subordinate revenue village establishment the yearly enumeration of all the statistical information as regards crops and rents has had to be modified, and provision has in most areas been made for a more accurate and more exact enumeration under a five years rotation system. In this way minutely accurate statistics are obtained for one-fifth of the lands each year, those for the remaining four-fifths being approximate only. There has thus been to some extent a diminution rather than an extension in the amount of information available. The experience gained in modern resettlements has demonstrated that the statistical information recorded under the record of rights is often surprisingly accurate, and it should be more so for the future limited area. I think that the Land Records Department should work out some method of tabulating the statistics of rents recorded for this area. They should be useful towards estimating the incidence of land revenue. They should be periodically published.

The census statistics of agricultural population are, though useful, deficient in many respects. We want further sub-heads by which we shall know the numbers of cultivating owners, labourers sub-divided into local and migratory, etc.

(ii) Many of the local Agricultural Officers in charge of farms and agricultural stations are now undertaking yearly estimates of the yield of principal crops. This system might be continued and developed.

Oral Evidence.

4879. *The Chairman.* Mr. Collins, you are Registrar of Co-operative Societies, Bombay Presidency?—Yes.

4880. How long have you held this office?—For four months.

4881. Had you any experience of the co-operative movement before you took up this office?—Practically none.

4882. In what field had your service lain?—I had been a Revenue Officer until then with experience of revenue settlement work and forest settlement work. For a short time I was in the Secretariat.

4883. Have you had opportunity to apply yourself to rural economy in the broadest sense before you undertook the duties of Registrar?—Yes; I had considerable opportunity when I was a Settlement Officer. Apart from that my service was in a district which is rather different from the other districts of the Presidency. My study was to that extent rather limited by the local circumstances.

4884. Do you think that it would be to the advantage of the revenue official and the public if the study of rural economy was made a part of the curriculum? Would it be a good thing if a degree in rural economy in its broadest sense were regarded as a qualification for appointment to the revenue service?—I should certainly think so as far as promoting members of the Provincial Service is concerned.

4885. I am thinking of the Provincial Service?—I think certainly it would be.

4886. I do not know whether you would like to make any general statement before I ask you one or two questions on your very interesting written evidence?—No.

4887. Do you think at the present time the Agricultural Department and the Co-operative Department are working sufficiently in touch with each other?—Yes. From what I have been able to see I should say they were more in touch here than in almost any other Province.

4888. To what extent is the Agricultural Department making use of the Co-operative Department for the purpose of propaganda and demonstration?—Firstly through the non-credit societies (especially the sale societies) and secondly through Taluka Development Associations, which are mostly registered under the Co-operative Societies' Act.

4889. How does the Agricultural Department approach your department on questions of propaganda and demonstration?—I will begin from the bottom. The Agricultural Department has got in most districts officers known as Agricultural Overseers, and in order to work with the Co-operative Department they have appointed a similar type of officer called an Agricultural Organiser who is supposed to organise non-credit societies like the sale societies and so on. But apart from the ordinary duties given to these officers, the Agricultural Overseers must also interest themselves in the organisation of non-credit societies and the Agricultural Organisers in the spread of agricultural improvements.

4890. What I am trying to get from you is whether every advantage is taken of the opportunities offered by the Co-operative Department to popularise agricultural improvements?—I think that is being done.

4891. Let us come from the abstract to the concrete. What particular improved method of tillage or improved variety of seed is the Co-operative Department advocating at this moment?—They are doing a great deal to spread a pure type of cotton seed.

4892. How is that propoganda arranged for?—The cotton sale societies are advised to stock the seed and distribute it to their members.

4893. How about the touch between the Agricultural Department and your own department in this matter?—In our sale societies we have agricultural officers attached for that purpose only, and we have got special cotton graders for that.

4894. Is the touch only in the districts, or is it at the centre as well? Do you get official communications from the Agricultural Department asking you to do your utmost to encourage co-operative societies throughout the Presidency to do this or that?—Certainly, I think the whole organisation has been arranged with that intention. We start off with a Joint Board consisting of the Director of Agriculture and myself, and we work through the Provincial Board and the Divisional Boards down to the Taluka Development Associations; and every question comes before both of us. We meet four times a year.

4895. So you feel convinced that the opportunities offered are being utilised to the full?—Certainly.

4896. There are no improvements or suggestions you wish to make?—No. I do not know whether at a later date the relations between the two departments may not have to be reconsidered. The exact province of each officer with regard to purely non-credit work in the co-operative movement may have to be reconsidered at a later date.

4897. You have given us an interesting note on the question of credit in relation to the co-operative movement. It appears to me that the germ of the matter lies in the facts and figures you have given on page 200?—Yes.

4898. Do these figures show that the rate of interest charged to the cultivator for loans either by a *sowcar* or a society vary in the main with the intensity or otherwise of the risk of famine in any particular district?—That is my opinion; and with the extent of the education in that particular part of the Presidency.

4899. In the main the lower rates of interest exist in those districts where the risk of famine is lowest, and the higher rates in those districts where it is greatest?—That is so.

4900. The reason being that when famine comes no payment either in respect of principal or interest can be expected?—I think the reason is that in any particular year repayment is a very doubtful matter. You cannot expect to get repayment every year; once every two or three years there may be difficulty.

4901. On page 200 you say, "The *sowcars'* rate for big agriculturists with large assets is usually slightly less than the societies' rates". That is the nominal rate. Does it include the auxiliary charges which I understand the *sowcar* makes? Is it really a fact that there is a net advantage to the agriculturist to borrow from the *sowcar* as against borrowing from a society?—I think that is so in some localities, though in very few. I have heard it is so in some part of Gujerat.

4902. Where that applies it must pay the large cultivator to borrow money from the *sowcar* and not the society?—I am afraid that is so.

4903. Does this apply in many areas?—No, in very few indeed.

4904. Does the nominal rate of interest charged by the *sowcar* represent in practice the whole interest charged?—No, certainly not. It may do so in the case of the better educated agriculturists who can see they are not imposed on, but not in the case of the smaller cultivators.

4905. The first year's interest is usually deducted before the money is handed over?—Yes, and there are usually other conditions such as that the cultivator must sell his crop to the moneylender or buy his seed through him.

4906. In the matter of payment of interest charges, does the moneylender or the society give the greater elasticity?—The moneylender.

4907. That is a great attraction to small cultivators?—Yes. We insist on more punctual repayment at more definite periods, but the moneylender is much more willing to extend the time.

4908. If you could get punctual repayment in an important percentage of cases you could lower your rate of interest?—Yes.

4909. You cannot get punctual repayment owing to the uncertainty of the crop due to the failure of the monsoon?—Yes.

4910. So the uncertainty of the monsoon is again one of the root causes of debt in this Presidency?—That is so. There is also lack of education and the fact that loans are not made to the proper people. ✓

✓ 4911. No doubt cultivators will borrow under any circumstances so long as their credit holds, but is it a fact that one of the great difficulties in improving the position of cultivators who are in debt is the uncertainty of the season?—Yes.

4912. Have you had any experience yet of the value of teaching the grading of produce to the cultivators?—I have in case of cotton sale societies.

4913. Do you think that a knowledge of that advantage is spreading amongst cultivators?—Very much, in cotton areas.

4914. Have you any views with regard to the advisability of attempting to spread by compulsion the adoption of improved varieties of cotton?—I have not considered the problem sufficiently on the spot to give any advice on that.

✓ 4915. On page 193 you say, "The banks must employ a larger and more efficient staff especially of Inspectors and open more branches, the societies must universally adopt the normal credit system, and there must be an intermediate link between the two in the form of Supervising Unions . . ." What does "normal credit system" mean?—The normal credit system means that the credit of every agriculturist is carefully prepared every year, the cost of his cultivation, the area of his land, his assets and debts and the expected income, and then by addition and subtraction you find out what his current year's requirements are going to be.

4916. That is a routine method of assessing his credit?—Yes. We have got printed forms for this purpose.

4917. I understand from your statement that it is not the universal practice?—No, but it is spreading gradually. It depends largely on the staff of the banks which advance the loans. Some of them have not yet got their Inspectors to do that. Very few societies can do it themselves.

4918. Then you say there must be a link between the Central Banks and the primary societies in the form of Supervising Unions or possibly Taluka Development Associations?—Yes.

✓ 4919. Are the Taluka Development Associations part of the co-operative organisation at this moment?—Some of them are registered and some are not.

4920. Before they can function in this direction they would require to be registered, would not they?—Yes.

4921. On page 193 you refer to the question of how far Government should make direct provision of finance for the present. I think you regard that as an open question?—Yes.

4922. Making direct provision for finance is in practice, apt to mean the hypothecation of funds provided by the general tax-payers of the country to the relief of particular individuals who have got themselves into debt?—I am afraid I have not put it correctly. I meant that Government must issue debentures. They are now spending a lot of money on *taccavi* which I think they should put into land mortgage banks.

4923. There is a tendency to look to Government for direct financial assistance?—Certainly. Practically every resolution is a recommendation to Government to help in that way.

4924. Schemes are advanced for the relief of people deeply in debt according to which societies backed by Government will take over the debt at a lower rate of interest than that claimed by the existing lender?—I would not go so far as that, of course.

4925. There is no general appreciation of the fact that the general taxpayer and the Government are one and the same thing?—No. That is what we are always trying to impress upon them.

4926. And that when Government funds are used to ease the position of debtors, what in fact is being done is to take money from those who manage their affairs well and give it to those who have failed to do so?—Yes.

4927. That cannot be too plainly understood or advertised?—I quite agree.

4928. Do you see any indication of the primary societies being in a position to offer long term credit, say for 15 or 20 years?—No. They have tried it on a small scale and I think it has been clearly shown that they cannot do it. It is too long a period and they have not got sufficient funds.

4929. You say on page 193, "There is undoubtedly a demand for institutions to provide long term credit. Often the first question asked in a credit society is when shall we be able to get money to redeem debts. Land mortgage banks are open to the criticism that they are only to a very limited extent co-operative." Have you any constructive proposals to improve that position?—I think we should start one or two land mortgage banks without delay. In certain areas you can start to-morrow if you can draw up a scheme.

4930. What do you say to the criticism that they are co-operative only to a very limited extent?—That is a criticism sometimes made. I certainly do not believe in it myself.

4931. You do not think there is anything in that?—It depends on exactly what is meant by "co-operative." There is not co-operation to the same extent as in the primary societies.

4932. I thought perhaps you wanted to make some suggestion about that?—I merely wished to anticipate criticism; that is all.

4933. You advocate the confinement of the system of *taccavi* to co-operative channels, where a co-operative organisation exists?—Yes, with certain exceptions.

4934. You do not go so far as to suggest that loans of that nature should not be given in all districts except through co-operative associations?—No.

4935. Some well-informed persons regard such restrictions as likely to be an effective means of spreading co-operative credit societies, do they not?—They do. I simply want this to be done in areas where there are co-operative credit societies. As the rules are at present, they simply say "in areas where there are co-operative credit societies". It does not mean that every village has got to have a society and that a man in a village where there is not one will suffer.

4936. Supposing in an area where there was no co-operative organisation these *taccavi* loans were not available, would not people in that area form a society in order to get the advantage of *taccavi* loans?—I do not think so. I do not think they are capable of it.

4937. On page 194 you are talking about the causes that have led to excessive debt, easy credit having led to excessive borrowing, and you say, "These half-educated agriculturists have, it is feared, been financed beyond their means and they are now in danger of losing their lands". It has been suggested to the Commission that in their case there comes a time when the extent of the loan altogether exceeds the value of the land on which the loan is secured, and when that time arrives the cultivator will be well advised to give up his land, clear himself of his debt, borrow a little more money, and move to another district, and settle there. What do you think of that idea?—No, I should not like that at all.

4938. It is done I suppose occasionally, is it not? You follow the argument?—Yes, I follow the argument. I think it is more likely they would become labourers instead of landholders.

4939. You do not think that practice would improve their credit?—No.

4940. On page 194 you do not advocate any stricter application of the Usurious Loans Act, or the Deccan Agriculturists' Relief Act, or the passing of any further Acts of this description. Are they, in fact, operative at all

in the districts you know?—In the districts that I know they are practically obsolete.

4941. Do you think the cultivators know anything about them?—They know a good deal about the Deccan Agriculturists' Relief Act. That is the only one that is used to some extent.

4942. I want a little more information about something that you have written on page 196, in answer to question 18 of the Questionnaire, with regard to attracting agricultural labourers in new tracts. You say "an attempt to attract them by such concessions and by loans and monetary grants has signally failed in Mysore". What experiment are you referring to there?—That was known as the Malnad tract improvement scheme. They have got a large area of forest and semi-forest on the edge of the Ghats, and they try to attract people by giving them these waste lands for nothing at all, and actually advance them loans to cultivate it. A very large number of them, as soon as they spent the money went away. A good many from our adjoining districts went there, and I should think about 50 per cent. of them have come back again debtors to the Mysore State. They will never be able to recover the money.

4943. Are there any other reasons than these you have suggested? Are there any particular reasons for the failure of the scheme?—I think all schemes in such malarious forest areas are very risky.

4944. Then you refer to campaigns against malaria and the pig evil. Does that refer to malaria and the pig as a pest of agriculture?—Yes.

4945. On page 196 you say "There is a general shortage and it appears to be due mainly to the undoubted improvement in the status and a decrease in the poverty (if not increase in prosperity) of the labouring classes since the War, the influenza epidemic and migration to towns". Have you noticed any tendency on the part of those who are agricultural labourers to become small cultivators?—I have seen a certain amount of it. I should like to say that I think the reason why some of these figures can be used to support almost anything is that they are not properly collected at present, figures showing who are really labourers and who are really landowners.

4946. On the same page you say: "As regards fodder the matter largely depends on the attitude adopted towards the question of communal grazing versus private grazing or grazing land held by co-operative societies and other organised bodies. The Cattle Committee of two or three years ago decided for the latter and I am unreservedly in favour of it." Has its adoption any effect on the rates paid for grazing?—It has not been adopted yet to any extent.

on the rates paid for grazing?—It has not been adopted yet to any extent.

4947. It has been tried in certain districts, has it not?—They have given out small areas to village committees.

4948. Do you know whether where it has been the rate has varied?—No, but they have not adopted it to such an extent that they have taken away all the communal grazing land. It has not affected grazing rights at all.

4949. It appears to be your view on the question of marketing that a great deal cannot be done until the essential data have been collected?—Yes.

4950. Do you think that should be the first step?—Emphatically so.

4951. And until that is achieved, is it your view that it is of very little use discussing it on the basis of mere impression of the share received by the producer of the raw material, of the agricultural produce?—Certainly.

4952. You are strongly of opinion that a survey of this nature ought to be made at the earliest possible movement?—Yes; we are doing a little in our movement.

4953. On page 198, in answer to question 22 (a) (i), you say, "As regards the credit side, I think Government's chief duty is to see that the staff for supervision, audit, and to a lesser extent propaganda, increases with the growth in the number of societies". So you then advocate that propaganda and supervision other than audit should be carried out by Government officers?—No. I have perhaps not put it quite clearly. I mean that the

officers who are doing audit, do, to a certain extent, propaganda as well, and that is bound to continue until the movement is more advanced than it is at present. I would not have special officers for propaganda. If I may be allowed to explain, we have now got only the Registrar and the Assistant Registrars. That is all the staff we have at present. If we want any propaganda work, or any enquiry made other than pure audit, we have to ask our auditors to do it; so that it is very necessary to have the audit staff increased as the number of societies increases.

4954. But you would rather see the advisors and propaganda work where possible carried on by a non-official agency?—Certainly. I had the opportunity of hearing what the last witness said; I should not agree with him at all.

4955. Then, on the same page, you say, "Some of our cotton societies are reaching their most critical stage when they are beginning to compete seriously with the middlemen and *dalals*, and they therefore need special sympathy and help from Government". What are the weapons used by the middlemen, when they decide the time has come?—There are many weapons. They start selling at lower prices and they can hold out longer than we can in that respect. They bribe our men, they publish pamphlets, and they go round the villages spreading all sorts of untruths; they make it difficult for us to get accommodation. At present, it does not matter what commodity you consider, we certainly would not control more than a fraction of that commodity in any particular market place.

4956. Could you send us a complete story of one of these struggles between established middlemen and societies?—I could.

4957. If you could state one or two in full detail, I think it may be very helpful?—The one I have in mind is the cotton sale society at Gadag.

4958. Perhaps you would let us have the whole story in writing?—Yes. Perhaps, I may be allowed to say that Mr. Madan knows it entirely.

4959. Of course, these economic struggles are tests of the efficiency of the societies, are they not in the main?—Yes, that is so; and it comes back to what we were saying before; we have not got enough men with knowledge of marketing. If we want to establish sale societies we have to look round for a manager, but there are hardly any such people available at present.

4960. Adventurings into the distributors' business are apt to show, among other things, that distribution is not quite as easy as it looks?—Yes, that is so.

4961. On page 199 you say, "The societies may be divided into those for the sale of a particular commodity, and those for the sale of produce in general". Do you think the single purpose society, so far as sale societies go, is the right type, or do you think a multiple purpose society is good?—As far as one can give a general rule it is, but I should not like to be confined to that entirely. In a district where you cannot say that any particular crops predominate, you would have to have a general sale society.

4962. Are you familiar with the history of co-operation in Denmark?—No.

4963. *Sir James MacKenna*: Is the basis of your structure the primary society, the unit society, at the bottom?—Yes.

4964. Then the Central Bank?—Yes.

4965. Then the Bombay Central Co-operative Bank which is the apex bank?—Yes.

4966. How is your apex bank financed?—It is financed by shares, by debentures, and by deposits.

4967. Deposits by the general public, or by societies, or by both?—Both.

4968. Are any reserve funds of societies deposited with the apex bank?—Not the reserve fund

4969. Where do you keep your reserves?—They are kept with the societies themselves and they are put into the working capital.

4970. What is the amount of money subscribed by the general public to the Central Bank, roughly?—I should say of the deposits, I cannot give exact figures but I think it must be somewhere about a half to three-fifths, about 50 lakhs.

4971. What is the method of finance from the apex bank downwards? Does the apex bank finance the Central Banks?—It gives loans to those Central Banks that are not self-supporting. A good many of them are self-supporting.

4972. And then the Central Banks do the same thing to the primary societies?—Yes.

4973. Has this apex bank any right of questioning an advance to a Central Bank or a District Central Bank, or must it pay an advance on the order of the Registrar?—The apex bank questions it. The Registrar has nothing to do with it. There is a rule in this Presidency by an agreement between the Secretary of State with the Provincial Bank, that all loans by the Provincial Bank must go through the Registrar. He must see all loans by the Provincial Bank; if he thinks any loan ought not to be made, then he can say so, but it is for them to say whether they are prepared to make it; that is all he can do.

4974. He cannot insist on the apex bank giving a loan to a particular bank?—Certainly not.

4975. Has the apex bank any power of inspection of the District Central Banks?—No.

4976. What guarantee have they of the stability of those banks?—I suppose the Central Banks would not be against their inspection, but they have no technical right to do so.

Mr. Calvert: They have a legal right to insist on inspection.

4977. *Sir James MacKenna:* Is there much Government money in your apex bank or not?—None.

4978. Yesterday, Mr. Rothfield was very emphatic on the retention of Government audit right through. Do you agree with him on that point?—Most emphatically.

4979. In the present condition of the movement?—Always. The Registrar is the registering and cancelling authority, and the only means that he has got is the yearly audit statement.

4980. *Mr. Calvert:* In the new Bombay Act there is a discretionary right in the Registrar to insist on an inspection of the Banks' affairs; the word used being 'may'; but in the Co-operative Societies Act, the word 'shall' is used?—I was asked whether the Provincial Bank had a right to insist on inspection: not whether the Registrar had a right to inspect.

4981. *Sir James MacKenna:* I am very much struck by the low rates of interest charged by *sowcars* in the Presidency, I am quite unfamiliar with such low rates from the professional moneylender in my Province. Your lowest rate would only be obtained on the deposit of gold or jewels. Are these low rates due to the integrity of character of the people?—They strike me as being extremely low. I have said it is chiefly due to the spread of the co-operative movement.

4982. But even so, the previous rates are not very high?—There are three types of persons. These are the rates to the ordinary agriculturist. With people who have no credit at all, they may go up to anything they like.

4983. But this is the ordinary rate on the security of land and personal reputation?—Yes.

4984. I think they are extraordinarily satisfactory. Can you tell me one point about land mortgage banks? Is it your idea to develop land mortgage banks under the existing Co-operative Credit Act?—Yes.

4985. Going further than that, it becomes a central subject, and that is the reason why, for land mortgage banks, you have decided to go on under the existing Act?—Yes.

4986. Will it not somewhat restrict the issues of the land mortgage bank?—I think nothing has been done yet; it is simply before Government. Our idea is to let it grow as the movement expands, we are not going to start off with any legal organisation.

4987. Just as the co-operative movement has grown?—Yes.

4988. *Professor Gangulee*: You have given us a very good account of the credit societies, but you will agree with me that the second phase of the co-operative movement, that is non-credit societies, is equally important or perhaps more important?—Equally important; I will not say more.

4989. Now, these societies are capable of extension in this Presidency?—Certainly.

4990. In what direction would you extend this movement? The non-credit side has so many aspects; which would you emphasise?—Sale societies, implements and manure supply societies, cattle-breeding.

4991. Is that in the order of importance?—Yes.

4992. That is, co-operative marketing is of the most importance?—Yes.

4993. You have made a statement here that the producer gets only 25 per cent. of the ultimate price?—That is in the case of one particular commodity, that is mangoes.

4994. You have stated in answer to the Chairman's question that you would start these co-operative marketing societies after an exhaustive enquiry into the marketing conditions. Am I right?—Yes.

4995. Do you not think that these co-operative marketing societies could be utilised for collecting the necessary statistics and data?—No, I am afraid they would be complete failures long before they got that information.

4996. You feel you cannot proceed to organise these co-operative marketing societies unless and until you have satisfied the first requisite which is the collection of data with regard to marketing conditions?—Yes.

4997. Should these non-credit societies be independent organisations or connected with the credit society?—They should be entirely independent.

4998. They should have nothing to do with the credit society?—Their organisation has nothing to do with it at all.

4999. How would you finance these non-credit societies?—They should be limited by a share system, and the members should be as far as possible societies themselves. Then they would have to get funds from the Central Banks against the produce which they hold. These sale societies will be of no use unless they can give advances to their members against the produce. Then there is the question of holding the produce for so many months in the year, and they want finance for that.

5000. For that finance you would not go to the credit societies?—No, certainly not; they have not enough funds.

5001. What would be the machinery?—The District or Central Banks.

5002. Do you recommend financial assistance from Government for the purpose of starting non-credit societies?—No.

5003. You attach, and rightly so, very great importance to the development of subsidiary occupations as a means of improving rural economy?—Yes.

5004. Do you feel that the general current of economic tendencies is against rural industries? The point I want to make is this; at the present time, there is mass production of things of that kind coming into the market. The economic pressure from outside is so great that perhaps rural industries, as we understand them in this country may not survive. Do you consider that such tendencies exist?—I should like to consider a specific instance like weaving. I do not think it is true to say that it is being driven out of the field by the manufacturing processes. I do not think the current is against it to that extent.

5005. But what scope is there for the revival of rural industries? Do you hold out any prospect of a revival of rural industries?—I would rather not commit myself on that; I do not think I have studied it sufficiently

5006. You will agree that the hope of their revival in any way is based on two important factors; local markets and the use of local materials?—Yes.

5007. Granted these two factors, can you really develop subsidiary occupations that would be beneficial to the population of the particular area?—I should say yes.

5008. Is it possible to apply co-operative principles to most of these industries? A list of subsidiary industries has been placed before us, including lac, weaving, and so on. Do you think it is possible to apply co-operative principles to most of these industries?—I should say it was essentially suited to them.

5009. Is there any urgent demand for societies for cattle-breeding and dairy farming?—Unfortunately there is not and that is where we want agricultural propaganda. There is no spontaneous demand from the people at present.

5010. In famine tracts, do you advocate the establishment of grain banks as a guarantee against famine? Are there any such banks?—No, there is no such bank that I know of. I am afraid I have not studied that subject.

5011. The primary purpose, of course, of co-operative societies is economic, but in most countries the economic results of this movement have been accompanied by various forms of moral and general improvement, such as mutual confidence amongst the villagers and close touch with one another?—Yes.

5012. Do you find such tendencies in India?—Very much so.

5013. With regard to the credit side of the question, on page 198, you make a very interesting suggestion, which impressed me. You say, "The other direction in which Government aid seems to be necessary on the credit side is the increased provision for banking facilities in outlying towns". What do you actually mean? You would have the banks, recognised co-operative societies. Am I right?—Yes, to recognise them so that they can be given facilities with regard to Government Treasuries and sending their funds to and fro.

5014. The banks honouring co-operative paper, is that what you mean?—Yes, that is what I mean.

5015. *Mr. Calvert*: I gather that you have, in the Presidency proper, 22,800 villages, and about 3,300 agricultural societies?—Yes, you have got the 1925 figures. We have issued the report for this year but I am afraid you have not received it.

5016. That leaves about 19,000 villages without a society?—Yes.

5017. Is the spread of the movement dependent upon the discovery of a kind-hearted philanthropist who is willing to guide and control?—No. In many areas the villagers are coming forward themselves and asking to have a society established in their village. We find that the chairman of a society in one village will establish one in the next village.

5018. Why is the movement so limited to a small number of villages?—I would not say it is limited to a small number of villages; it is limited to certain areas. In the Dharwar district it is in 48 per cent. of the villages, but you get a district like Kolaba, where it is 2 per cent.

5019. It is merely a question of time?—Yes.

5020. *Sir Chunilal Mehta*: Is it a question of time?—I should say, in most cases, it is only a question of time. You get definite forest areas and isolated areas, where it will take a long time indeed. Take, for instance, the interior of the Konkan.

✓ 5021. *Mr. Calvert*: On page 193 you say that the only limits to financing every member of a society are the efficiency of the society and the financial position of its members. Do you not consider that character, education, and a knowledge of the proper use of credit are also important factors?—Yes. Did I not convey that? I mean, we have got enough money in the movement to give everybody a loan, but he may not be a proper person to give a loan to.

5022. A proper person in the sense of understanding the use of credit, and whether he has any debts already?—Yes, and whether he is a defaulter.

5023. You do not suggest the limiting of loans to people with property?—Certainly not.

5024. Then you advocate that Central Banks should employ a large and more efficient staff of Inspectors?—Yes.

5025. I suppose you are aware that in one large Province that system has broken down?—No, I do not know that.

5026. And they have finally decided to adopt the Punjab system of co-operation by education?—I am not aware of that. I do not mean that they should employ Inspectors to go round and teach the people. The only way of watching the disposal of their money by societies is by District Inspectors. You have some districts where the bank only meets once a year and decides these matters. They make dreadful mistakes because they have not got any local knowledge; they must rely on the inspections.

5027. You do not have a general meeting of all your societies which fixes the credit limits of all the societies?—No, we have not got to that stage.

5028. On page 193, you discuss the question of whether the system should be controlled from Bombay or partly through district banks, etc., I cannot understand why the system should be controlled. Why should not it control itself?—That is because I have not made myself clear. I mean, if you establish a land mortgage bank in a particular district, should all the funds and the business be conducted through the District Bank of their district or should it be conducted from the Provincial Bank in Bombay. Our idea is that probably to begin with, it all ought to be done from Bombay; the local agency will be simply for collecting the share and transmitting the information, but scrutiny of the loans and the money will actually be provided from Bombay through the apex bank.

5029. You say on the same page that mortgage banks are open to the criticism that they are only to a limited extent co-operative. What exactly is your meaning?—I shall have to put it in a concrete way in order to explain what I mean. Supposing you establish a land mortgage bank in a taluka. It will be composed of borrowers perhaps spread over all the villages. There may be one borrower in one village and another borrower in another village. The only thing that unites them is their common purpose of taking loans from the central institute. There is no unity such as you get in a primary society. I do not think A will care very much whether B at the other end of the district uses his money properly or not as long as he (A) gets what he wants.

5030. But surely A has given his credit to the society?—Yes, he has given his credit to the extent of one share, which may be one-tenth of the amount he borrows. I do not think he feels that if B misappropriates his money he will be in such affected danger as if they were both members of a primary society.

5031. They have not been educated up to it?—There is not sufficient contact between the two. They are not so closely connected. If you put it in another way; in some countries I understand there are ordinary land mortgage banks established by Government. The only difference between a bank of that description and a co-operative land mortgage bank is that there will be a certain number of people united together in the district in a society. That will be the only co-operative connecting link between the two.

5032. You have not pushed co-operative education yet to such an extent that the people of the district feel that they are all of one common brotherhood?—No. I do not think so.

5033. On page 194 when you are dealing with the main causes of borrowing you omit cattle mortality. Would you include that?—In definite areas I would but I would not put it as a chief cause.

5034. Is that not one of the major causes?—No, I should not put it as a chief cause.

5035. Litigation?—Yes, I should agree as to litigation, I think.

5036. Have you examined your income-tax returns to see whether there is any marked increase in the amount of capital put into this moneylending business?—No.

5037. Have you examined your census figures to see whether the number of moneylenders is increasing?—You mean statistical tables of moneylenders?

5038. Yes?—I do not know that we have such things.

5039. You have statistics of occupation?—I do not think we get those figures.

Dr. Hyder: He would not get them; the income-tax officers would have them.

5040. *Mr. Calvert:* Would you regard as one of the chief causes of debt the increased capital available for lending?—Yes, I would in some areas.

5041. And the lack of alternative forms of investment in the villages; that is to say a villager who has money, wants to invest it near his own home?—Yes.

5042. He has no means of investing it outside the village?—No.

5043. *Dr. Hyder:* If the rate of interest in a particular village shows a tendency to go down, will it not indicate that the moneylender lowers his interest because he has no other source of investment?—He lowers it; but not because there is no other source of investment. The only reason is the existence of a co-operative credit society. I do not think the fact that he has got no other source of investment will make him charge lower rate of interest.

5044. *Sir Thomas Middleton:* Surely, competition of money offered will have some effect on the rate of interest?—You can go back as far as you like in history, he has not had any other form of investment. Therefore, why should you say now that the rate of interest has gone down because he has no other source of investment?

5045. *Mr. Calvert:* In the early days he had not got the money?—No.

5046. On page 195 you say, "I do not think that non-terminable mortgages should be prohibited." Are there any economic advantages to the countryside in these non-terminable mortgages?—No, none at all. I have no great experience of them. I should like to correct that if I may; I think they ought to be prohibited.

5047. On the same page I have not quite understood why you recommend that Government should make a grant of Rs. 200 for preliminary expenses?—I do not recommend it generally. These are only the terms that were given in this particular case. This was a particular instance where Government did give Rs. 200.

5048. Actually the Punjab Government pays the whole cost of consolidation. Would you object to that?—All the staff for measuring and mapping out ought to be paid by Government, yes; but my instance is entirely out of date because I did not know of the existence of this Bill.

5049. There is a small matter mentioned on page 195 about gun licenses. Is there any limit in this Presidency to the issue of licenses for guns of half barrel length for crop protection?—There is certainly a limit to the issue of gun licenses. I do not know the particular form of license.

5050. We cut off half the barrel in the Punjab and it goes without license?—We have no such system.

5051. *Dr. Hyder:* What do you kill with them—birds? You cannot kill pigs with them.

Mr. Calvert.—We do not kill anything with it; it merely makes a noise.

5052. On page 195 and elsewhere you refer to dairying as a promising secondary occupation. If dairying is economically profitable, why is it that your kind-hearted philanthropist does not take on dairying? Does not the fact that he carefully avoids dairying suggest that it is not profitable?—I can only say that dairying is an extensive industry throughout certain parts of Gujarat.

5053. Not in such extensive way as in Canada and America?—Not on such a big scale; of course it wants organising.

5054. It is not capitalistic. Where do they send the product?—All the milk goes to Ahmedabad or Bombay.

5055. *Dr. Hyder*: Does it go to all parts of India?—I think it does; but mainly it goes to Ahmedabad and Bombay.

5056. *Mr. Calvert*: In two places you refer to the need for collecting data. Would you advocate a standing board of economic enquiry?—No. I think it could be done without a board.

5057. How can you have systematic collection of data unless you have somebody to do it?—I should rather do it through the non-official agency of our Institute at present as far as we are concerned.

5058. Is it undertaking detailed village enquiries?—Yes, they are just beginning to do it.

5059. On page 198, you say that the policy must be one of decentralisation, that is of encouraging the non-official control of the movement. You are aware of course that at the last Conference of Registrars we decided that no society should be regarded as an "A" society unless it received no help from either official or non-official agencies?—I do not remember that particular recommendation that class A societies should receive no help from official or non-official staff other than the annual audit.

5060. If you are going to have official control you can never have a class "A" into which to put a society?—I think that will depend upon what you mean by control. Do you contemplate a society which no one ever visits except at odd times?

5061. Societies which receive no visits at all except for the annual audit, purely self-governing societies?—I think that is an ideal that may be worked up to, but it is not possible at present.

5062. Taking that as the ideal do your non-officials put before themselves the aim of getting rid of themselves, and making themselves unnecessary? Do they adopt the principle that self-elimination is the first law of nature?—Not at present, but we should like them to do that: we want to eliminate our Honorary Organisers as far as we can.

5063. They are working to make people independent of themselves?—Yes, or rather, have their own organisation for inspection through Supervising Unions.

5064. Supposing now you had an annual general meeting of your Institute, and the primary society members simply turned out all the honorary workers, would your honorary members rejoice in it as being a great victory for self-government or would they take umbrage?—No; they want to continue.

5065. Their own ejection would be the greatest victory that their own teaching could achieve?—That is so, but they do not see that at present.

5066. Then on page 193, you suggest grants from Government. Is not that another case of public money being handed over to private bodies?—You mean taking away from one section of the taxpayers to give to another?

5067. Taking the money of the general public and placing it at the disposal of private bodies?—Yes, it is.

5068. Do you not object to that?—I object to that on principle, but not in exceptional cases.

5069. It is not a goal to aim at?—These grants are very small; I do not think there is any objection to it.

5070. On page 199, I am very glad to see that you say that a greater degree of education than that which is now found amongst agriculturists is required to win through. I take it that what you mean by that is that a greater degree of education than that now given by your philanthropic controllers is required?—No, I mean ordinary education in the three R's.

5071. Not economic?—It comes to the same thing. The people are not sufficiently educated.

5072. In economics?—Everything.

5073. You can train the peasant to a right appreciation of sound economic principles without his being literate?—I do not mean that exactly.

5074. On page 200, with the greatest deference I suggest that there is some confusion between the rate of interest and the cost of borrowing. The *sowcar's* rate of interest may be lower than that of a co-operative society, but the actual cost of borrowing from a *sowcar* is really very much higher?—You mean because there are various incidentals which do not come in the rate of interest?

5075. Yes, and in the co-operative society a certain balance of interest goes back to the common fund?—Yes, that is certainly a point; it goes into reserve funds.

5076. The rate of interest is not the sole criterion?—Certainly not; that is very important.

5077. In answer to the Chairman, you mentioned that your insistence on punctual repayment was not quite so popular as the elasticity of the moneylenders?—Yes.

5078. But your insistence on repayment is solely due to a desire to get the people out of debt?—Yes.

5079. That is why you insist on repayment?—Yes.

5080. The moneylender has not that object?—No, he wants them to remain in debt.

5081. Is there any rural thrift movement system in Bombay? You have got a very fine urban thrift movement?—We have tried to do something, but the results have not been very good up to now.

5082. In Sind you have?—Yes. They will not take any interest at all at present. Not a pie of interest is being paid in Sind. Being Mahomedans they will not take interest. We use the reserve fund to decrease the rate of interest.

5083. *Sir Henry Lawrence*: You are speaking of Sind?—Yes.

5084. *Mr. Calvert*: On page 200 you say: "In some cases *sowcars* have been enabled to recover their long-standing debts by transferring their dues to societies." Is this your idea of non-official control and guidance?—Yes. It is rather naive, but it is so.

5085. *Mr. Kamat*: At page 194, you say: "I do not advocate any stricter application of the Usurious Loans Act or the Deccan Agriculturists' Relief Act or the passing of any further Acts of this description." Is the class who invest their money in land increasing or decreasing in the Bombay Presidency?—As far as my experience as a Revenue Officer goes I should say it is increasing.

5086. You mean outside men making money in business and investing it in land or in doing moneylending business?—Not moneylending business, investing money in land.

5087. That has increased?—As far as my experience goes, yes.

5088. Are those who do moneylending as a business on the increase or decrease?—The village moneylending class is on the decrease.

5089. At the present rate of spread of the co-operative movement do you think at the present moment we have been able to touch the problem of finance or borrowing, say even to one-tenth of its seriousness?—I have given figures.

5090. You say 12 per cent.?—Yes.

5091. And you hope that if the spread of the co-operative movement goes on like this you will be able to oust the moneylending classes in a short time?—No.

5092. That is to say, the moneylender with all his evil ways will remain?—Yes, as he has in other countries.

5093. If he has his evil ways and he will remain, do you not think that an attempt should be made by legislation to improve him?—No, not more than what has been done at present. I think a lot of this legislation is obsolete, and we do not want any more shocks to credit.

5094. Was there any attempt made to find out the fraudulent ways of the moneylender as to how far he is himself under disabilities such as delays of law, which induce him to be fraudulent towards the cultivator? Was there any attempt made to find out why he has recourse to fraudulent ways and whether it is possible to check this by legislation?—I have no knowledge on that subject.

5095. Is it true that the present method of litigation leads to enormous delay, and that is one of the reasons why the moneylender raises his rate of interest?—It causes delay, that is certain, but I cannot answer that question.

5096. He has also difficulties in promptly recovering the money from the cultivator. Is that one of the reasons why he raises his rate of interest?—That is quite obvious; that must be so.

5097. In the light of that then, was any attempt made to find out the cause and to check his evil methods, by legislation if necessary?—I am not aware of it; I have no knowledge on the subject.

5098. Suppose an enquiry like this were made with a view to checking the bad methods of the moneylender, would you not advocate any legislation to check these methods?—There would have to be very strong reasons in my opinion for any legislation at all.

5099. You say that the moneylender will remain for years?—Yes.

5100. Would you allow his evil methods to go on like this for all time?—But he can remain without his evil methods. I do not object to his remaining; but I object to his evil ways.

5101. How would you check them?—The general spread of the movement will check it.

5102. You mean education will check it?—They will be eliminated naturally and gradually in that way.

5103. You are not then in favour of legislation?—No.

5104. *Dewan Bahadur Malji*: You have been a Revenue Officer in the Presidency for some years?—Yes.

5105. During your tours have you found that the condition of roads is very bad speaking as a whole? I mean internal communications; I am not speaking of Provincial roads?—Yes, I should say so.

5106. And in order to advance the condition of the people all round, it is necessary that they should be provided with better roads and better facilities of transport?—Yes.

5107. Similarly arrangements for veterinary assistance are in some parts altogether unknown. There are no hospitals or touring veterinary assistants in some parts?—Yes, that is the case in many parts.

5108. Therefore, veterinary arrangements have not received adequate attention?—Yes: I have used Veterinary Services as a specific instance.

5109. Then, you are in favour of civic surveys?—You mean surveys of the economic condition of the people?

5110. Yes, and also of the potentialities?—I am.

5111. Would you recommend such surveys in rural areas at the expense of Government?—No. They should as far as possible be done without expense to Government.

5112. What is the state of things in other countries in regard to these surveys?—I do not think I have sufficient general experience to say.

5113. In any case, if such a survey is made it will considerably help you in administration?—I agree: I think lack of knowledge is one of the chief obstructions at present.

5114. The question of the efficiency of inspection has been insistently brought to the notice of the District Banks both by you and the Provincial Bank?—Yes.

5115. The same remarks would apply to the Supervising Unions and Development Associations: that there should be good efficient supervision?—Quite so.

5116. Would you employ a man on Rs. 40?—It depends on the standard of living in the different districts. I think so many people are over-paid nowadays that Rs. 40 might not be so bad as it sounds.

5117. I am talking of Supervisors?—Yes; from Rs. 60 to Rs. 80 is about what we recommend.

5118. They are trained Supervisors?—Yes.

5119. The gentleman in Kanara about whom I talked, it seems to me, is a man without any qualification. Would you recommend a man to be put on the Development Association management unless he is a B.Ag. or L.Rg.?—I should prefer men with those qualifications if one can get them. ✓ An uneducated man is a positive danger.

5120. On page 194, you speak of the error of over-finance. Would you like these failures to be included as lessons in co-operation?—They would serve as good illustrations—Certainly.

5121. They could be published?—Yes; there are a good many of them I am afraid.

5122. As regards audit, such complicated societies as power pump, cotton sale and housing require different types of audit?—Yes.

5123. And auditors have to spend a longer time on them?—Yes.

5124. In spite of the fact that the auditors are paid for their time, the forms, etc., still require your attention?—Yes.

✓ 5125. There are not sufficient forms drawn up to specify the appropriate type of management?—Yes.

✓ 5126. But as development proceeds these difficulties will soon be remedied?—Yes, that is a matter of detail.

5127. *Sir Henry Lawrence*: You came quite recently to the Co-operative Department?—Yes.

5128. Are you satisfied that it is on the right lines and is doing some good to the country?—Yes, perfectly satisfied.

5129. What is the amount of money you get for your co-operative budget?—It was something between 5 and 6 lakhs last year.

5130. That represents about 1 per cent. of the ordinary land revenue?—Yes: the land-revenue being about 548 lakhs, I think.

5131. You have given figures on page 193, which show that 12 per cent. of the agriculturists occupying land are being financed by co-operative credit societies?—Yes. My figures are based on Mr. Rothfield's estimate of requirements being Rs. 20 crores. It depends upon the accuracy of his statement.

5132. You have made no study of that figure yourself?—I have not made any calculation of it myself. I think it is based on particular types of lands for different kinds of cultivation.

5133. The total cropped area is about 28 million acres and that would be about Rs. 8 per acre?—Yes.

5134. That is rather a low estimate?—It is a low estimate.
5135. You wish to see an expansion of the movement till it is able to finance a much greater proportion of the agricultural operations?—I do.
5136. Have you got in view any large expansion of your own department?—No. I do not think so at all. All we want is a sufficient number of efficient auditors and inspecting officers in the form of Assistant Registrars.
5137. Those are officers to be paid by your department?—Yes; and Agricultural Organisers for non-credit societies.
5138. All that comes from your budget?—Yes.
5139. What is the increase to your budget which you think will be required in that short time?—An immediate increase of at least 25 per cent. is required.
5140. Do you anticipate any difficulty in getting this amount?—I do.
5141. Do you think that the attention of Government to the importance of this work might be definitely drawn?—I think so certainly.
5142. As regards *taccavi* the proportion of agricultural operations financed by *taccavi* is very small?—Yes.
5143. In times of famine I believe the figure may go up to 1½ crores in a year?—Yes.
5144. But ordinarily it would not be more than about 20 or 30 lakhs, would it?—I am afraid I cannot give the figures.
5145. So that the greater part of the financing of agricultural operations must be carried out through these co-operative credit societies from money derived from the agriculturists?—Yes. If I may supplement what I said before, we are given 3½ lakhs every year. We have never used more than a lakh or two lakhs by way of *taccavi* through the co-operative movement. That shows the very small extent of it compared with the total loans and we are supposed to do most of the *taccavi*.
5146. *Sir Chunilal Mehta*: Is *taccavi* to be for long term?—Yes.
5147. *Sir Henry Lawrence*: Some work is being done to encourage the use of water channels through operations effected by Mr. Lowsley?—Yes.
5148. Have you been in touch with any schemes of that kind?—I have not actually seen them on the spot but I have read about them and I know fairly well what has been done.
5149. Would your co-operative societies come in for the purpose of distributing this water and arranging finance of schemes which Mr. Lowsley may devise?—I said that in exceptional cases *taccavi* should be given. This is a good instance of an exceptional case where you should give *taccavi* loans.
5150. I do not quite understand?—*Taccavi* should not be given except in exceptional cases. These water channel schemes are a good instance of an exceptional case.
5151. Government are very largely interested in the success of these schemes and therefore should provide the finance, is that your point?—Yes, that is so. We cannot do it through the co-operative movement at present.
5152. You say on page 198, that the railway levy unduly high tariffs and that cases have been brought to the notice of the Divisional Boards of Agriculture and that the question would probably be best tackled by the Commerce Department of the Government of India. Is there no room for settling the question on the spot with the railway authorities?—I should think it would be rather difficult, being a Central subject; it ought to be tackled by the Central authority.
5153. Could not the co-operative societies bring the matter to the notice of the local railway authorities?—I suppose they could, but I do not think it will be of very much use.
5154. To use the Commerce Department to alter the railway rates from Loni to Bombay would be using very heavy machinery to crack a small nut?—Certainly, but they should make general enquiries to find out how far this

statement can be substantiated or not. I tried to collect some information and I found it very difficult. People make these general statements but it is very difficult to collect any specific instances of products that are being penalised in this way. One case I can tell you of at present is that mango pulps on coasting steamers are charged high tariff; but we have no information. I think that would be better tackled by the Central Government.

5155. But you see no objections to local associations taking action in conjunction with the Advisory Board that have been established for railways in Bombay?—No objection at all.

5156. You have not yourself made any application to that Board?—No.

5157. I think that might be considered. A statement has been made to this Commission that cattle-breeding and dairy farming cannot be an economic success. Do you accept that view?—Generally I do. In most areas they are not paying. In certain areas they can be made to pay.

5158. Have you got any co-operative societies specially established for this purpose?—In cattle-breeding there are about a dozen societies in Dharwar and Belgaum and 3 in Thana; that is all we have got. Those in Dharwar are doing fairly well; those in Thana are no good; and elsewhere we have not been able to do anything up to now.

5159. Do they receive the advice of the livestock expert?—They do. I think that is a line on which we ought to do something.

5160. There are rather remarkable demonstrations of the improvement of cattle-breeding in the Agricultural Show here?—Yes.

5161. *Sir Ganga Ram*: Can you give me an authoritative definition of long term and short term loans? People talk of long term and short term but what do they mean? How many years would you call long term?—I would call anything over five years long term.

5162. Anything beyond five years?—We advance loans in our societies up to a period of one, two, three, four and five years.

5163. Up to 5 years it is short term; beyond five it is long term?—Yes. I should not like to be tied down to any figures.

5164. Do you give loans to zamindars on simple interest or compound interest?—Simple interest.

5165. If simple interest, at what rates?—Yearly.

5166. Therefore if he does not pay after a year his debt is carried over to the next year in the capital account?—I think it is simple interest only. If the society goes into liquidation then it would not be simple interest, but ordinarily it is simple interest all the way through.

5167. Next year you do not charge compound interest?—No.

5168. Up to how many years do you do that? Even if he does not pay it for 20 years you do not charge him compound interest?—If he does not pay in 20 years I should think the society would have been cancelled long before that.

5169. What is the rule I want to know?—The rule is simple interest. But the society has power to impose penal interest. If a man is not paying his loans back properly, the other members can impose penal interest on him.

5170. On page 195, you pin your faith to fencing. I had a conversation with a zamindar yesterday and he said the fencing did more harm than good, because it opens one hole for the pigs to get in and when all the villagers get up these pigs do not know how to get out and they destroy the whole field. The zamindar told me "For heaven's sake do not give your opinion in favour of fencing." Is there anything in it?—I think he has got a poor idea of co-operative effort.

5171. It stands to reason that it what will happen if the pigs do not know how to get out?—They never ought to get in.

5172. What is the nature of the fencing you have recommended? Is it laid in cement?—No, the walls are just stones laid on top of each other.

5173. A couple of pigs will knock them down?—I have had a lot to do with these walls; I can tell you they are most successful.

They will make a hole in one place and most probably destroy the whole crop before the villagers get up.

5174. *Sir Thomas Middleton*: You said that your limit for a short term loan is five years?—About 5 years on short term, and they are very rare.

5175. Do you use the term "intermediate loan" here?—No.

5176. So that you classify credit exclusively into short term and long term?—Yes.

5177. I see on page 197, of your notes that you yourself as Settlement Officer have taken considerable interest in the question of village grazing and you have made proposals for village forests. These forests were grazing reserves, were they not?—They were common grazing land coming under what we call minor forests.

5178. But so thinly planted that grass was the main crop?—Yes.

5179. Your difficulty arose chiefly because non-agriculturists refused to agree to an enclosure?—Yes.

5180. Has there been any attempt made to separate the population of the village into agriculturists and non-agriculturists and to allocate to the agriculturalists an enclosed area which they might look after leaving a certain portion of the waste open to other villagers? Have you attempted what one might call a partial enclosure system?—No, we have not. The idea sounds a very good one, but we have never done anything so complicated as that up to now.

5181. On page 193, you say that the land mortgage bank system is much better than Government *taccavi*. When I first read that sentence I thought your point was that from the point of view of the Government it was superior, but I see it is from the point of view of borrowers that you regard it as being much superior?—Quite so.

5182. Because *taccavi* leads to spoon feeding and facile credit?—Yes.

5183. Are there any other objections to the *taccavi* system?—It does not always get to the right people and it is not always used for right purposes. There is a lot of payment of bribes to small officials and difficulty in getting it.

5184. On page 200, there are comparative figures illustrating the difference in cost in borrowing at the *sowcar's* rates and at the society's rates. I take it these figures are not strictly comparative figures, that is to say, they do not represent the cost at which a particular individual could borrow from the *sowcar* or from a society?—No.

5185. They merely show the prevalent rates?—Yes.

5186. If they show the prevalent rates then one is rather puzzled to know why the minimum rates of the *sowcar* somewhat exceed the minimum rate of the society, unless Mr. Kamat's suggestion is correct, and the explanation is that the *sowcar* is open to certain disabilities in collecting his money?—He is open to a good many disabilities.

5187. And is that the reason for the higher rate of interest?—No, that is only one of the reasons. I mean if you take a moneylender anywhere in the world, he is a moneylender by profession.

5188. But he is a moneylender in competition. He is out to make a maximum profit. If he cannot in favourable circumstances reduce his rate of interest to the minimum charged by competing societies there must be certain disabilities from which his business suffers?—Yes; he squeezes whenever he gets a chance; but he has to squeeze sometimes when he does not want to.

5189. Would you distinguish between the *sowcars* of this country in the way we might distinguish in Britain between a private banker and a money-lender? Are there *sowcars* who would correspond to the private bankers and

are there others corresponding to moneylenders as we know them in Britain?—I should distinguish, yes. There are some moderately honest *sowcars*.

5190. We want to classify *sowcars*?—Yes.

5191. Another figure puzzled me. In reply to the Chairman you mentioned that the maximum rate of interest was highest in a famine area?—Yes.

5192. But I find the maximum is 25 per cent. in Kaira and Ahmedabad. Compared with the Deccan one would not expect to get that high rate? Is there any reason for the high rate?—I said in places where education is very poor and the development is much less. There are certain parts of Kaira and Ahmedabad which are not at all prosperous.

5193. I know, but you have spoken of Kaira and Ahmedabad together and you have added the words 'in general'?—I said parts of Kaira, Ahmedabad and Broach.

5194. Would you agree that in these areas the intelligence is quite as high as in any part of the Presidency?—Yes, but, strange to say, there are few people who are more racked by the usurers than in certain parts of Kaira. It is over-populated.

5195. Is it not that pure conservatism which has caused them to stick to usurers?—Our co-operative movement is very backward in Kaira.

5196. *Sir Henry Lawrence*: May not your remarks apply to a certain section of the population?—Yes, *patidars* in certain parts, I am told, can get loans at 6 or 7 per cent.

5197. The *dharalas* have to pay from 24 to 25 cent.—Yes.

5198. *Dr. Hyder*: In regard to the moneylenders you stated that their disabilities are great now. Are there disabilities under which moneylenders suffer? I was wondering whether you know that in days when there was no British rule the disabilities were there but now the whole machinery of the State is at the disposal of moneylenders. They advance money and through the machinery of the courts every pie is realised?—If there is anything to realise; yes, I see what you mean.

5199. You said that the progress of the co-operative movement in Sind is very slow and people in that part of the Presidency do not take any interest. Have you tried the method of giving them the money in a collective form rather than lowering the rate of interest and thus bringing to them copious draughts of facile credit?—I do not think there would be copious draughts; it is simply their own money which they have put by themselves.

5200. If loans were made easier by lowering the rate of interest there would be a tendency for applications for loans to increase?—It would only be their own money which they have put by themselves and I do not see why they should not have their money back at lower interest on a later date.

5201. You would not give back this money in other forms?—Yes, in any form they want it.

5202. Do you not think this giving of money to them by reducing the rate of interest would conduce to the evils of facile credit?—No. By facile credit I mean that a man who could formerly get a loan of Rs. 200, finds he can get one of Rs. 500 or 600. But in this case it is limited to the amount of money they put into the society.

5203. As regards the scheme for long term credit now before Government I was wondering whether you would explain it in detail, whether it is a scheme for specific improvement purposes, whether it is a scheme in connection with the equipment of peasants or whether it is a scheme which does not require any declaration as to the purpose of the loan or whether all purposes are lumped together?—No, certainly not. It is merely a scheme put up to Government. It was for two main purposes, the redemption of old debt and improvement of land. The redemption of

old debt is the main purpose. In any particular district, or in any more convenient area if you like, people collect together who want to redeem their debts: they should put up a definite security in the shape of their lands and they will be given loans up to 33 per cent. or 50 per cent. of the value of their lands. They will form themselves into an association in this particular district and they should be required to take up shares to, I think it was, 5 per cent. of the loan they want. The main finance should come from the Provincial Bank. All these schemes should be sent to the Provincial Bank for consideration. In order to check the scheme you must have an expert land valuer to examine the land which they offer as security, see whether it is encumbered or otherwise and what the real value is. The schemes would be put one by one to the Central Bank in Bombay through the District Bank.

5204. So that the applicant has got to be interested in the land mortgage bank to the extent of 25 per cent. of the value of his assets and the loan he would get would be to the extent of 33 per cent. to 50 per cent. of his real property?—Yes.

5205. In other countries they advance money up to two-thirds?—There is a difference of opinion in India. In Burma they are considering two-thirds. We are rather in favour of 50 per cent. at present because you have got to go into the question of encumbrances, where it is easy to make mistakes, and land values alter rapidly.

5206. Have you got large landowners or are you concerned with small substantial farmers?—We are chiefly concerned with small substantial farmers.

5207. *Sir Chunilal Mehta*: In answer to the Chairman you stated you were satisfied that there was adequate co-ordination between the Agricultural Department and your department?—Certainly.

5208. It might be of interest to the Commission if you could supply them with copies of the three Government Resolutions* which state exactly how that co-operation works?—Yes, I will do that.

5209. With regard to the limited extension of co-operation in various parts of the Presidency you said it was only a question of time. No doubt it is, but there are peculiar difficulties in certain tracts. In the Konkan the question of land tenure is a serious handicap to the extension of co-operative movement there?—Yes, I am trying to meet that by having societies on the share system.

5210. Similarly in the Panch Mahals, where the Bhils are moving from place to place, it is difficult to get anything done?—Yes.

5211. You would then consider the question of land tenure must be seriously taken into account?—Yes.

5212. Some system may be a great hindrance to the spread of co-operation?—Yes, certain systems are.

5213. You say on page 193, that the loans made to agriculturists may be calculated at two-thirds of what they require?—Yes.

5214. You say that the loans made in 1925-26 were two crores and the estimated requirements were three crores. Why do you fix it at three crores?—That is simply based on the figure of Mr. Rothfield. He gave 20 crores for the Presidency. Then you calculate the number of members compared with the total agriculturists in the Presidency, and by the rule of three you get 3 crores.

5215. Three crores required by the members of the societies?—Yes.

5216. *Mr. Calvert*: You are speaking there of cash requirements?—Yes.

5217. You are not referring to the costs of cultivation?—Of course, many loans are made in the shape of manure.

* (1) Press Note No. 2962, dated the 21st October 1921.

(2) Government Resolution No. 3378, dated the 5th June 1922.

(3) Government Resolution No. 8266, dated the 26th January 1924.

5218. This is for cash requirements; the cost of cultivation would be five times as much?—Yes.

5219. This is the actual cash required?—Yes.

5220. *Mr. Kamat*: For the existing members of the societies?—That is so. If you want to buy manure, you call that a cash requirement.

5221. *Sir Chunalal Mehta*: You have been asked about the arrangements for the proper inspection of Central Banks and primary societies. Although the new Act says the Provincial Bank may do the inspection, there is at present an arrangement whereby it employs a certain number of Inspectors, the cost of whom is borne one-half by the Provincial Bank, one-quarter by Government and one-quarter by the Central Banks?—Yes.

5222. That, I take it, was necessary because we want to be quite satisfied that the loans taken by individuals in primary societies are used for the purposes for which they are taken?—Not only that, but to see that the societies do not misappropriate the funds.

5223. It is very necessary to see that the loans taken by members of co-operative societies are properly utilised? If they take a loan for land improvement it is necessary to see it is used for land improvement and not for a marriage ceremony?—It is very necessary to do that, and also to see that they do not take loans which there is no prospect of their paying back. That is even more important.

5224. I see you are in favour of an unofficial agency to inculcate this point, so I suppose you consider that some kind of organisation in addition to the development of the Primary Societies themselves would be desirable?—Absolutely essential for impressing on the people what we may call the moral and thrift side of the co-operative movement.

5225. Have you considered any such organisation?—Yes. If we had Supervising Unions throughout I do not think we should want Inspectors, but each must move towards the other by some form of intermediate agency, and until one of them is complete we shall have to use both.

5226. Have you considered the further extension of the idea of Taluka Development Associations in the form of smaller units of organisation?—I have not considered that, but I feel convinced that it would not be a good thing to make it any smaller.

5227. Until you get the right type of men?—Yes.

5228. Have you had an opportunity of looking into the draft Bill that has been suggested for dealing with the sub-division of holdings?—I saw it yesterday.

5229. Do you think that your objections to legislation in the matter of preventing these sub-divisions still hold?—I think the Bill is a very fine piece of work, and I want to withdraw them all.

5230. I suppose you are aware that some 2 or 3 years ago the Government asked the Registrar of Co-operative Societies and the Director of Agriculture to take one or two villages in hand and see whether consolidation could be achieved by voluntary effort?—Yes.

5231. Have you seen any results of that?—I have only read the literature available in Government resolutions. The result seems to be nothing so far.

5232. Your predecessor said that it was not possible and nothing further was done?—We have not tried very hard yet. We are still trying in the Umbergaon taluka.

5233. So that some kind of legislation is desirable?—It would be desirable, but I should still like to go on attempting it by means of voluntary effort, and your new Bill will still make it possible for us to go on doing it through co-operative societies if we want to.

5234. Have you had any information collected by co-operative societies with regard to this sub-division and consolidation question?—I do not think they collected it but the subject has been considered at conferences of co-

operative societies. They considered it in Gujarat, for instance, and have decided that something should be done, but they are divided on the question of whether they should have an enabling law or not.

5235. Did you notice that objections often came from the legal element, the lawyers?—No, I have not noticed that.

5236. You will perhaps find that is so from the record of the Belgaum Co-operative Conference. With regard to the co-operative dairy societies, have you considered what is the minimum limit of finance for a large dairy society, which has to supply milk to a town, for instance?—No. We considered it with regard to the establishment of a milk supply society in Anand, and that is all.

(The witness withdrew.)

APPENDIX.

The Gadag Cotton Sale Society and the Middlemen.

The society described in this note is the Gadag Co-operative Cotton Sale Society and it was established in 1917. Gadag is a centre of the cotton trade of the Karnatic, and is situated in Dharwar district. The Society has a large membership amongst the agriculturists of Gadag taluka.

2. It may here be explained that the policy of the Agricultural Department as regards the spreading of improved cotton seed in the Southern Division is to distribute this through cotton sale societies. The Gadag society is the sole grower for the improved Gadag No. 1 Cotton, and an area of 5,000 acres owned by its members has been selected and is known as a reserved area. The cotton so grown is inspected and *rogued* by the officers of the Agricultural Department, and the society contracts to sell back to the department all the seed so produced, which is again distributed as pure seed of the next generation to the society and to the public. In order also to preserve the type the pure cotton grown by members of the society is graded by a special officer of the department before it is sold.

3. The society's business prospered from the beginning, and by 1919 it had aroused uneasiness amongst the local *dalals* or middlemen. That year they organised a boycott as a result of which the society had to suspend business for 10 days, and ultimately the society had to agree to certain conditions the chief of which were (1) that it should like the *dalals* charge 1 rupee instead of 4 annas as before and (2) when selling cotton to an agriculturist financed by a *dala* it should deduct the latter's dues from the sale-proceeds and hand them over to him. [It may be explained that *dalals* also act as financiers to agriculturists. They advance money to them and often make it a condition that the latter shall sell their cotton through them.]

4. The society's business however continued to flourish. The *dalals* then formed an association and later on from 15th June 1925 they organised the boycott which is still continuing and threatens to extinguish the society. They had in the meantime left no stone unturned to convince the Bombay merchants and mill agents through their local agents that the society was a bad thing and was dealing dishonestly. Some of the methods adopted in this boycott have been :—

(i) They tried to prevent willing buyers from bidding at the society's auctions.

(ii) They held rival auctions soon after those of the society and deliberately offered higher prices for small lots in the hope of misleading the cultivators who are the society's members. But the latter remained loyal although the prices they got were less than those of the former year.

(iii) They organised boycotts amongst the society's cartmen and *hamals*; and later a boycott of the society's cotton by ginning and pressing factory owner and merchants.

(iv) Subsequently certain *dalals* with a party of 25 men trespassed on the society's premises, forced open its office room and threw out some of its furniture and books on the pretext that one of them had a share in the ownership of the premises and that the society had been given notice to vacate but did not do so. An arrangement was subsequently made for the society to continue to occupy till the coming April.

(v) They spread a rumour that the Assistant Registrar who has been actively helping the society was to be transferred.

5. The society was thus much hampered. It had to sell its seed at cheaper rates, to enter into a contract with a ginning factory on unfavourable terms, and to buy a piece of land at Rs. 15,000 to hold its auction sales.

6. Eventually the Registrar (Mr. Madan) approached Government and a Conference between the mill-owners at Bombay, cotton buyers and cotton sale societies and Government officers was held at Bombay in February 1926. At this Conference the views of both sides were freely discussed. Against the society it was urged that it had been selling non-members' cotton and selling cotton of inferior kinds by auction. Eventually it was decided that the society should observe the following two conditions and that in that case the buyers from Bombay would instruct their local agents to buy from the society.

(1) The society to restrict its operations to cotton grown by members only.

(2) Cotton of improved seed only to be sold by auction and the rest by private treaty.

7. It is not pretended that the society has always been well-advised or blameless in its actions. There are some less principled persons amongst its members. On the whole too the selling of non-members' cotton was not a good move, though it was done only with the object of building up the business.

8. The auctions of 1926 were then held but unfortunately owing to various causes, some of which are not fully clear, none of the agents of the Bombay firms bought except one of Messrs. Tata Sons & Co., although the society has strictly observed the conditions. The *dalals* have continued to spread pamphlets against it mostly inaccurate. Tata's agent bought the whole lot, otherwise the society would have failed.

9. Since then the boycott has been continued more vigorously than before. Some of the society's members have become disheartened and this has produced internal dissensions which however have been set right up to now. Nevertheless the whole position will turn on this year's auction sales. The Registrar intends to approach the Bombay buyers. It would seem that if their agents do not bid this year and the cotton is not sold, the society may have to close down. Another serious feature is the situation with regard to the price of American cotton, which is out of parity with that of Indian cotton. For that reason many firms are buying American cotton this year instead and may not want the Dharwar cotton which the society sells to any appreciable degree. This will result in the probable collapse of the most promising experiment in the selling of the agriculturists' produce by co-operative venture, at any rate, in the Southern Division. The following figures show the progress of its business. By last year it had come to control $\frac{1}{4}$ th to $\frac{1}{3}$ th of the cotton brought to the Gadag market. *

Year.	Value of cotton sold.	Profit.	Share Capital.	Number of members.	
				Individuals.	Societies.
	Rs.	Rs.	Rs.		
1920-21	3,52,450	119	13,353	995	6
1921-22	3,94,309	5,590	13,762	1,005	27
1922-23	6,63,347	8,967	15,589	1,069	29
1923-24	18,20,318	18,647	19,467	1,111	63
1924-25	6,93,233	13,184	37,914	1,327	70
1925-26	15,17,696	16,565	41,976	1,697	85

**Mr. C. C. INGLIS, Executive Engineer, Special Irrigation Division,
Bombay.**

Replies to the Questionnaire.

Introductory Note on Irrigation Agriculture.

Before replying in detail to the Questionnaire I must point out that agriculture and irrigation are dealt with as two separate subjects.

20 years of irrigation experience, the last 10 of which have been on special research work, with experimental agricultural farms in my charge, have demonstrated that when questions of irrigation agriculture are considered from the purely agricultural or purely irrigational point of view, little or no headway is made. In irrigated tracts the aim must be to mould irrigation facilities to meet agricultural requirements and to modify agricultural practice to meet irrigation limitations.

(For years past the Agricultural and Irrigation Departments have been working at cross purposes; but the reason for this is not perversity but lack of appreciation of the problems and limitations of each others' media.)

The Agricultural Department sets out to solve agricultural problems without realising and therefore without avoiding irrigation limitations; while the irrigation staff on the other hand are apt to condemn agricultural proposals, which though useless in their original form are capable of useful modification.

When new methods are being introduced, human nature being what it is, failures are attributed by the Agricultural Department to shortcomings in the irrigation management; while the irrigation staff are over-keen to impute the blame to the unpractical methods of the Agricultural Department. Unless there is a single controlling authority inefficiency must result. This is being gradually recognised. Thus in America investigations are carried out by a team of men working together, a method which as pointed out by Mr. A. Howard in his presidential address to the Science Congress at Bombay last year is not likely to be so successful and is certainly more expensive than work done by a single Research Officer in undivided authority, with special knowledge and experience of all sides of the problems involved (with irrigation and agricultural staff working side by side under his guidance).

The Scientific Research Officer attached to the Public Works Department in the Punjab is Mr. B. H. Wilsdon who realises both sides of irrigation agricultural problems, as he was hitherto Agricultural Chemist, Lyallpur, and there carried out exceedingly valuable researches into soil problems in irrigated tracts—notably the movement of soil moisture and the reclamation of barren and salt affected lands. He is associated with Mr. E. S. Lindley, Superintending Engineer.

In the Deccan the Special Irrigation Division was opened in 1916 to investigate problems which the Agricultural and Irrigation Departments had hitherto been investigating from different view points with little or no success.

These problems included—

- (i) investigations into soils and subsoils which led to a solution of the problems of drainage and soil selection;
- (ii) the movement of subsoil water and its effect on the yield of wells in irrigated tracts;
- (iii) water requirements of crops under field conditions;
- (iv) improved methods of irrigation—both as regards distribution of water by modules and measuring devices and the layout of lands for irrigation;
- (v) the conditions which favour aquatic weed growth in canals; etc.

At first sight it may seem that the direction of such experimental farms should be in charge of the Agricultural Department. There are basic reasons, however, why this is not the case:—

- (i) "*Irrigation practice should be based entirely on the greatest good of the greatest number, not on the greatest good of the individual cultivator.*"

The Agricultural Department has very naturally viewed agriculture from the standpoint of the individual. That, I consider to be the basic cause of misunderstanding:

- (ii) *The greatest good of the greatest number and efficiency are synonymous terms; so are efficiency and revenue.*

In other words irrigation efficiency as judged by revenue (if we neglect rise and fall in crops rated) corresponds with the greatest good of the greatest number. It is in other words to the interest of the Canal Officer to do his best for the mass of the cultivators. The Agricultural Department on the other hand very naturally base their experiments on getting the best return for the individual cultivator. This may be and often is, in opposition to the interests of the mass of cultivators.

- (iii) The Irrigation Officer by his training is taught to see big; agricultural training naturally tends to concentrate on detail; but in irrigation it is the big view that counts.
- (iv) Irrigation limitations are much more rigid than those of agriculture and only a Canal Officer is in a position to realise those limitations; or see how the limits can be extended.
- (v) The Canal Officer's training brings him into daily contact with problems as they are in the field; whereas the Agricultural Officer has cases put up to him by the cultivators—generally extreme cases—and at best much of his information is one-sided.
- (vi) Agricultural improvements can generally be greatly speeded up if they are pushed with confidence and understanding by the canal staff; thus in the Deccan though the advantages of terracing were long recognised little or no progress was made until the bund rules were introduced by the Irrigation Department.

These rules were fought step by step by the cultivators backed up by the Agricultural Department, yet they are now generally admitted to have been beneficial leading to terracing, levelling and standardising of areas, which in turn has reduced waste and damage and increased the area under crops.

- (vii) If the farm were run by the Irrigation Department the canal staff would be much more anxious to push proposals which emanated from such farms; and would be in much closer touch with the work in progress.

It is not, of course, suggested for a moment that Irrigation Officers should staff these farms. The farm Superintendents would be agricultural men, while the staff on irrigation experiments would be engineers; but both would pool their ideas under a single Research Officer.

Such farms would naturally be run with an eye to meeting pressing needs rather than to carry out research for research sake. That the results would be exceedingly satisfactory is not merely to be expected; but has already been definitely demonstrated by the Special Irrigation Division, which has obtained in the past few years results of enormous importance to the mass of the cultivators.

The necessity of considering "irrigation agriculture" from the view point of the interests of the mass of the cultivators as opposed to the interests of the individual cultivator is of such vital importance that I must stress the point. Not merely does this alter the lines on which research must be carried out but it also completely changes the methods which must be adopted for introducing improved methods.

For example:—

The Special Irrigation Division have found that though slightly heavier crops of sugarcane can be grown with 125" of water than with 75" of water the increase in outturn is not at all in proportion to the extra water used. Thus when 125" of water was put on one acre the average outturn of "gul" was 14,552 lbs.; whereas with the same quantity of water spread over 1½ acres the outturn was 22,178 lbs.

Bearing in mind that water is our limiting factor the importance of reducing the amount taken is obvious; but it is not surprising that the Agricultural Department have been telling the cultivators that they will benefit by heavier waterings; because they are of opinion that the *individual cultivator will benefit by the heavier waterings.*

After all, the Agricultural Department must either win the individual cultivator to their side or else fail entirely. If they were to preach the use of less water to benefit another cultivator at the tail of a canal they would merely be wasting their breath.

The Irrigation Department, on the other hand, are in a very different position, because they have the interests of the mass forced on them at every stage; and they are in a position to restrict the supply to the individual in the interests of the mass.

QUESTION 1.—(a) Experimental farms should be separated from demonstration farms. The former cannot be expected to pay their way, the latter should do so or be closed down.

My experience is that a natural bent for research is an exceedingly rare gift possessed by not more than 1 man in 10. Of those who have the gift some have not got the necessary qualifications.

There should be one specially selected Scientific Research Officer in each Province, who should advise on the methods to be followed and should be in charge of the central experimental station.

In the Presidency and also in Sind there should be one Central Irrigation Research Station with a farm where both irrigation and agricultural research should be carried on concurrently.

In addition to this there should be a Central All-India Organisation for co-ordinating the work of the various Provinces and giving expert advice. I would point out that the cost of this scheme would be met many times over by an increase of even 1 per cent. in efficiency; because even experimental farms almost pay their way if they are run on business lines.

That the increase in efficiency to be expected is far in excess of 1 per cent. goes without saying—the figure for the Bombay Deccan may be put at 30 per cent when full improvements now in view are carried out.

I am in entire agreement that we should investigate the scientific value of the indigenous theory and traditional methods of agriculture; but I go very much further and say that we should also investigate the reasons for present practices whether they be good or bad.

(In India you cannot afford to treat agriculture as a pure science and ignore the psychology of the people. The very same impulse or custom which impedes us in one case may assist us in another.)

The longer I work amongst the irrigators of the Deccan Canals the more I realise that there is always some root cause for every practice; sometimes it can be overcome, sometimes it can be got round; but until we learn to diagnose the case we are not likely to be able to prescribe a remedy.

(b) The main cause of slow progress is not so much due to want of skilled workers or facilities as to lack of understanding and appreciation of the factors to be met.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(a) Any improvement which saves work or reduces costs—almost at once—will always be taken up, for instance, metal ploughs.

Improvements which only show their value after some years are rarely popular and hence have to be brought in by indirect methods and not by advice. If you advise a man to level his field he is not likely to do it; but if you were to refuse water unless his field were levelled it would be done to his lasting benefit.

What we need to do now is to make a much more careful study of indirect methods of attaining the end desired.

(b) If demonstration farms were run on business lines and all accounts were open to the cultivators little more would be necessary. If, however, demonstration farms do not pay their way they carry on weight with the cultivators.

Experimental and demonstration farms should be rigidly separated otherwise losses on demonstration plots will be imputed to experimental plots.

Demonstration plots should be restricted to fields of capable cultivators and "splash" should be avoided until the demonstration has been proved to be entirely successful. To start off with a "splash," and then to modify the method, or even withdraw it, does much harm. If the expert cultivators made a success of any method it will gradually spread; but if mediocre cultivators adopt a method and it fails through carelessness or bad management confidence will be shaken.

(c) Expert advice will be adopted provided it takes into consideration the local conditions and the psychology of the people. Success depends almost entirely on confidence, and consequently no practice should be recommended unless it is proved beyond question to be a considerable improvement.

(d) The introduction of metal ploughs is a case of conspicuous success for the Agricultural Department. The use of copper sulphate for preventing "amut" is another great success. The use of ammonium sulphate as a top dressing for cane is another conspicuous success.

Straining off impurities during the manufacture of 'gul' has also been generally adopted.

The substitution of the ridge method for the *Vafa* method and the reduction of sugarcane 'setts' for cane are other examples, but the latter changes are only being adopted very gradually. When irrigation methods are further perfected these improvements will be adopted generally; because then the stimulus to get the biggest crop with the restricted supply of water available will be very great.

Green manuring is just beginning to be adopted, and where the area of cane is big enough to make it profitable, multiple furnaces and power crushers are gradually being introduced.

The reason for the success of these is not any special demonstration or propaganda work; but is simply due to the fact that they have proved an immediate success; but in many cases the new methods were not taken up generally until low prices of produce forced the cultivators to adopt methods which were cheaper to make ends meet. Thus it was not until the slump in 'gul' rates in 1923 that the number of setts were reduced from 18,000 to 12,000 though the Agricultural Department had shown years earlier that 8,000—9,000 were sufficient.

A striking case of failure recently occurred when the Agricultural Department tried to introduce monsoon *juar* in the Matoba Tank area. This area is naturally a *rabi* tract and the water-supply is essentially a *rabi* supply; so that when the demonstration plot was planted the birds of the air congregated and concentrated on the one isolated crop of grain.

I do not want to enumerate failures; but can say that the reason for them has always been due to lack of appreciation of local conditions. A failure of this leads to lack of confidence.

QUESTION 4.—ADMINISTRATION.—For irrigation agriculture there should be a research station in every Province and in Bombay, two because the Deccan and Sind canal conditions are totally different. There should also be a Cen-

tral Research Station which should co-ordinate the work all over India and give expert scientific advice on highly technical points.

(b) It is unnecessary for instance to have a first class hydraulician at every experimental station, because the very advanced mathematics of hydraulics often plays a minor part. One such man for the whole of India would suffice and he could be lent to any Province temporarily requiring him and should always be available for consultation.

Similarly it would be unnecessary to have expert soil physicists for every farm because the need of India is not an excess of science, but an all round knowledge of local conditions and general agricultural practice.

The same applies to experts of agricultural chemistry.

(c) (iii) ROADS.—Irrigated tracts in the Deccan are badly in need of roads and field tracts. There is a cess of 2 annas in the rupee on irrigation rates which is handed over to the Local Boards. It was anticipated that a large part of this would be devoted to improving communications in the irrigated tracts, but for the most part the money is spent on schools and dispensaries outside the canal areas. A part of this cess should be earmarked for roads in the canal tracts.

In irrigated tracts roads are of essential importance to the irrigators. Sometimes the roads are in charge of the canal staff, sometimes the Roads Branch look after them, and sometimes they are in charge of Local Boards.

As the canal staff have to use the roads daily they are the people most interested in keeping them in repair and are in the best position to inspect them. Furthermore it is sometimes possible to carry out a combined scheme which benefits both the canal and irrigation. Finally the roads in charge of the irrigation districts are actually far superior to those looked after by the Roads Branch, and enormously superior to those looked after by the Local Boards. The Sangvi-Baramati road is a good example of a road with a chequered career. It used to be in charge of the Public Works Department and you could then motor along it. It was then taken over by the Local Boards and rapidly became impassable. It was then handed over again to the Public Works Department and gradually brought back to a useful condition. Government should by all means experiment with handing over roads to the Local Boards where the country is dry; but where the roads are of vital importance and become impassable so easily—as is the case in irrigated tracts—experiments ought to be avoided.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(a) In irrigated tracts fragmentation can be checked, and consolidation sometimes effected, by refusing irrigation water to fields which are less than a fixed minimum area; because if the land is excluded from irrigation its value drops and hence it is to the interest of the owner to sell his land rather than let it drop out of irrigation. If the minimum area were put at 6 acres, that area would be standardised as the minimum holding over the greater part of the areas commanded by the canals.

Such a method would be simple and effective; but could, of course, only apply to areas in canal tracts.

QUESTION 8.—IRRIGATION.—(a) Mr. Beale's Report on the Surveys for Protective Irrigation Works in the Deccan (1909) goes into full detail as to the schemes to be taken up in the Deccan in years to come.

Extensions of the Mutha Canals, Godavari and Pravara Canals systems are now under consideration; and remodelling of the Nira Left Bank Canal is in hand. This is sufficient for the present.

The future of the Deccan Canals depends on whether sugar factories can be established or failing that whether Government is willing to finance unproductive schemes; because no Deccan Canal scheme will be productive unless a large part of the water available is used for sugarcane.

(b) Until recently an unknown quantity of water was given to an unknown area for an unknown time. Recently the areas have been unitised into half acre plots and we are not standardising discharges, so that only the

time factor remains. Under the Deccan conditions it has always been found to be impossible to fix periods of flow owing to the enormous variations in demand which occur from time to time. The Special Irrigation Division has been studying this problem for some years and it is believed that a method can be devised to fix the supply with some elasticity as to the time when the supply will be given. If this is successful the cultivator will be given a definite supply and allowed to irrigate as large an area as he can with the water supplied (subject, of course, to limits). There will then be a strong incentive to the cultivator to spread the water supplied over a larger area, which will lead to great economy.

At present conditions are such that we have to supply water according to the demand—as judged by the cultivator—and consequently there is no incentive to the cultivator to irrigate carefully. The objectionableness of this system is obvious; but for 20 years a solution has seemed to be impossible and it is only since the Special Irrigation Division has been opened that it has been possible to work out a scheme based on agricultural requirements and irrigation possibilities.

Tail outlets must take whatever water reaches them and hence must be of the non-rigid type. The efficiency of distribution does not, however, depend on the type of tail outlet used; but on the type of outlet used near the head of distributaries.

Where there is alternative silting and scouring of the distributary bed, causing fluctuations of the water level for the same supply—such as occurs in canals in Sind and Northern India—a highly rigid type of semi-module, or even a module is desirable. Lower down the distributary a less rigid type of module is desirable, because a module does not damp out fluctuations of supply caused by careless regulation or closure of watercourses, so that if rigid semi-modules were used all excesses and shortages would reach the tail and alternatively flood the tail or leave it short of water. As the lower sections are reached it is generally desirable to increase the proportionality of semi-modules, and as a rule the lower half of distributaries will have proportional semi-modules installed.

This is an exceedingly technical question, on which one cannot generalise. Different conditions must be met by using different types of outlets. Thus though in Northern India semi-modules are accepted as more suitable than modules, and many advocate proportional semi-modules; yet in the Deccan semi-modules are far inferior to modules; because we are distributing stored water and have to aim at giving a known supply to a known area *when required*.

This question is being studied in detail by the Special Irrigation Division; and I hope I will be given the opportunity to show the Agricultural Commission the Special Irrigation Division Hydraulic Testing Station at the Effluent Farm, where the various measuring and regulating devices in use all over India can be seen.

QUESTION 9.—SOILS.—(a) (i) The area of soils rendered unculturable by water-logging and salt efflorescence on the various canals in the Bombay Deccan is approximately 30,000 acres.

Drainage schemes have been completed or are in hand to protect 10,000 acres.

The preparation of estimates for further drainage schemes to protect 11,000 acres are nearing completion. The total area needing protection exceeds 150,000 acres. The question of how to finance such schemes is still under consideration; but no matter how the money is finally recovered the capital must be provided by Government in the first instance, because drainage should be done to prevent damage occurring. If it is delayed till the physical state of the soil is seriously damaged reclamation may be impossible, and will at any rate be much more expensive than if the work were done at once. Government should therefore provide funds now to enable a comprehensive scheme of drainage to be carried out in the Deccan Canals tracts.

The great secret of soil fertility in irrigated tracts is to keep the soil continuously in a good state of tilth.

The cultivators attempt to do this by putting on enormous quantities of manure. A large part of this manure goes towards neutralising the evil effects of over-watering, or is washed into the subsoil without doing any good.

Less than half the manure at present used by the cultivators would suffice if irrigation water were used with care. The trouble is that over-watering and over-manuring will somewhat increase the growth of a cane crop; but within a very short time soil deterioration sets in, and to counteract this deterioration still more manure is added and so the soil goes from bad to worse.

No amount of preaching will overcome over-watering, because immediate gain is more attractive to the cultivators than a delayed reward especially when the former needs a minimum of care while the latter necessitates constant watching and effort on their part. Even had the Agricultural Department constantly preached the use of only 75" depth of water for cane they would have had no success, but when the Irrigation Department have perfected their methods of distribution it will be in the interests of the cultivators to extend their area with the restricted supply of water and we may confidently look forward to a 30 per cent. increase in cane area using the same supply of water with a reduction in cost of production; and damage to the physical state of the soil.

(a) (ii) In deep areas where the black soil overlies a layer of impermeable *chopan*, drainage will reduce the subsoil water level and so prevent further damage; but will not reclaim the damaged soil.

The damage in such cases is due to alkali salts (sulphate and chloride of sodium).

The soil is naturally of a heavy type (clay soil—like regur) and is deflocculated by the presence of soluble salts. Hence special soil treatments are required in this case. Several lines of investigations are in progress, which show that only sulphatic treatments are successful.

The method which seems to hold out the greatest promise of success is (1) by leaching out the alkali salts after dividing the damaged area into a number of suitable level plots, followed by constant flooding (3" depth of water being maintained for about three months). Gypsum should be applied in the later stages of flooding—at the rate of 2 tons (Rs. 50) per acre, which will effectively leach out the alkali salts.

(2) After this treatment, flocculation of the surface soil can be brought about by the use of bulky or green manures in conjunction with sulphur. The latter (½ a ton per acre—Rs. 60) hastens the process of granulation and causes the soil to darken in colour indicating physical improvement.

(b) (i) The shallow soft murum areas on the Effluent Farm at Hadapsar has been turned into high grade sugarcane land by a system of ploughing, manuring, cropping and irrigation. The Special Irrigation Division is investigating the possibility of carrying out reclamation schemes of this sort in the canal tracts on a large scale. The cost of such reclamation will be small—as cropping is an essential part of the method—and land so reclaimed will not merely profit the owners enormously but will also improve the duty (and hence the revenue) of the canals, because soft murum areas are usually situated along the canals, so that losses of water in the distributary channels will be reduced.

Lands at first water-logged by the canals often dry out and as a consequence are reclaimed naturally.

While (ii) deep soil areas have in many cases become salt affected due to the rise of subsoil water. These very rarely improve again unless drainage and reclamation is carried out.

(c) So far as drainage is concerned, this can only be done and maintained satisfactorily by Government, because if neglected, drains are likely to become useless in a few months.

QUESTION 10.—FERTILISERS.—(a) Poona Sewage Effluent—after dilution with canal water—is being distributed on Distributary No. 5 of the Mutha Right Bank Canal for irrigation.

The charge for the effluent, apart from the water, is Rs. 120 per acre of cane. The dose given contains 300 lbs. of nitrogen.

The nitrogen as delivered to the field is not in the form of nitrates or nitrites; but ammonia.

Experiments show that 300 lbs. of nitrogen in the form of effluent is of equal value to 200 lbs. of nitrogen in the usual standard manures.

No bad effects to the soil have followed the use of effluent. In fact the shallow soils of this area have distinctly improved, since it was introduced.

At present the annual area of cane to which effluent is given is 390 acres; but it is eventually intended to extend the area to 1,700 acres.

Experiments as to the best dose show that 225 lbs. of effluent nitrogen are sufficient with careful irrigation, being equal to the standard Manjri manuring of 150 lbs. nitrogen (in the form of oil-cake, fish, ammonium sulphate).

Effluent is of little or no value for the first 6 weeks after plantation and must be cut off three months before the cane is to be crushed, as otherwise the cane will not ripen and continues to grow causing "lodging."

Almost all crops thrive on effluent; but sugarcane is much the most suitable because cane requires large quantities and so the distance to which the effluent has to be distributed is reduced and losses in distribution cut down.

Where conditions favour its use this exceedingly valuable manure should not be wasted.

Mr. R. G. SULE, Executive Engineer, Ahmednagar.

Replies to the Questionnaire.

QUESTION 2.—(ii) Yes. An extension of agricultural education is necessary particularly in the canal areas. At present there is only one school at Loni in the Poona district, which is situated in the irrigated tract. Multiplication of such schools is essential to train the young agriculturist to a better method of agricultural development. The present method of imitation and experience is one which is very slow. There is hardly any initiative (probably there are other reasons also for want of initiative but this is one of them), and it is expected that a mind trained to understand the causes and their effects may bring about a quicker development than is possible at present.

(r) So far as is seen at present, a greater portion of these trained people are seen in Government service than outside, and this leads one to believe that in most cases the incentive to the study of agriculture, is the opportunity it offers of entering into a technical branch of Government service, where such training is essential.

But a change is coming slowly, and I have recently come across two or three instances where agricultural graduates from Poona Agricultural College have started farming on the Pravara Canals.

QUESTION 3.—(a) Practical results as achieved by private agriculturists, influence the cultivator a great deal regarding the possibilities of any improvement.

(b) Private influential cultivators should be induced to carry out the demonstrations on their own farms with only just the necessary guidance from Government as is essential to bring out the main facts to be demonstrated.

QUESTION 4.—(c) (ii) Generally, yes. But extension of railways in the irrigated tract is necessary to enable the green produce to be taken to the nearest market as quickly as possible. As an instance, a railway line from Belapur on the Dhond-Manmad line, to any station near Nasik on the Great Indian Peninsula Railway which would open up the tracts now irrigated by the Godavari and Pravara Canals and would be a very great help in the development of these tracts.

(c) (iii) Generally, yes. But here also there is a scope and demand for further extension in the irrigated tract. It is expected that in a very short time, motor transport will be fairly common, and a system of feeder roads, connecting by a trunk road to the nearest railway station would help the cultivators very much.

QUESTION 5.—(a) There is no doubt that some steps are necessary for the better financing of agricultural operations. What is really wanted is the easier terms of a Government advance, with the easy facilities of getting it quickly as from a private financier. The difficulty is to get it. Probably rural banks may offer some solution but I would venture no opinion about it.

N.B.—(Replies refer to the Deccan.)

QUESTION 8.—(a) (i) I would advocate the adoption of new irrigation schemes in the districts of Ahmednagar, Sholapur, Bijapur, Poona (i.e., in the parts of the Deccan which are always badly affected by famine). The schemes that are possible in this tract are mostly investigated by Mr. Beale. I would also suggest further extensions of the existing systems wherever it is possible. Non-perennial canals on a large scale are not likely to be a paying proposition in the Deccan. Even the perennial canals advocated above, will require careful investigations regarding their financial aspects. In considering the financial aspect due weight has to be given to the protective value of the work.

To make the adoption of the above works possible, it is necessary to find out means of making them pay their way. The works constructed so far, are not doing so. Means will have to be found to make them do so (cess, etc.). Unless this is done work on the future projects is likely to be held up.

(a) (ii) In areas where improvement in agricultural conditions by big irrigation works is not possible, irrigation by small tanks, should be considered and adopted. Financially the working of small tanks may not work out, even as well as the bigger irrigation projects. But they have their own advantages. They can be scattered over the country at suitable places. The areas irrigated by them being small, their requirements of labour and manure can be easily drawn from the adjoining unirrigated tracts. In famine times these small patches under irrigation may be able to supply fodder etc., and bring relief to the adjoining areas.

These small tanks will be very useful in producing a better quality of seasonal crops, and some garden crops to meet the requirements of the locality.

(a) (iii) The introduction of well-irrigation is strongly advocated in all areas, in the irrigation tract, where the subsoil water level is fairly high, say within 10' from the ground level. I would advocate, even this, that in the irrigated tract where the water level is as high as within 10' no irrigation by direct flow from canal should be given, and the cultivator made to use the subsoil water which is so easily available. Wells in such tracts should be encouraged as far as possible.

(b) Yes, as far as it goes. I would very much like to adopt the system of distributing water by measure by introducing modules. I understand, distribution by modules, is being experimented with on some canals and I believe when a practical system of modules is worked out, it will mark a great improvement in the present system of distribution.

QUESTION 9.—(b) (i) Light soils (overlying soft murum) have shown marked improvements when carefully worked and brought under irrigation. Green manuring seemed to have great effect on their texture.

Instance.—Some of the lands in the Belapur Company's areas, and at other places on the Pravara Canals.

(b) (ii) Heavy soils under constant irrigation show a tendency to deteriorate. When first brought under irrigation some of these lands allow 3 (or even more in some cases) crops of cane in succession. But after the tract is under irrigation for some time, the lands are not capable of giving good yields under constant irrigation, and need more rest.

Example.—In the older canals in the Poona Division, I understand that they cannot get good ratoon crops of cane. On the Godavari for the first few years after its start, the irrigators could easily get two ratoons from their cane crops. Now they complain that from the old lands (which have been irrigated for sometime) they cannot get the second ratoon so well. On the Pravara where the irrigation is started only 5 years back, the 2nd ratoon crop of cane is still quite a good crop.

QUESTION 10.—(a) In the irrigated tracts, the importance of manure is well realised by the irrigators. The difficulty is about getting it cheap. Greater use of these manures or fertilisers could be profitably made only if these could be had more cheaply. Advice to the cultivators as to the manurial values of the various manures and fertilisers, and their selection to suit the various crops would be useful.

(c) I would like to take the help of the various Irrigators' or Cultivators' Associations, and popularise the fertilisers through the help of these bodies.

(d) All the irrigated areas where cane is being grown (Godavari and Pravara).

(f) To make other fuel as easily and cheaply available. To encourage *babul* plantation where possible.

QUESTION 11.—(a) and (b) The improvements of existing crops and the introduction of new crops including fodder crops, are the two essential points

which require very careful attention in the irrigated areas and it is on these, that the success of the irrigation policy in the Deccan will ultimately depend. At present the main crops grown on these canals are:—

- (1) Cane; (2) *juari*; (3) *bajri*; (4) wheat; and (5) ground-nut (cotton is just being introduced and is in the experimental stage, so also turmeric).

Of these, cane is the only crop which is given very careful attention by the cultivator. The other crops are raised mainly to utilise the residual effect of the manure from the cane field. The attention given to these crops is very passing and cursory. It is quite necessary to find out if any other crops with better food value or money value, can be introduced to replace some of these. I have rarely seen a man growing a *bajri* crop, or a large area of *juari* crop on his well. But under the canal, the demand for the seasonal crops in the *kharif* and *rabi* seasons is mostly made up of these crops. (A man, with a well, does not think it worth his while, to raise a *bajri* crop on his well. He knows that if he has to lift his water, he may as well as utilise it for something which is more beneficial to him, and he probably grows some sweet potatoes or vegetables, or chillies, or any other thing that brings him a better return. Regarding *juari* also, he just tries to raise a crop (if he at all raises any) to give him enough fodder for his bullocks and enough corn for his family, but he would not raise a *juari* crop on well-irrigation to sell it.) If he has to sell the crop he would always grow something which is much more paying than *juari*. But on the canals these are main seasonal crops for which water is demanded. I believe, an assured water-supply deserves to be better utilised. About the wheat crop on the canal, it also does not get the same attention, as a crop raised on well water.

It is necessary that these crops should be replaced as far as possible by other crops which can bring a much better return. But if from an agricultural point of view it is quite essential, that these crops should be grown in the irrigated tract on canal water, then investigation is necessary to see if the quality of crops can be improved by any means possible. More careful cultivation and better seed are necessary.

“Better seed” as an essential factor of successful cultivation, also needs attention. A number of distributing centres of good seed in the canal tract would be of very great benefit in improving the quality and quantity of crop raised. Probably the method that was adopted in introducing N. R. cotton in the Deccan, would suit very well.

(c) Efforts are being made by some progressive cultivators to introduce cotton, tobacco, turmeric, onions, etc., in the irrigated tract. But it is too early to say if they have been very successful. But they promise well. Fruit culture is also finding favour with some—particularly the well-to-do cultivators. In fruit culture the cultivator has to wait for a few years before he can expect a return and so the poor cultivator is slow in adopting it. From the present rate of progress of fruit culture on the canals, it seems, that that branch of agriculture will thrive very well.

Mr. C. C. INGLIS and Mr. R. G. SULE.

Oral Evidence.

5237. *The Chairman* : Mr. Inglis, you are Executive Engineer of the Special Irrigation Division?—Yes.

5238. And Mr. Sule, you are also Executive Engineer?—Yes.

5239. I understand that it is agreeable to you two gentlemen to be heard together by the Commission, and of course it is to be understood that if one of you is in disagreement with the views expressed by the other, he will say so. I propose to conduct the enquiry on Mr. Inglis' memorandum. I should like, at this stage, to say that the Commission is greatly obliged both to Mr. Inglis and to Mr. Sule for the trouble which they have taken to give us their extremely useful written evidence. We have read these through, and perhaps I may ask, at the outset, whether either of you desire to make any statement in amplification of his memorandum or whether you would like at once to proceed by way of question and answer. Do you wish to make any statement, Mr. Inglis?—No.

5240. And you, Mr. Sule?—No.

5241. Now, in this memorandum, there is a very interesting presentment of the view that the irrigation aspect of cultivation in irrigated areas does not receive quite the attention that it should in presenting matters of cultivation and tillage to the cultivator?—Yes.

5242. I think I may say that the paragraphs in question are extremely clear, and whether readers agree or do not agree with the conceptions there set down, after reading it through they ought to be perfectly familiar with Mr. Inglis' views. I should like, at the outset, to ask you whether you wish to suggest any machinery for the closer co-ordination of these two departments?—I think it is almost impossible for the two departments to work separately and work closely enough together for the purpose intended. The difficulty is that we do not understand each other's standpoint. I was Executive Engineer in charge of Irrigation for 12 years, before I took up this special work, and when I took it on, I found I knew very little about the agricultural side, and I found all through that the difficulty of the Agricultural Department is that they do not understand our side of the question. That cannot be remedied unless you get the two men working together, as they do under me. I have got irrigation men and agricultural men from the Agricultural College working under me. I hear both sides of the question, and then we try and work out a mean way to attain our results; and we have found all the time, even after so many years, new points cropping up which the other department has not understood or realised; and therefore you want something much closer than the two departments working together. Of course, I am referring primarily to the Deccan. The conditions are not the same in Northern India.

5243. I wonder whether you can conceive of any machinery which could be generally applied all over India to secure better co-ordination between the two departments?—I do not think that there is any alternative but to work under one department or the other.

5244. You think the whole volume of agricultural and irrigation matters should be placed under one department?—I should like to see only one department in irrigated tracts. I think the Irrigation Department are quite as much in the wrong, or misunderstand the other side of the question quite as much as the Agricultural Department. Neither of us understand the other side of the question.

5245. I can quite appreciate your view. You are not referring to agriculture in the dry tracts?—Yes. There is only about 1 per cent. of the Bombay-Deccan that is irrigated under Government canals. It is a very small area, and it is rather, I think, left out in the cold.

5246. Do you think there should be a special joint department for this 1 per cent.?—For the irrigated tract only, of the Deccan.

5247. Who is to be responsible for that joint control?—I think the Irrigation Department must be responsible, because they are the most affected and the most interested.

5248. Do you ever meet the Agricultural Department round a table?—Yes, frequently.

5249. On what occasions?—Lately, on the question of water-rates.

5250. You have had special meetings to settle a particular point?—Yes.

5251. What I may call statutory meetings?—Yes.

5252. Annual meetings?—No. As a matter of fact, we do meet almost every year; or the Revenue Department, the Irrigation Department and the Agricultural Department meet practically every year; but it is not definitely laid down that they must meet. But at those meetings we are mostly talking at cross purposes.

5253. Do representatives of your department attend the Provincial Board of Agriculture?—I have personally done so, I think, on every occasion. There are generally one or two of us.

5254. Has Mr. Sule done so?—No. I have been there on three or four occasions; I do not think anybody else in the department has done so.

5255. *Sir Chunilal Mehta*: Has not Mr. Gordon done so?—There are generally one or two of us; I cannot remember. Generally at these meetings, they are purely agricultural questions, as opposed to irrigation agriculture. It is a totally different subject and it is generally altogether outside our interests.

5256. *The Chairman*: I quite appreciate that, but short of the birth of this new joint department to deal with the Deccan, it does appear to me that closer touch by means of regular attendance at the Provincial Board of Agriculture, which might meet more often than does the present Board, would be an advantage?—I have attended most of these meetings, and I know more about agriculture than most of the people there, but there is very little that touches agriculture in the irrigation tracts, discussed at those meetings.

5257. Have you no hope of educating the Agricultural Department?—No. I have no hope of educating the Irrigation Department either. We are at cross purposes, one with the other.

5258. I quite appreciate it; they are at cross purposes one with the other. I want to get to the root of your views. On page 227, you say, "Irrigation practice should be based entirely on the greatest good of the greatest number, not on the greatest good of the individual cultivator." Is that part in inverted commas as being a quotation from some other document?—No.

5259. I take it that from the angle of any one cultivator there is an ideal and that ideal is to obtain the highest possible yield from his own land?—Per acre. The limiting factor is his area, not his water.

5260. It is however a fact, or is it not that practices in relation to the irrigation of a particular plot which may have the effect of substantially enhancing the yield in any one year will not increase the yield over a period of years?—With sugarcane that is so, because you will damage the soil.

5261. Presumably, the cultivator is hardly disposed, even to that extent, to take a long view?—No, and that is why we must adopt indirect methods instead of direct methods.

5262. To what extent are you in touch with individual cultivators?—In connection with their methods of cultivation, you mean?

5263. Yes?—The Canal Officer is in almost daily touch. He goes into the fields, sees the people, and knows their methods; our distribution of water is based on their methods, and our object is by indirect methods to induce them to improve their methods.

5264. Under existing conditions, is it part of your responsibility to explain to the cultivator that he must forego a large yield in any one year, partly for the sake of his own yield in future and partly for the sake of the general well-being of the neighbourhood?—It is not part of our work now, but the officers inform them accordingly; that is to say, I have told all the cultivators who come to meet me that my motto is the greatest good of the greatest number. That is fully appreciated. It is not our work to do so, but that is what actually in practice we do for them.

5265. *Sir Henry Lawrence*: Do you do that as an executive officer in charge of an irrigation canal or in virtue of your special irrigational research work?—I am speaking of my own case, which includes work in all the irrigated districts in the Deccan. That is to say, when the blocks were introduced all this had to be explained in detail. What seemed to the cultivators to be quite unfair had to be explained to them. It was explained to them that it was for the benefit of the mass of the cultivators. At first they thought we were making these rules simply to give them trouble, and it was explained to them in detail that all the rules were to force indirectly an improvement of the methods, so that the greatest number of people would get the advantage, and they have appreciated it.

5266. You have authority to alter the distribution of water?—Yes, with the Superintending Engineer's permission.

5267. You are not the officer directly responsible?—No.

5268. *The Chairman*: You, I take it, up to a certain point, can, by withholding the water, ensure that your views shall take effect?—Yes.

5269. Of course the Agricultural Department are not in that position?—No, that is my point.

5270. Do you think you can shoulder the whole responsibility in this 1 per cent. of the Deccan for agricultural administration keeping in as close and sympathetic touch with the cultivators as is the Agricultural Department at this moment, and also hold yourself responsible for withholding water?—Yes, because the advantage will be obvious to the cultivators. When they get less water, their crops will improve.

5271. You expect a difficult time I suppose at the outset of this experiment?—No, the more I have gone into this work, and the more I have spoken to the people, the easier I find it. The bigger cultivators are now getting educated up. We understand their point of view, and they understand ours, and therefore we talk about things and understand each other's difficulties. There is no question that the benefit to the cultivators if water was reduced would be enormous. Even they themselves will tell you that they know they are damaging their field by over-watering.

5272. And yet they have not got the strength of will to resist the temptation?—The trouble is that the big cultivators do not do it themselves. They have low-paid workers who are not skilled, to do it. It is considered rather undignified for a big sugarcane cultivator to go out into his fields and look after them himself, he engages help. Our trouble is not with the big owner and the big cultivator. The trouble is that he leaves the work to his servants, and the servants have no particular interest in conserving the water.

5273. How about the small cultivator?—The smaller cultivator is rather like the servants; he is not educated sufficiently to realise the effects of his practice.

5274. You see, my point is that the certain amount of unpopularity that attaches in this matter to the Irrigation Department is inevitable. I was wondering, if that is so, whether it would not be a little difficult for you to withhold water and keep in close and sympathetic touch with the cultivators?—I think a good deal of the unpopularity is there because the Agricultural Department are preaching other doctrines in the same area, other methods than we recommend.

5275. On page 228 of your note, Mr. Inglis, you say, "In the Presidency and also in Sind there should be one Central Irrigation Research Station with

a farm where both irrigation and agricultural research should be carried on concurrently." What irrigation research is being carried on in the Presidency and Sind?—None in Sind, and in the Presidency none beyond what you saw to-day.

5276. In addition you suggest that there should be a Central All-India Organisation for co-ordinating the work of the various Provinces and giving expert advice. Would you suggest who should be responsible for the direction of that Central Research Station?—If the Public Works Department is the responsible body of the Province it will be under the Public Works in the Central Organisation too.

5277. And responsible directly to the Government of India?—Yes. At the present time in several Provinces exactly the same work is being done and we do not know about it.

5278. While on the question of Central Organisation, do you think matters are satisfactory at the moment in respect of such machinery as for settling differences of view on irrigational matters between Province and Province?—So far as I know there is practically no Central Government at all for irrigation.

5279. Do you think there ought to be?—Yes.

5280. What form do you think it might take?—I should like to think about that.

5281. I wanted to know whether you had any scheme in mind?—No, I have not, I am afraid.

5282. On page 229, you say, "Demonstration plots should be restricted to fields of capable cultivators and 'splash' should be avoided until the demonstration has been proved to be entirely successful." In your experience is the Agricultural Department in the habit of advertising particular methods of varieties before they have satisfied themselves that they are suitable for the districts in which they are to be used?—In the irrigated tracts, yes.

5283. You do not think the Agricultural Department makes sufficiently close experiment?—It is the same problem over again, they do not know the difficulties. They do not know the irrigation limitations.

5284. *Dr. Hyder*: What do you mean by irrigation limitations?—The Agricultural Department are rather inclined to think that we should give water at any time a cultivator wants it. The distribution of water in the Deccan is extremely complicated. The Canal Officer is just in the same position as a General in charge of a big army; he has to regulate the supply of water according to the demands and needs of a large number of cultivators. Water is coming down the channel, and he cannot accelerate its rate; and he cannot slow it down. There is a certain amount of available water and it has to be distributed—not by any rule but where it is required most. He has to direct his water so as to do the greatest good. It is not like the Punjab where the demand is uniform. In the Deccan it is entirely different. It is an exceedingly difficult hydraulic problem. He has to meet the demand wherever it may be. If a mistake is made it may take a week before he can get the canal flowing again normally.

5285. *The Chairman*: What is the particular irrigational tract you are most familiar with?—I know all the Deccan tracts very well indeed. The Nira Left Bank Canal is the most advanced.

5286. How long does it take for the water from the storage reservoir to get to the lower part of the commanded area?—About four days, and in the Pravara Canals it takes about 6 days.

5287. So, you have to see ahead for six days?—Yes, six days ahead, and if we get a famine year we have to conserve the water and we have to look as long as two years ahead.

5288. On page 230 you discuss the question of roads. Do you wish to suggest that the mileage of roads in charge of the canal staff should be increased?—I think all the roads in the canal tracts ought to be under the

canal staff. We have them under the canal staff in certain cases, and they are a success, but in most cases the roads are not in charge of the Irrigation Officer.

5289. On page 230, you say, "In irrigated tracts fragmentation can be checked, and consolidation sometimes effected, by refusing irrigation water to fields which are less than a fixed minimum area; because if the land is excluded from irrigation its value drops and hence it is to the interest of the owner to sell his land rather than let it drop out of irrigation." Who decides what is to be the fixed minimum area?—At the present time the only minimum is that a block shall not be less than one and a half acres. Our unit area for irrigation is 20 *gunthas*; that is half an acre, and they have to have 3 times that.

5290. I suppose if two owners of contiguous fragmented parcels decide to work together you would regard their holding as one?—Yes, provided it was put in the Government register. (Record of Rights.)

5291. You suggest that the minimum area might be put at six acres?—It would vary with different canals. Mr. Sule would like to see it more on new canals, say, 10 or 12 acres. On old canals you probably could not go beyond 6 acres because on the old canals fragmentation has already taken place to a considerable extent.

5292. In irrigation areas where existing rights do not arise, that is to say, where by irrigation you make fertile an area which before you irrigated was uncultivable, would you advocate the insertion of restrictive clauses in the lease compelling the cultivators to adopt certain methods?—That does not arise in the Deccan because the whole of the land is occupied.

5293. You have no experience of that?—Not here. In Sind, certainly.

5294. You would also advocate compulsion in matters of improved crop varieties being planted?—Yes.

5295. You would go in for a more or less complete system of control in all those ways?—Yes.

5296. Is that done at all in Sind?—Not that I know of. It has been done in some of the Indian States I know. I am told that they have enforced the growing of only one variety of cotton, but I do not think anything of that kind has been done in Sind.

5297. You do not think it would be resented by public opinion or that the restrictions would render the land less attractive to possible tenants?—I do not think any tenant will stand out against his own interests.

5298. On page 231, you say, "Under the Deccan conditions it has always been found to be impossible to fix periods of flow owing to the enormous variations in demand which occur from time to time. The Special Irrigation Division has been studying this problem for some years and it is believed that a method can be devised to fix the supply with some elasticity as to the time when the supply will be given. If this is successful the cultivator will be given a definite supply and allowed to irrigate as large an area as he can with the water supplied." Is that based on the working principle of giving a man rather less water than the whole of his land requires?—Yes.

5299. So as to encourage him to make what he has so far as he can?—Yes, because at present the area is fixed and he is allowed to take as much water as he feels inclined to take. We want to cut down the supply so that if he spreads his water as well as possible he will be able to cover his whole area, but not otherwise.

5300. *Dr. Hyder*: In that case, would you base the irrigation rates on the area or on the quantity of water supplied?—I would distribute water by measurement and not sell water by volume unless we get some measuring device which cannot be tampered with. The trouble is that under the present forms of measurement it is possible to increase your water-supply without

being erected. The unscrupulous men who increase their supply would not pay for the extra supply. The result will be everybody else would suffer. We do not want to put a temptation in the way of the unscrupulous.

5301. In that case would you carry your rates according to the area and the kind of crop grown?—Yes. I have got a note on that.

5302. *The Chairman*: Are you going to put that in?—Yes.

5303. Will you tell us what it is?—I will read it* out, if I may.

5304. *Mr. Calvert*: That only applies locally to a particular canal?—No; it is the principle in Northern India.

5305. You sell by cusecs?—It cannot be done, because the modules will be tampered with. There is no module in the world which measures water; it only gives the fluctuating discharge according to the water level in the distributary. If the distributary silts or scours, more or less water will go down that outlet and no account is taken of it; it is not measured. You must have either a meter or a module before you can measure your discharge. It can be measured within 5 or 10 per cent.

5306. *The Chairman*: Do you think the time is in sight when the distribution of water on a volumetric basis will be practicable in the country with which you are familiar?—Yes, I do; I hope to do it within ten years.

5307. You think it will come about within ten years?—Yes.

5308. What are the essentials before you can bring that method into practice?—To persuade the Irrigation Department to take it up.

5309. You think there are no practical difficulties in the way?—Only individual difficulties. It is ten years now since I started this, and it is working now on one distributary. In the last 18 months I have increased the duty for cane from 50 to 65 on that distributary. That is simply by distributing the water much more carefully so that the cultivator knows when he is going to get it and how much he is going to get.

5310. Does the distribution of water on a volumetric basis presuppose some co-ordination, co-operative or otherwise, between the cultivators to regulate the flow as between themselves?—It makes it very much easier if they do and we prefer them to do that, but at the present time they cannot do it. You can work to a definite programme much better if you have a known discharge flowing for a known time.

5311. You do not contemplate having a water-measuring machine for the land of each individual cultivator?—There is no such thing at present. The cost would in any case be prohibitive.

5312. I notice that you advocate immediate attention to drainage whenever land is irrigated?—Yes; otherwise the land becomes damaged, and the intensity of the damage is about proportional to the time that the land is damaged. If land has been damaged for five years it would take five times as long to reclaim it as it would if it were damaged only for one year. If, therefore, you do not drain the land immediately the canal is opened it may not be possible to reclaim the land at all; at least, it would be very much more expensive and difficult to do so.

5313. Is the damage in this area due to water-logging without hypersalinity, or is hypersalinity the result of water-logging?—There are certain water-logged areas but these are easy to deal with. Where there is difficulty is where there is salt efflorescence due to a high subsoil water level.

5314. You do get a water-logged condition without efflorescence?—Yes.

5315. Do you think it is only a question of time before efflorescence appears?—No; there are some soils that will never get salty.

5316. At the same time you can have efflorescence without water-logging?—Without water at the surface, yes; but you must have water within four feet of the surface.

* Appendix: Sale of Water by Measurement.

5317. I should like to ask you Mr. Sule one question. In your memorandum on page 234, you say that extension of agricultural education is necessary particularly in the canal areas. At present there is only one school at Loni in the irrigated tract. Have you any personal experience of the school at Loni?—(Mr. Sule) No.

5318. Do you know whether the school of the Loni type has made any impression on the cultivators in the immediate neighbourhood, which is an irrigated one?—I do not know.

5319. What you are concerned with is, therefore, the spreading of accurate information about the needs of agriculture in irrigated areas by the best means that can be devised?—Yes.

5320. You strongly advocate the method of demonstration by which the cultivators are encouraged to carry out improvements by experiments on their own lands?—Yes.

5321. The value of that being that the other cultivators and the cultivator in question are thereby convinced that it is really the method and not merely the expenditure of Government monies that has produced the improvement?—Yes.

5322. Have you any experience of attempting to get cultivators to adopt green manure?—Yes; that is now being taken up.

5323. Does that mean that in every case there must be a whole year fallow?—No. In the case of sugarcane what they do is to put in green manure in the cold weather, and after three months growth they plough it up and leave it there and in January or February they put in the sugarcane.

5324. It means giving up one crop of sugarcane?—No, they can put the cane in after one cold weather crop.

5325. If they do it after one cold weather crop, does it mean an important sacrifice of money to the cultivator for the moment?—It means some sacrifice, but not much.

5326. Have you ever known of cultivators adopting the practice of green manuring?—Yes.

5327. Do many of them use it?—Not many. Some of the progressive cultivators do it.

5328. Do those who use it continue its use once they have tried it?—I think when once they have got some knowledge of the thing they always try to keep to it.

5329. Is it usually the larger cultivators who do it?—Yes.

5330. The small man thinks he can hardly afford to do it?—They do not realise the importance of the thing.

5331. Have you had experience of propaganda carried on by co-operative societies?—No.

5332. Are there any co-operative organisations which work in the area in which you are most familiar?—There are one or two co-operative societies.

5333. Are they doing any propaganda work at all as far as cultivation practices go?—They are doing something, but it is hardly worth mentioning.

5334. Meantime I suppose that an Irrigation Officer says very little about methods of cultivation when he is going round to cultivators?—I think he says quite a good deal about it.

5335. When he goes round he says a good deal, you think, about improved methods of agriculture?—When he talks to the people about their irrigational difficulties the question of other agricultural matters always comes up.

5336. So that an Irrigation Officer has an opportunity when he goes round to put matters from the point of view of irrigated agriculture as well as from what Mr. Inglis would call the purely agricultural angle?—Yes.

5337. I do not know whether you agree in the main with the points put forward by Mr. Inglis?—I agree with him in the main.

5338. *Sir Henry Lawrence*: You gave us some figures with regard to the total cost of the canals in the Deccan and the return that Government get from them? What is the capital expenditure and present increment of the canals at present working?—(Mr. Inglis) The total expenditure on Nira Left Bank Canal was 63 lakhs; and the revenue we are getting from it now is 9 to 10 lakhs.

5339. That is paying well?—That is the only canal in the Deccan that is paying well. Mr. Sule can give you the figures for the newer canals.

5340. As regards the other canals?—(Mr. Sule) I can give only rough figures: 102 lakhs for the Godavari Canal and 138 lakhs for the Pravara Canal. That is the capital expenditure.

5341. What is the return to Government?—5 lakhs from the Godavari Canal and nearly the same from the Pravara. A gross return of 4 to 5 per cent.

5342. Are there any canals which pay less than that?—(Mr. Inglis) The Mutha canal also pays about 4 per cent. There are no other canals in the Deccan yet. The Nira Right Bank Canal has only just been opened, so that we have no figures for that.

5343. What has been the expenditure on that?—When completed it will be 4½ crores, roughly.

5344. The expenditure on that canal is more than the expenditure on all the other canals put together?—Yes; it is a very expensive canal.

5345. What is the return expected?—I cannot give the figure off-hand.

5346. Will you please find it out?—I will try to do so. Roughly it is anticipated to pay 2½ to 3 per cent., I believe.

Mr. Calvert: I have asked Mr. Harrison for this information.

5347. *Sir Henry Lawrence*: For sometime there has been a proposal to make the Irrigation Department give a better return by charging an occupier's rent or something of that sort—an irrigation cess. Have you had anything to do with preparing proposals for that?—Yes.

5348. What is the character of those proposals?—The areas under the canals are to be divided into three categories; those suitable for sugarcane, those suitable for *rabi*, and monsoon crops; and the cess was to vary from a maximum of Rs. 14 to Rs. 6 for sugarcane to Rs. 6 to Rs. 2 for *rabi* and a uniform rate of Rs. 2 for monsoon areas. The idea of that was that at present a large number of cultivators do not attempt to use irrigation water. If they have suitable land and have to pay that cess they will have to do something to meet the cost, and the idea is that if they do not cultivate it themselves they will let it out to tenants who will.

5349. At present the general tax-payer is paying for the benefit of the irrigated area cultivators something like 50 lakhs of rupees a year?—Yes.

5350. It is hoped that you will be able to recover this for the benefit of the general tax-payer by this special legislation?—Part of it.

5351. Only part of it?—Yes.

5352. Irrigation in the Deccan must always be a losing concern for the State?—At present rates, yes, but when the water cess is introduced it may be different.

5353. Even then we cannot recover the whole of the fifty lakhs, which Government is paying out on the canals?—It is anticipated eventually that with the cess all the existing canals will pay 6 per cent., and so pay their way.

5354. You mentioned the difference in the rates for sugarcane and *rabi* cultivation. Can you tell us what the rates are on sugarcane at present?—It is Rs. 45 per acre for sugarcane.

5355. And for monsoon cultivation?—Rs. 4 per acre.

5356. And *rabi* cultivation?—Rs. 8 per acre.

5357. In the whole of the Deccan, the area under sugarcane is roughly how many thousand acres?—Just over 30,000.

5358. Has that increased in recent years?—As the new canals were opened up, the area increased. The Pravara Canal was only opened 3 or 4 years ago, and the cane area there is gradually increasing.

5359. The success of the irrigation canals depends on the area under sugarcane?—Unless some other new crops can be found to take its place. The advantage of sugarcane over any other crop is the great amount of water it takes in a restricted area, giving a very big revenue return. Cotton might pay as well were it not for the fact that we would have to spread the water over such an enormous area that the losses on distribution would be too great.

5360. Is there any indication that sugarcane cultivation is decreasing following the recent fall in the price of sugar?—No. If anything it is increasing slightly each year.

5361. The present price of *gul* is not favourable to cultivators?—We believe that the *gul* market is almost flooded now, and that with any further opening of canals it will not be possible to sell all the *gul*; in other words, the idea is that the limit of sugarcane growing in the Deccan has almost been reached, unless sugar instead of *gul* can be made out of the cane.

5362. It has not been your experience that last year cultivators refused to grow sugarcane owing to the bad price obtainable for the crop?—No.

5363. Were not the rates for sugarcane decreased in consequence of that?—The rate has now been reduced this year. It had been raised to Rs. 66 per acre, and it has now been brought down again to Rs. 45.

5364. Your principal difference with the Agricultural Department relates, I believe, to the amount of water to be used for cane. They advocate 125 and you 75 inches?—I think the differences of opinion are largely misunderstandings. I do advocate less water than the Agricultural Department.

5365. Is the difference as great as between 75 and 125?—I am not sure what the Agricultural Department advocate, but they have stated that my figure is rather too low.

5366. What do you advocate?—75 to 80 inches.

5367. What is the maximum tonnage per acre you expect to get with 75 inches?—We got 66 tons last year.

5368. Where did you get that?—At the effluent farm, not on effluent but on 150 lbs. nitrogen in the form of fish cake and ammonium sulphate.

5369. A very satisfactory outturn?—That was the maximum; the average was 44 tons.

5370. I did not altogether follow your statement about those modules? They have something they call an A. P. M. in the Punjab. Have you tried that here?—Yes, we have got it.

5371. It is satisfactory?—Very satisfactory, but no more so than Kirkpatrick's module which we have in Sind, and it is probably easier to tamper with.

5372. I asked Mr. Sangster about that and he said it could not be done?—An expert hydraulic man could do it. It can be done; there is a method for doing it which I will not give away. Any semi-module can be tampered with to a certain extent if you only know how to do it.

5373. I am not clear as to the meaning of your paragraph on page 232 in which you refer to enhancing the revenue of canals. Do you advocate sugarcane being cultivated on shallow soft murum areas rather than on deep soil?—No; I propose to make those shallow soft murum areas into good soil about 18 inches deep, and then allow them to grow sugarcane on that improved soil.

5374. That would give you a natural drainage?—Yes.

5375. And prevent water-logging and saline efflorescence?—Yes. The soil is much more suitable for sugarcane in reasonably shallow than in deep areas.

5376. *Sir Ganga Ram*: How many years' service have you?—Twenty-one.

5377. How much of that have you spent in Bombay?—I have spent 4½ years in Sind and the remainder on irrigation work in Bombay.

5378. Have you ever visited the Punjab irrigation works?—Several times. I know Mr. Crump, Mr. Wilsdon and Mr. Lindley intimately, and all their work.

5379. Have you some system of control by which you allow a man enough water for a proportion of his holding only?—The trouble in the Deccan is that you have to give out water according to what the cultivator wants.

5380. The cultivator has got a bottomless stomach; he will never be satisfied?—He has!

5381. I am a cultivator myself; but with us there is a strict rule and I am not allowed more than so much. You are at liberty to cut or increase the water?—We restrict their water as far as we can by indirect, not direct, methods. If we stop their water by direct methods and refuse to give a man the quantity he requires, then if anything goes wrong with his crop he says it is our fault, and the responsibility lies with us.

5382. Would you limit his cultivation in any way? We have a rule now (I do not know if you are aware of it) whereby if a man has 1,000 acres you deduct 25 per cent. leaving 750 acres. Divide that by 250, and that is what we get, and not an inch more. Have not you anything like that?—No. With you the soil is uniform and the rainfall does not affect the case; but with us we have to close the canal down every time there is rain.

5383. Do you charge anything for green manuring?—The charge at the present time is the monsoon rate of Rs. 4.

5384. We have remitted the whole thing. Supposing a man prepares his land for *rahi* during the *kharif* season, do you charge him anything for the first ploughing, and so on?—With us that is done on the rainfall. Practically all the ploughing is done on the rainfall and not on canal water.

5385. In what month do you sow sugarcane?—You should sow it in January or February; actually they sow it as late as April and May.

5386. Is there no rule about it?—No, it is very very difficult; you see the supply varies from year to year.

5387. Then they wait for the supply from the canal when they can sow; is that so?—If the supply is short, then, in the past they have not been allowed to plant the new cane until the old cane is removed. It is not in the same field; it is in another field. That is one of the irrigation practices which is wrong and which is being changed.

5388. How much water do you lose by evaporation in your storing tanks?—About 5 feet in depth.

5389. How much per day?—0.25 of a foot on the average. It varies from about .015 to .040.

5390. What is the duty?—The difficulty in working out the duty is that sugarcane takes enormously more water than any other crop.

5391. Is there a Bombay bulletin on sugarcane in which it is stated that after investigation it is found that 72 inches is the proper depth?—No.

5392. You are not aware of that?—No.

5393. There is a bulletin about it in the Bombay Presidency; 72 inches is the proper depth and that has been proved to be quite enough?—From the Bombay Presidency?

5394. Yes, the bulletin was issued by the Agricultural Department; I am surprised you do not co-operate more with the Agricultural Department?—But that is some years ago, when Professor Knight was here; it is not what they are saying now.

5395. Then has the world changed? Because sugarcane has become dear, does it therefore require more water, do you think?—I do not know.

That bulletin on sugarcane is issued by the Government.

5396. *The Chairman:* What year?—I am not quite sure.

5397. *Sir Ganga Ram*: Would you put the Agricultural Department under a Chief Engineer?—No, certainly not.

5398. Perhaps you mean that the Agricultural Department and Irrigation Department should be under one Minister; is that what you mean?—No, I want much closer co-operation than that; the co-operation must begin much lower down; it must begin with the men who are doing the work.

5399. I cannot understand. You say distinctly that both departments should be under one control?—No, there should be a branch of the Irrigation Department under the Irrigation Department with both agricultural men and irrigation men working together.

5400. Have you worked out data as to the requirements of all the crops?—Yes.

5401. Could you send me a copy?—Yes.

5402. How much for *rabi*?—I will send it to you.

5403. I am surprised to hear you say that the Agricultural Department have been advocating waste of water. Do you enforce the system we have in the Punjab by which one acre is divided into so many parts?—We have a similar system of half acres.

5404. Do you know that in the Punjab we have a system of one-eighth acre?—Yes, one-eighth acre, but that is not enforced in the Punjab now.

5405. On page 230 of your note you say, "It is unnecessary, for instance, to have a first class hydraulician at every experimental station, because the very advanced mathematics of hydraulics often plays a minor part. One such man for the whole of India would suffice and he could be lent to any Province temporarily requiring him and should always be available for consultation". What does the Hydraulic Engineer do?—He distributes water in this case.

5406. Would you not recommend a distinct rule, as we have in the Punjab, of so much water per gross acreage?—No, in the Deccan only some of the peasants want water. The soils vary enormously; there are deep soils which are totally unsuitable for some crops but very suitable for other crops; there are no soils suitable for all crops. We find that we do not want to distribute a proportional supply as in the Punjab. We want to give a definite known supply for which one requires a module. Mr. Gibbs' module is the one we are adopting from the Punjab.

5407. Are you aware that a meter has recently been invented which can be used by two or three people together?—For big enough areas it is quite easy to get a meter.

5408. In cases of flooding I see you recommend the use of gypsum. An enormous supply of gypsum would be required, would it not?—It does not follow it would be useful in the Punjab; it is useful here.

5409. You say it costs Rs. 50 per ton here. We can easily send it to you from the Punjab at Rs. 10 per ton?—I am very glad to hear it. It costs Rs. 25 per ton locally. Rs. 50 was for 2 tons.

5410. When I was Executive Engineer I used to pay 1 anna per maund to the contractor for collecting. It used to be As. 5 in Lahore including the railway charges. I do not think it should cost much more here than there?—I do not know where it has come from, but it has been purchased in Bombay.

5411. You say that in one case you have three rotations?—Our standard rotation for blocks is a three-year rotation.

5412. You emphasise the need for roads. Do you mean metal roads or non-metal roads?—Metalled roads.

5413. Who is to pay for it?—It would be on exactly the same principle as that on which they were run before; the money will come from the same source. It is only a question of who is to carry out the repairs.

5414. Do you make any use of all the rank grass which is growing beside the canals?—I would like Mr. Sule to answer that because I am not in charge of any canal at present.

5415. Do you make any use of that grass, Mr. Sule?—(Mr. Sule) No: we let it out for grazing.

5416. But I mean do you keep it in reserve for famine?—No.

5417. Do you make ensilage from it?—It would be hardly worth it; there is not much of it.

(Mr. Inglis). We have not such large quantities in the Deccan such as you have in the Punjab; there is practically no grass on the canals.

5418. We have a system by which if there is only an As. 8 crop a remission of the revenue is allowed. Have you any system of that kind?—On paper "yes", but one of our troubles is that we cannot afford to let a crop die and so remission has rarely to be granted.

5419. Dr. Hyder: But you have that system in Sind?—Yes, in Sind. We sanction areas here; we sanction the area we can irrigate.

5420. Sir Ganga Ram: Is there any rule or principle as to how much is to be irrigated and how much water is to be given, or does everything depend upon your will?—Yes, there is a principle.

5421. What is the principle?—The principle is that each owner has no right to water, if that is what you mean. The man who first applies for water has the first claim; it is "first come, first served".

5422. Do you mean to say that all the people round about have no right to water?—No. Most of them do not want it.

5423. Why do they not want it?—Because it is only a certain number who want to use irrigation water; some of them would not take it if you made them a present of it.

5424. Then how do they water the land?—There is sufficient rain in the Deccan to grow some crops in most years.

5425. Have you no independent Drainage Board or Drainage Engineer?—I am the Drainage Engineer myself for all the canals in the Deccan.

5426. Then you have nothing to do with the distribution of water or anything of that kind?—No, not now.

5427. Can you give me one instance; for example, how much water is required for *jowar*?—About 1½ feet.

5428. Is that *rabi* or *kharif*?—*Rabi*.

5429. Of that, how much do you think is evaporated, how much absorbed by the plant, and how much goes in the subsoil?—I am afraid I could not answer that straight off.

5430. Does the *kharif jowar* require more water?—There is rainfall which makes it require less.

5431. We will give credit for the rainfall separately; supposing there was no rainfall, how much water would be required? Whether the water comes from the canal or rain is irrelevant?—It would be about the same. Even if we ignore rain, the humidity of the atmosphere is considerable. The conditions are very different in the Punjab.

5432. Sir Thomas Middleton: You have just told us you are largely concerned with drainage?—Yes.

5433. And with the reclamation of land which has suffered from alkali?—Yes.

5434. What is your chief kind of alkali; is it the white or the black?—Sodium sulphate mostly; sodium chloride to a large extent also. The rest of the salts are a very small proportion. There is a very slight quantity of carbonate as a rule.

5435. So that you are free from the most troublesome kind of alkali?—Yes.

5436. You have found that the alkalis you describe can be cured or prevented from accumulating by washing out?—Provided you get the land in time before the physical state is utterly or practically destroyed.

5437. Early drainage is your remedy?—Yes; prevention is far better than cure.

5438. You have not got to tackle the black alkali problem in this Presidency at all?—No; there are small areas of black alkali, but we are leaving them alone up to the present time. Calcium chloride is a very bad salt which we sometimes get here, but fortunately not in large areas.

5439. You have told us that your motto was the greatest good for the greatest number, but you did not say numbers of what. Is it the number of agriculturists or the number of tax-payers?—I meant number of agriculturists.

5440. It seems to me that your motto and that of Dr. Mann must come near together in practice; he is thinking of agriculturists one by one, and you sum them up and arrive at the same result?—I can give you an example to show that Dr. Mann and I do not see eye to eye. Supposing an individual cultivator can get a slightly bigger crop with 125 inches than he can get with 75 inches, then the individual will take 125 inches; but if you spread that 125 inches over one and two-thirds acres the total benefit to the two cultivators will be enormously greater than the benefit to the one cultivator if he is allowed to take 125 inches for 1 acre.

5441. Your point is that Dr. Mann does not take that view and recommends that the individual should get as much as he can and not think of his neighbour?—On one occasion before the Sugar Committee he said that in so many words; it is in writing.

5442. Your experiments indicate that 75 inches is enough at the present time; but how long have these experiments been going on?—My experiments are really a continuation of the experiments of the Agricultural Department 10 years ago; I agree with what they said 10 years ago.

5443. Is it the result of a single year's experiment, or of the continuation of those experiments?—Our results are steadily improving under that treatment every year.

5444. How long have you been carrying them out?—Since 1918.

5445. The Irrigation Officer in charge of the canals sells water and takes his orders for water in order of application; that is to say, the cultivator who applies first is first served?—What generally happens in practice is that you say that applications must be in before a certain date. You generally do not get all the applications you want by that date. All the men who apply for water before that date get water, and as to the remainder, as they come in you take them in order of priority.

5446. So that it is really the late-comers who run the risk of not being supplied; the bulk of the cultivators are in the same category, they come in before a certain date and they are all equally entitled to water?—Yes.

5447. The canal officer does his best to distribute the water between them?—Yes. At the present time water is given on 6-years leases almost entirely, so that if a man gets in time in the first year, he gets water for 6 years. The man who is late does not get water for 6 years unless there is an excess supply.

5448. *Dr. Hyder:* You have the same system as in the Central Provinces?—The Central Provinces conditions are almost the same as our conditions but I am not quite sure of their system.

5449. The conditions as to rainfall?—Yes, and requiring water, and so on; but I have never been there so that I cannot tell you whether it is exactly the same.

5450. *Sir Thomas Middleton:* In describing the duties of the Irrigation Officer in charge of the canal, you said he had to look a week ahead and sometimes a season ahead in releasing water?—Yes.

5451. Is it possible to acquire experience that will enable him to do much better than he can do by chance when he has such a problem?—Very much so; it is extraordinary how the experienced man can do it.

5452. They acquire the gift of prophesy and can see a season ahead; but, looking at the rainfall tables, it looks an almost impossible task to prophesy a year ahead?—It is not so difficult as all that. The difficulty is that you may have rainfall in one part of the canal and not in another part of the canal; you must judge what effect that will have on the water required.

5453. The only question I was asking myself was whether, if the canal officer in addition to his irrigation experience had a wide knowledge of agriculture, he would be able to do any better than he does at present. It seems to me that his job is hard enough at present and I doubt whether any additional knowledge we might be able to give him would improve his efficiency?—I think the cultivators will tell you 'Yes'; their feeling is that when mistakes occur they may be due to ignorance of their requirements.

5454. That may be the cultivator's view?—It is obvious it must be true to a certain extent; the more you know about agriculture the fewer mistakes you are likely to make in irrigation matters.

5455. I wonder whether that is so when you are dealing with a problem of this kind. I think if you professed to know a great deal about agriculture you might more often be accused of making mistakes?—To put it in another way; for 12 years I was in charge of canals. We all know what the ideal of the Deccan irrigation is; that is to arrange to give a supply of water and to allow the cultivator to do as much as he can with that water; but for the 12 years I was in charge of an irrigation district I could not see daylight, and for about 6 years after I took up research I could not see daylight. Now I can and that is purely because I have been able to balance the problems of agriculture and irrigation.

5456. It is not because you have had experience as an Irrigation Officer?—No, I think it is agricultural experience essentially. My point is that the irrigation man is not competent to run a canal unaided and the agricultural man is not competent to run a canal unaided.

Certainly the agricultural man is not competent; I agree with you there; but I am not so sure about your other point.

5457. *Dr. Hyder*: A chart has been handed over to me and I ask you to see whether the rainfall presents similar features in the Deccan as in this district which I understand is in the Karnatic where you will find there are only 4 years in which the rainfall is above the average, there being a deficiency in the remaining 21 years?—If we were building a dam we would store the equivalent of these run-off in a bad year of rainfall; we would design on the supposition that the dam filled in all but famine years in that period.

5458. I was trying to ascertain the deficiency of rainfall; is the state of affairs in the Eastern Deccan with which you are familiar similar to that?—Yes.

5459. So that the Eastern Deccan is an insecure tract?—Very insecure.

5460. All these canals that have been constructed in the Eastern Deccan were constructed more or less as protection against famine?—Yes.

5461. Your problem, I understand, is that these canals do not pay their way?—Yes.

5462. But were they expected to pay their way?—No, most of them were not expected to pay their way even when they were constructed; they have all been protective works, with one exception.

5463. So that in the Deccan you have to compare the outlay by the State on these irrigation works and the cost of famine relief which would otherwise fall on the State?—Yes.

5464. If those two costs are equal, you would say there was room for the construction of a canal in the Deccan?—Yes, that is the present outlook.

5465. And if the direct revenue from the canals is greater than the expense to which the State would be put in famine relief if the canals did not exist, you would say that the State was making a profit on the canals?—Yes.

5466. You have enunciated the axiom with regard to irrigation that you should work for the greatest good of the greatest number. I am not quite sure that I have followed the application of that axiom in another science. You have got a limited quantity of water in the Deccan?—Yes.

5467. You want to make that limited quantity of water go as far as possible?—Yes.

5468. Now you come at once into conflict with the agriculturist; his business is to find out the exact quantity of water that is required to bring a certain crop to maturity?—To get the optimum crop, to get the best crop.

5469. To get the best results?—Yes.

5470. To bring the crop to maturity under normal conditions. You are always concerned with the maximum results. Your point of view is that the Head of the Agricultural Department and his officers are always concerned to get the greatest amount of produce, or how to bring the crops in an insecure area to maturity, never caring about the greatest results?—Yes, but there they have got the limiting factor of the rainfall, which is definite in these dry tracts.

5471. But since that knowledge is possessed by both departments, I do not see why there should be an incompatibility of views between you as Irrigation Officer and the Agricultural Department?—But the moment you get down to irrigation their statement is that the limiting factor is not water. To put it at its lowest, they want to be popular with the man they are teaching; they want to get him to say that they are doing the best for him. The best that can be done for him is to give him more water, if water is the limiting factor.

5472. Even in these insecure tracts?—No, because there the limiting factor is definite and you cannot get away from it; it is rain.

5473. I understand you would like the Agricultural Department to be more closely in touch with your department; do you want them to be under you entirely?—No, I want agricultural men and irrigation men to work together.

5474. You do not want to swallow the Revenue Department, do you?—No, certainly not.

5475. You would leave the work of assessing rates and proper charges to other people?—The actual preparation of the assessment papers is done by us now; it would be easy to collect the money.

5476. But the rates?—That is done by us now; we do all the assessing now. The Revenue Department, except for the village work and that sort of thing, does comparatively little work in the irrigated tracts. We do not do the collection. They have got land revenue assessment to do, of course; we should not like to take that on.

5477. I understand you would compel the cultivators of the Deccan to take up the particular quantity of water that you will give them, and you will compel them, further, to grow the kind of crop that you will help them to grow?—Yes.

5478. Do you not think that involves a large measure of compulsion?—We do not fix the area; we say, we give you so much water; with that you are to grow as large an area as you can of particular types of crops of which sugarcane is the most important.

5479. If you are going to adhere to your maxim of the greatest good of the greatest number, you will desire to spread your water over the greatest area. Would you like to compel the cultivators to grow the crops you think

they ought to grow, and then you will give them the quantity of water you think they ought to have? The Irrigation Department in those circumstances would certainly be a power in the land?—So as to bring in the biggest profit to the mass of cultivators. If we spread water right down to the tails of the canal, the area which can be irrigated is very much less than if we utilise the water at the head of the canal. We wish to utilise the water, which is limited, so as to bring in the greatest profit to all the cultivators; not to one individual.

5480. *Sir Chunilal Mehta*: Perhaps you would like to explain the principle of the greatest good to the greatest number of people. Owing to the fact that there is a very great demand for water in the Deccan by the cultivators everywhere, everyone wants water whether he gets it from canal irrigation or from rain?—Yes.

5481. The idea of your department is that the largest number of people should get water, even though a certain number may not get the amount they would like to use?—Yes; in other words, utilise the water as economically as possible.

5482. And for the largest number of people?—If there was a demand, yes; but unfortunately it would not be economical to give water to everybody along the whole canal. That is the trouble.

5483. But, subject to the amount of water you can possibly give, you like to distribute it over as large a number of people as possible in an economic way?—Yes. In this proposal for an irrigation cess there would be a uniform intensity in each parcel. If the rate fixed for a parcel were Rs. 14, that means the whole area would be under sugarcane; if Rs. 10, half would be under sugarcane. We are trying to get a uniform intensity in such areas as are suitable for that particular intensity.

5484. You told Sir Henry Lawrence that the Nira Left Bank Canal cost Rs. 63 lakhs, and you were getting about Rs. 9 lakhs revenue from it?—Yes.

5485. Are those revenue figures net or gross?—Gross.

5486. The net figures would be very much less?—Yes.

5487. With regard to the proposed cess, although you agree with the principle that Government should pay something out of the common purse, from the general taxpayer, towards these particular areas, still, the idea underlying the new cess is to do away with unearned increment for the future in the case of the fortunate people who happen to have their land close to where the canal runs?—Yes.

5488. That is the underlying idea of it; it is not designed to screw as much as possible out of the people who use the water, in an attempt to make the canal earn 6 per cent.?—It happens to work out to about 6 per cent., but there is no reason why you should not have the cess, even if it brought it to 10 per cent.

5489. *Dr. Hyder*: If your water rates are sufficiently high, you can get in the whole of the unearned increment in that way. If for a certain time there is a settlement still in operation in a certain district you can impose an owner's rate, but if your water rates are sufficiently high what becomes of the unearned increment?—In the first place, if the land is not irrigated at all you do not get any water rate; but you do get a cess, and by imposing a cess you can force a man either to irrigate his land himself or to let it to a tenant who will do so for him.

5490. *Mr. Calvert*: Your cess is what we call an owner's rate?—I am not quite sure what an owner's rate is.

It is what you call a cess.

5491. *Dr. Hyder*: They have an owner's rate in the Punjab, and we have it also in the United Provinces, because it was found there was a certain amount of unearned increment, but this disappeared when there was a revision of the settlement of land revenue?—That is because with you everyone has a right to a share in the water, but here they have not.

5492. *Mr. Calvert*: It did not disappear; it was merged in the land revenue, and indirect credit given to the Canal Department?—Everybody has put up the same argument that you have. The great difficulty is that we would have to put on a rate of about Rs. 45 an acre in the case of land suitable for sugarcane. If a man did not want or was unable to grow cane, that would be a ruinous charge. If you ask him to pay a water rate like that for water which he does not take, in a few years you would ruin him.

5493. *Dr. Hyder*: What is your rate at present for sugarcane?—Rs. 45.

5494. If you charge a man Rs. 45 he may or may not grow sugarcane; he may or may not take your water. Supposing he found it profitable, he would take your water, pay his Rs. 45, and have done with it. Where is the difficulty in imposing a sufficiently high water rate?—Raising the water rate always tends to discourage irrigation, whereas putting on a cess always tends to encourage it, because the man has to grow irrigated crops to be able to pay us.

The Chairman: One is on the water and the other is on the land.

5495. *Sir Chunilal Mehta*: In other words, since the canals came into existence the price of land has gone up enormously?—Yes.

5496. What was the price of land when these canals were started, and what is it now?—Before the canal came it varied from Rs. 30 to 50, or even lower, an acre; now it is up to Rs. 600, and in some sugarcane tracts as high as Rs. 1,000, an acre.

5497. Entirely due to the canal?—Very largely, at any rate.

5498. That was done at the expense of the general taxpayer, and there is no particular reason why an individual owner should get the benefit of what may be called unearned increment?—Certainly not.

5499. You said that about 10 years ago the Agricultural Department recommended 75 inches instead of the 125 which is now being talked about?—That is what I am told. I do not know the Agricultural Department advocate 125 now; all I know is that members of that department in the irrigated tracts have told the cultivators that the figure I have given them is much too low; and I am told by cultivators that the figure they give them is 120 inches. They take about that now, and they say the agricultural people tell them that is about right. I am informed the Agricultural Department's figure 10 years ago was 72 inches, and I know Professor Knight said 7 feet of water was sufficient, 84 inches.

5500. That is round about what you recommend now?—Yes.

5501. When Professor Knight recommended 7 feet, he was in charge of propaganda, was not he?—He was in charge of the Manjri farm. I do not know whether he was in charge of anything else.

5502. Did he not do agricultural propaganda, just as the Manjri people are expected to do now?—I think so.

5503. Apparently there was no conflict then between the Agricultural and Irrigation Departments?—Not on that point, but that is really a very minor point. It is not on the question of the quantity of water, but how to restrict the water, that the difference arises.

5504. Did he not take that into account also?—No. He also opposed indirect methods for reducing waste.

5505. At that time there was no conflict of propaganda amongst the cultivators, that is my point?—That is so on that one point, but my point is that propaganda in a case like that is of very little use, because if a man can get 5 tons extra cane by employing 125 inches of water he will do it. You have to introduce indirect methods, and that is where the clash comes.

5506. Do you know of the arrangements made in the Punjab, for proper co-ordination between the Agricultural and Co-operative Departments?—Is there the same difficulty there? The trouble between the Agricultural and Irrigation Departments is lack of understanding of each other's problems.

5507. You said that neither an Agricultural nor an Irrigation Officer is able to run a canal unaided?—Not as efficiently as he should, no.

5508. Not as efficiently as if the experience of both were combined?—Quite.

5509. Supposing you had an arrangement under which there was a Board similar to that instituted for the Agricultural and Co-operative Departments, and suppose on that Board the Irrigation Officer sat with, say, the Deputy Director of Agriculture, and all proposals with regard to agriculture in irrigated tracts were submitted through them jointly to the Superintending Engineer and the Director of Agriculture jointly, do you not think that would help?—The way I would put it is this: if one man speaks German and the other French, do you think sending anything through them would help?

5510. The Irrigation Officer speaks French?—He can learn German.

5511. Well, make the Agricultural Officer who speaks German learn French?—He can do something himself, but he cannot make the other man do anything.

5512. That is to say, you would abolish one or other of these departments? Do you think either the Irrigation or the Agricultural Officer is able to take in hand irrigation work as well as agricultural work and propaganda and regulation of canals?—I think that one head, with an agricultural man, an irrigation man and a propaganda man working under him, would make a very much better job of it than all these people working separately at cross purposes.

5513. Then that one head must know all these subjects?—Yes.

5514. The man at the head will require to be an expert both in irrigation and agriculture?—Yes. He must be trained in practical agriculture, not super-agriculture. He need not know agricultural chemistry and that sort of thing, but he must know the practical side of it.

5515. Can you get a man who is an expert in both subjects?—I think I am myself, and I know Mr. Wilsdon is in the Punjab.

5516. You would prefer such an arrangement to the co-ordination of agricultural and irrigation officers?—Frankly, I do not think such co-ordination is possible; their view-points are too wide apart.

5517. *Sir Ganga Ram*: Are you referring to Bombay or the Punjab?—In the Punjab your limiting factor, like your rainfall, is fixed, but here nothing is fixed; everything is in a state of flux. Even in the Punjab they have the research department under the P. W. D.—under Mr. Wilsdon—so even there they find there are some problems which can best be solved by a man who knows both sides of the question.

5518. *Sir Henry Lawrence*: Mr. Wilsdon is not in the Agricultural Department?—He was first of all in the Education Department. He was then made Agricultural Chemist at Lyallpur, but found he was losing Rs. 250 a month, which, though he liked the work very much, he could not afford to do. He is now under the P. W. D. He is a chemist and physicist.

5519. *Sir Chunilal Mehta*: This question of co-ordination has never really been considered?—The essential duty of my division is to co-ordinate the two.

5520. The system you advocate is being worked by your department now?—Yes.

5521. But this other system of getting the officers of the two departments to work together has not been tried?—I think we are trying it all the time.

5522. But not officially?—Yes; we have been brought together many times officially.

5523. And after experience you are convinced it is hopeless; it cannot be done?—For the Deccan, yes.

5524. Suppose you had one officer to handle both these subjects, would he be under the Minister of Agriculture or the Member for Irrigation?—The latter.

5525. Is the Minister of Agriculture to have no say in this matter whatever?—I do not know how that could be arranged; it would probably be very difficult. It should be under the Irrigation Department in any case.

5526. Your solution would probably be that irrigation and agriculture should be under the same Minister, that might be an ideal arrangement?—I think that would be desirable, but one is a Transferred subject and the other is not.

Sir Chunilal Mehta: It will not be a Reserved subject for ever!

5527. *The Raja of Parlukimedi*: Before taking up a big scheme, what arrangements do you enter into with the ryots to ensure your revenue?—None, in that sense. There is no guarantee to the individual ryot. They do not all want water. Those who do want water come and ask for it, but there is no definite guarantee to all the cultivators.

5528. You must have some guarantee of revenue before you push forward a scheme?—Yes. It is assumed that the canals will develop at a certain rate, as experience has shown in the past that they have.

5529. You do not advocate any agreement or arrangement with the ryots?—No.

5530. With regard to distribution of water, if there is an application from the ryots on a joint system, do you welcome it?—No. It must be in the name of the owner of the land.

5531. The distribution is done by officials, is it?—Yes, right down to the field.

5532. Suppose the headman of the village undertakes to carry out distribution and also undertakes to pay the revenue that has to be paid, do you not welcome that?—They have been offered that, but the difficulty is that unless we do the distribution we do not know the requirements. We cannot have the headman of the village coming and saying "We want so much water to-morrow;" we have to make arrangements 10 days' in advance, and we must know exactly what the requirements of each outlet are. We can only do that if we are managing the distribution of the water or working on some definite system like a proportional supply, which is impossible in the Deccan.

5533. Do you levy the water cess according to crop, or what?—It is on an area basis, but the various crops have different rates.

5534. Does it also depend on the type of source from which the water is given? In the Madras Presidency, for instance, there are first and second class sources?—Most canals have one rate, but in some cases where the tank does not fill every year and where the supply is not assured they have a lower rate. Each of the bigger canals has the same rate.

5535. *Sir James MacKenna*: Has any progress been made with lining the canals?—Yes. We have tried bitumen without success and we have tried concrete lining. We have found that all the linings are less watertight than the natural silt deposited. Linings may be all right when first constructed, but then hair cracks appear in the concrete, and these grow bigger. As soon as the concrete begins to get porous the leakage is greater than it would be from the natural canal surface, because there is no silt deposit on the concrete itself.

5536. So it is the cheap, natural process of silting which is most successful?—Yes, except in special cases.

5537. *Professor Ganqulee*: I do not quite understand your idea of the Irrigation Department being 'French' and the Agricultural 'German,' as if the twain can never meet. Irrigation has two aspects, the engineering and the agricultural. I do not see why there should be any conflict. Do Irrigation

Officers study the agricultural aspects of the questions with which they have to deal?—We do as far as we can.

5538. Where?—As best we can from bulletins and books, and from the agricultural officers themselves.

5539. When, as in the case of Poona, there is an excellent Agricultural College available, do you send your officers there or come in contact with the Deputy Director and the research workers who are working there?—We do not take lectures or anything like that, but we know what is going on and we see some of the work.

5540. You know the nature of the work there through the literature that is published?—Yes.

5541. You are not in direct contact with the officers working there?—To a certain extent, yes.

5542. Suppose Dr. Mann is carrying on experiments to find out the water requirements of sugarcane, and you are also concerned with that question (because, after all, it is an irrigation question), do you not think it is to the common interest of both departments to meet in direct contact, and not through literature, where there are facilities? Do you not think that would facilitate co-operation and co-ordination?—You mean, if I saw his work and he saw mine?

5543. Let us say he is carrying on laboratory experiments on a problem which is of common interest, like the water requirements of sugarcane; you are concerned to find out how much water that crop takes under field conditions. Now, it is as much to your interest to find out the water requirements of sugarcane as it is to his to find out how that amount could be properly utilised under field conditions. I do not understand, therefore, why your two departments cannot come together?—As a matter of fact, that is rather a straight-forward, easy case. Even there, however, his idea is to get the best outturn for the individual, while ours is to get the best outturn for the water. We could tell him that and he might agree; probably he does agree that our outlook and aim are different, but there are more difficult problems than that.

5544. I am not concerned with the question of maximum benefit to the maximum number of people; I am considering it as a scientific and agricultural problem. Here is a problem which concerns your department, and which is being investigated in the Agricultural College at Poona. Do your officers visit the place and come in contact with the research being carried on?—Yes, but they do not really know enough to be able to appreciate what is going on.

5545. Such an officer would not be able to grasp the nature of the scientific problem?—That is it.

5546. In considering this question of water-supply, you are chiefly concerned with the better utilisation of the water?—Yes.

5547. And you recommend this as one of the methods of increasing the revenue? You want to spread a certain quantity of water over a large area?—Yes.

5548. In this idea, are you actuated by any motive of increasing the revenue?—It is our duty, in my view, to get the greatest profit for the people of the country. Incidentally, happily for us, that also brings in the biggest revenue to us; but if there is any clash between those two things we have to consider the interests of the people of the country first and revenue second.

5549. Can you give us any idea of the sources of wastage of water? First, you say, there is the cultivator himself, who uses more water than he ought to. Are there any other factors?—There is percolation from channels.

5550. Any others?—Those are the main ones.

5551. Do the farmers object to the compulsory restriction to half an acre, so far as bunding is concerned?—Yes, they object to a certain extent,

firstly because it costs them money to put up the *bunds* we insist on, and secondly because if they use water carelessly it stagnates at the bottom of the field and damages the crop. Thirdly, it interferes with inter-cultivation.

5552. Is it your experience that an increase in the number of waterings means an increase in the yield? Take the rainy season?—The only experiments of that type are what you saw this morning at the effluent farm; where it has been found that provided the soil is kept in a very good state of tilth the quantity of water, the period between waterings and even the amount of manure put on have little effect. You can get a 60 ton crop with 75 inches of water and 150 lbs. of nitrogen and waterings at intervals even up to 15 days. None of those things has much effect on the return provided the state of the soil is good.

5553. I understand 9,000 acres on the Nira Left Bank Canal have been converted into useless alkaline land?—Yes.

5554. In your experience, if an excess of water is used it leads to water-logging?—Yes.

5555. In spite of these evil consequences the cultivators clamour for more water. Why?—Because in any one year a cultivator will get a larger return if he takes more water. He does not see far enough ahead.

5556. You recommend the volumetric basis of distributing water?—Yes.

5557. I think that was also recommended by the Irrigation Commission?—Yes.

5558. It has not been practised yet?—The trouble is we have not had the measuring and distributing devices to enable us to do it.

5559. Have you any efficient measuring device now?—Yes; we have a device which gives a fixed discharge, and provided the time for which it has been flowing is known the quantity is also known.

5560. Is there any possibility of extending irrigation by means of tube wells in this area?—No.

5561. Mr. Sule, on page 234 you say the extension of agricultural education is necessary, particularly in a canal area. That is, of course, a very important point. You particularly mention Loni, are you acquainted with that school?—(Mr. Sule) No. I mentioned Loni because it is the only school in an irrigated area.

5562. Do you know the Loni district?—No.

5563. In your note you refer to the practical results achieved by private agriculturists influencing the cultivator. What is the difference between the two?—None. I only wanted to differentiate between the private agriculturist and Government.

5564. Mr. Calvert: What is the capital cost per acre irrigated?—(Mr. Inglis). The cost varies from Rs. 90 in the case of the Nira Left Bank Canal (which was the cheapest) up to Rs. 250, but in working this out you must remember that sugarcane takes 8 times as much water as the *rabi* crop, so that unless all the figures are brought to *rabi* basis they are not comparable. It depends whether you have much sugarcane or not. If you have no sugarcane the rate would be much lower than the figure I quoted.

5565. That is the total capital cost per acre irrigated?—You cannot apply figures obtained from one canal to another, because the conditions vary.

5566. What is the cost of delivering the water per acre irrigated, including maintenance, staff, depreciation, etc.?—Rs. 3 to Rs. 6 per acre, as against a revenue of Rs. 10 to Rs. 17 per acre irrigated. That is for the period 1922-24; it is a little higher now.

5567. That cost excludes the interest charges?—Yes.

5568. Can you tell us the interest charges per acre irrigated?—I assume you want this information for the newer canals, and I have cut down 6 per cent., which is what you would have to pay now.

5569. I want the actual cost. You have had certain losses; you have not been able to meet your interest charges?—Yes.

5570. Those have been added to the capital cost?—Yes.

5571. So the interest charges per acre irrigated are now very high?—Yes.

5572. I want to know what they are?—I thought you wanted the figure for the new canals.

5573. No. I am not concerned with those?—Mr. Harrison can give you those figures better than I can; he has got them.

5574. What system of protection do you adopt? Are you trying to protect as many families as possible by giving to each family water sufficient to irrigate a portion of its holding only, or are you concentrating on irrigation of the best available land?—The best available land, subject to the demand for water. There is no demand for water when we first open a canal for *rabi* or seasonal crops of any kind, until sugarcane has developed the canal. The *rabi* crops follow sugarcane. You would imagine that in a famine tract the first thing the cultivators would irrigate would be seasonal crops, but the first move is for men from outside to grow sugarcane, and then gradually the ordinary seasonal crops are taken up by the local people.

5575. You do not arrange to irrigate one-fourth or one-third of each man's holding?—We do not do that at all now. Our canals are not profitable, but we try to get the maximum profit possible out of them.

5576. But even in the case of a new canal you only arrange to irrigate a certain proportion of that area, one-third or one-fourth?—Yes.

5577. What have you done in this particular case with your protection works? Do you arrange to irrigate one-third or one-half of the cultivated area?—That depends on the demand. If there is a big demand for water for sugarcane, there is very little water for anything else; if there is no such demand, we spread the water over a much longer length of canal.

5578. There is no definite scheme of protection laid down?—No.

5579. *Dr. Hyder*: These sugarcane people are leaseholders to whom you agree to deliver a certain quantity of water?—Yes.

5580. *Sir Henry Lawrence*: Can you say what will be the maximum area irrigated in a year in the case of the Nira Right Bank Canal?—About one-quarter; that will be the proportion of it. Speaking from memory 130,000 acres is the area to be irrigated, and 500,000 acres are commanded.

5581. *Mr. Kamat*: The older projects give a better return on capital; you instanced a capital expenditure of Rs. 63 lakhs and a return of Rs. 9 lakhs?—Yes.

5582. The later projects are not giving you so good a return as the older ones?—Nothing like so good.

5583. When these new projects are more fully developed, do you expect to reap a better return?—The Godavari Canal is now fully developed, but is not giving us so good a return as the Nira Left Bank Canal. The average return on all the canals would be about 3½ per cent.

5584. Is the land revenue assessment for lands irrigated along the canal more than it is for lands in the dry part of the country, on account of the canal?—There has only been one revision since the canal was constructed, so that it could only have been put up one-third as a maximum. There has been a small increase of only a few annas per acre.

5585. The Revenue Department are getting something extra owing to the fact that the land is irrigated?—Yes.

5586. Possibly at the next revision there may be a further increase?—Yes, but it goes to the Revenue Department and does not help us, and the amount would in any case be almost negligible towards increasing canal revenues.

5587. Were not these canals intended as an insurance against famine rather than as a commercial proposition?—The Nira Left Bank Canal and the Mutha Canal were.

5588. Is it not correct to say the objective was to provide a protection against famine and not to construct a purely profit-making concern?—I think you are wrong in saying “a purely profit-making concern.” The trouble is that if we did not give the water to sugarcane, most of it would go to waste. It is only in famine years that other people want water. Unless we guaranteed the water to the sugarcane cultivator he would not grow the cane. The best protection against famine is really to grow sugarcane, because it means more money and more work, and in a famine year people can come to the district where they are crushing the cane and earn wages to keep them going.

5589. I see your maxim is “The greatest good of the greatest number.” As a general rule, is it not unsafe to administer a department by hard and fast maxims? If there is a fallacy in the maxim, the whole administration goes wrong?—After all, one has to work on some principle, and the interest of the cultivators is surely the highest one can work on.

5590. You yourself admitted just now that for 6 of the 12 years of your administration you were rather seeking light, yet you were all the time working according to this maxim?—No; that maxim was somewhat recent. Cultivators asked me what my principle was, and I had to think it out to tell them.

5591. Are you quite sure even now there is no fallacy underlying this maxim?—I should like to hear it.

5592. When you say “The greatest good of the greatest number,” is it the greatest number of people or the greatest number of acres?—It is the greatest profit to the mass of the cultivators.

5593. In the case of a man who wants to grow sugarcane, say, five acres of it, is it a good policy to give him an insufficient amount of water which may result in his having a poor outturn, or to give him a very good quantity for 4 acres only, so that he may get a good return?—We found the average outturn of the effluent farm last year was 44 tons with 75 inches of water. Cultivators themselves will tell you they get 30 tons with 140 inches of water. One of the worst curses of the cultivator is too much water.

5594. True, but what minimum per acre is required for a good outturn of sugarcane? Has that to be determined by your department or the Agricultural Department?—By our department.

5595. That is where the conflict comes in; you say it is your department which should determine these things, but the Agricultural Department says it knows best?—I think the Agricultural Department would be in general agreement with what I say about the quantity of water.

5596. If in some cases they do not, what happens to the cultivator?—Whatever we state will be based on definite experiments.

5597. I will give you a concrete case, of which probably you are aware. In the case of these *bunds*, did you not promulgate an order that cultivators were to divide their fields into half acre plots, and round these plots certain *bunds* of earth of a certain size were to be provided?—Yes.

5598. Then there was some agitation against the size of these *bunds*, in which the Agricultural Department took part?—Yes, against us.

5599. Ultimately you reduced the size of the *bunds*; and promulgated a reduced size?—The original size was arranged before I came to the Deccan. It was reduced afterwards.

5600. That means there was some mistake in the first order promulgated by the Irrigation Department?—At that time they had not the agricultural experience which I say is essential.

5601. Is it not possible by some method to have co-operation between your department and the Agricultural Department on such questions?—It is

not so much a question of co-operation as of understanding each other; we talk different languages.

5602. It is not a question of talking different languages; you are talking the same language. It is a question of research in which both of you are interested. For instance, on Manjri farm Mr. Knight was conducting a research as to how much water was necessary, whether *bunds* were necessary and what size they ought to be. Could you not have deputed a man from your department to watch it, and to co-operate with Manjri farm, and until some conclusions had been arrived at by the two of them you could have withheld the promulgation of any order? Was not that possible?—The conditions after the *bunds* were put in were enormously better than they were before, even if they were not what is now believed to be the best. The damage to the canal tract was reduced enormously by the *bunds*. Members of the Agricultural Department themselves testified to the improvement due to the *bunds*, and to the fact that the advantages following their introduction were very much greater than the disadvantages. That has been admitted now generally even by the cultivators.

5603. I accept the general conclusion, but you have not caught my point. While your department was trying to find out the exact sizes and amounts necessary to prevent waste of water, whether it should be 2 feet by 2 or 2 feet by 1, before you promulgated as your definite conclusions that the size should be so much, I ask, could you not by common consent with Dr. Mann's department have made certain experiments at the Manjri farm first of 2 feet by 2 size and then 2 feet by 1 size?—During the 5 years that that would have taken were we to let the conditions go from bad to worse?

5604. You accused the Agricultural Department of making a splash, but you were, it seems, making a "splash" because you wanted to be ahead by 5 years?—There is no "splash" about that at all; that is not what I mean by a "splash."

5605. At any rate, you had to modify your conclusions about the sizes of these *bunds*?—Have you never changed your opinion on any point in your life?

5606. I mean in this case it was avoidable?—It was avoidable, but the *bunds*, even in their first stage, were infinitely better than having no *bunds*.

5607. I accept the general conclusion, but the question was on the matter of sizes; I think the Agricultural Department was concerned and any premature conclusion could have been avoided by you. I am trying to prove that co-operation between your department and the Agricultural Department is possible on matters of research. They were trying to find out whether the minimum water required was 75 inches. Did your department co-operate with the Agricultural Department in going to Manjri before you laid it down that 75 inches was the quantity necessary and not 125 inches?—There has been no rule laid down at all.

5608. Was that a conclusion reached by definite experiment?—I am afraid I do not follow the trend of the argument.

5609. The point is that you say you are talking two different languages; I say both are talking the same language but a little co-operation is necessary?—Our department stated that these *bunds* should be constructed in order to prevent waste of water; there is no question that they did prevent waste of water. That is not in question; there is definite proof on that point. The Agricultural Department went round telling the cultivators that they should oppose these *bunds*; there is definite proof of that; they went round the irrigated tracts telling the cultivators to resist these *bunds*.

5610. *Professor Ganqulee*: Did they not consult you before they went to the cultivators?—They said perfectly openly in front of us at conferences that they were opposed to these *bunds*. When they opposed these rules they opposed them generally on wrong reasoning, and since then even the cultivators have come round to admit that they have done a lot of good. One of our main reasons was that if the cultivator puts on too much water, the *bund* prevents the water running to waste on another man's field and damaging another

man's field, but damages the field of the man who has put on too much water. I say the man should not put on too much water, and if there is any damage, surely the man who does wrong should be the man to be punished and not the unfortunate man down below. There again is the same mistake of supporting the individual cultivator against the mass of cultivators.

5611. *Sir Henry Laurence*: In what year did this discussion take place?—It has been going on since 1913.

5612. *Mr. Kamat*: You say that the bigger landholders leave it to their servants to handle the water when it comes at night?—No, I do not say merely at night time, at any time.

5613. Sometimes you do allow the water discharge to go through the fields at night, and the water has to be handled even at night time?—What do you suggest we should do? The water is there, we cannot stop it.

5614. Can any landholder handle the water without the help of the servants? I mean it is inevitable?—My personal opinion is that there should be men trained for distributing irrigation water at a common outlet; they should have a professional man to do it. One of our rules is the dividing up of the area into half-acre plots which has made the distribution of water easier, because they know now how long it will take. It is very much easier than it was; that is one of the benefits of the *bund* rules.

5615. If all you mean is that there should be trained men to handle the water, have any steps been taken in consultation with the Agricultural Department to do it?—We have been trying to get the cultivators themselves to take it up.

5616. *Dewan Bahadur Malji*: Have you a genuine desire to see this difficulty solved?—Very much so. I have refused other appointments which would have been very much in my interests.

5617. And you do not wish a headlock to be reached?—No. We are getting round it by the special irrigation division.

5618. *Sir Ganga Ram*: Do you give all flow irrigation?—All flow.

5619. But is there no lift irrigation?—Yes, but we can utilise all the water we have got by flow; there are a few acres but it is not worth a man's while to lift water. The cultivator here does not like lift irrigation. He gets lazy when he has flow irrigation, he finds it is so easy.

5620. Our people in the Punjab like lift irrigation better. Are there falls on your canals?—Yes.

5621. What use do you make of those falls?—The trouble about using falls in the Deccan is that the supply is not continuous; it may run for 5 days and then may be closed for 5. Where the flow is continuous on a canal, there are no falls.

5622. You make no use of such falls as there are?—The crushing of the sugarcane at the effluent farm is done by water power, but it has never been taken up. We have got that in mind the whole time but the people do not want it.

5623. Why are you so much more ready to give water for sugarcane than to give water for food crops?—Because it means you can concentrate your irrigation and avoid the great loss by percolation in your channels.

Is not food of first importance in a country where you are subject to famines?

5624. *The Chairman*: If you were the dictator in this matter, how much water per acre would you give the cultivator of sugar?—My impression is that instead of 75 inches we should probably have to give them getting on for 100 inches.

5625. How much are they getting now?—140 inches.

5626. Do you suppose a reduction from 140 inches to 100 inches would reduce the acreage under sugarcane?—No, it would increase the acreage.

5627. You do not think the reduction in the water per acre would dissuade a portion of cultivators from planting sugarcane?—It will have to be brought

in very gradually. My idea would be gradually to increase the duty from year to year or every second year; but we would tell them, "That amount of water by your old methods will irrigate so much; if you can irrigate 10 or 20 per cent. more you may do so." They would do so, because it would bring in a greater profit.

5628. Even in the ideal conditions of a dictatorship, and yourself as that dictator, you do not contemplate the possibility of reducing the water from 140 inches to 100 inches in the first season?—No.

5629. It could not be done?—No.

5630. So that there is present in your mind the fact that the cultivators at any rate in the earlier stages of your experiment, if you insisted upon an immediate reduction, would turn to crops other than sugarcane?—They might give up altogether if it were brought in too quickly.

(The witnesses withdrew.)

The Commission then adjourned till 10 a.m. on Thursday, the 28th October, 1926.

APPENDIX.

**Note on The Sale of Water by Measurement for Irrigation by
Mr. C. C. INGLIS, Executive Engineer, Special Irrigation
Division, Poona.**

The wide divergence of opinion which exists as to the feasibility and suitability of sale of water by measurement is due to a misconception of terms combined with confusion of thought.

2. The reasoning on which the argument for "sale of water by measurement" is based is usually somewhat as follows:—

- (i) "It is desirable that the cultivator should get water when he requires it and in such quantity as will give him the best return."
- (ii) "A man will take less water when he is paying for it than if his supply were not metered."

"It is obvious therefore that sale of water by measurement is eminently desirable."

3. Although the above line of argument seems at first sight to be conclusive, yet it is brimful of fallacies.

In the first place even if it were desirable that each individual cultivator should get water when he wanted it and in the quantity he desired, yet if this practice were followed the interests of the mass of the cultivators would be jeopardised; because variations from normal flow conditions would spoil the régime of the channels and so reduce the general efficiency; furthermore at periods of high demand all would want extra water, and if some men got extra water the others would suffer to a much greater extent than the pampered individuals would gain. In other words the more the interests of the individual cultivator are taken into account the more the mass of the cultivators suffer. This is the basic point of irrigation practice—namely that "the interests of the individual must give way before the interests of the mass of the cultivator."

4. Again, even if it were desirable to favour the individual against the mass, it would still be impossible to give water to individuals when they wanted it and in the quantities they desired—because an irrigation system is not like a town water-supply, with the water in pipes under pressure so that when water is wanted a tap can be turned. Under such conditions sale by measurement would undoubtedly be more economical than charging so much per house or a percentage on the rates; *but even in a town water-supply, should a water famine occur (i.e., when the "supply" is the "limiting factor" as in the case of irrigation) further economy is obtained by cutting down the supply, allowing water to flow for only a few hours each day.* Hence, even in towns the highest economy is obtained by a system which restricts the supply far below the people desire, and distribution is then done on a system which is analogous to distribution of water by semi-modules. This is much more economical than mere metering.

5. Nothing is more certain than that if a man who had hitherto been given a supply restricted by a semi-module were told he could take the quantity he desired by paying for it by measurement he would increase his supply per acre considerably. The reason for this is obvious. Take the case of sugarcane for example. By increasing the depth of water from 80" to 120" a cultivator could increase his crop by 2 tons per acre, which would bring in Rs. 50 additional return per acre. For this extra water he would pay Rs. 22-8, or he would increase his individual profit by Rs. 27-8. Is there any doubt he would take the extra water? Obviously there is none.

6. But what about the mass of the cultivators? Between them they would get 40 acre-inches less water than before—or sufficient to grow half an acre and produce an additional $\frac{1}{4} \times 34$ tons; or say Rs. 100 profit. There

would then be a net loss to the cultivators of Rs. 100 *minus* Rs. 27.8 or a loss of Rs. 72.8.

7. I may add that in this particular case the extra outturn of 2 tons would be purely temporary; because the extra water would damage the physical state of the soil; so that within a few years the man taking 120" would get a smaller outturn than those getting 80", and there would then be the double loss to the individual and to the mass of the cultivators. *Ignoring the damage due to extra water, however, we see that so long as water is the limiting factor "sale of water by measurement" (in its generally accepted meaning, and the meaning in which I have found it is used by the cultivators and members of the Agricultural Department in the Daccan) will lead to more water being taken per acre and consequently a reduction of area irrigated with a very big loss of potential profit to the mass of the cultivators.*

8. But there is another method of selling water which has come to be known as "sale of water at volumetric rates." Under this system water is distributed in exactly the same way as when rates are assessed on an area basis; the only difference is that *rates are assessed on water supplied and not on areas irrigated.*

9. The advantages claimed by the advocates of the system are that—

(i) The Revenue establishment who measure the areas, would be unnecessary; and so the cultivators would be relieved of interference and trouble caused by them.

(ii) The cultivators would be free to distribute the water as they wished.

10. Those who oppose this system point out that—

(i) The Revenue establishment would merely be replaced by Gauge Readers.

(ii) These Gauge Readers would be in a much better position to extort money; because

(a) they could falsify their records of discharges much more easily than areas could be falsified; and

(b) they could increase or decrease supplies without there being anything to show that this had been done, whereas areas irrigated can be checked at any time during the season in which the crops are irrigated.

(iii) There are no recording meters, except such as are prohibitive in price, which overcome the necessity for the human element, nor is there any cheap meter which cannot be tampered with.

(iv) Volumetric rates do not allow for differences of soil nor for losses in transit to fields; consequently the man with good land near the head of an outlet could irrigate a much larger area than the man with sandy land at the tail, yet both would have to pay the same for the water. Not merely would this be unfair to the cultivator at the tail; but it would also mean that the volumetric water rates would be kept down to the amount that the man at the tail could pay; whereas on an area basis the charges can be based on averages not on the worst case. It may also be pointed out that the main principle of irrigation assessment is that Government should take a fair share of the profits due to the water supplied. This is what occurs when charges are by areas; but would not hold if charges were based on water at outlet head.

(v) If there were no records of areas, information about low duties of individual fields or portions of outlets would not be known; there would therefore be no data available which would lead to remodelling, nor any effort to improve conditions. It is by going among the irrigators that we learn the clash between agricultural requirements and irrigation limitations, and without this knowledge there is not much hope of progress.

- (vi) Water would be taken across drainage channels. This would not generally do much damage locally; but cause damage to adjoining areas, whose interests we must protect.
- (vii) A man to save himself trouble would take water from an unsuitable part of his field instead of maintaining an additional channel. This would lead to more water being used and hence less profit. It may be argued that a man will not deliberately sacrifice profit; but we who have had to run canals know from long experience that when the choice lies between additional effort or a small, not very obvious loss, the line of least resistance will be followed.
- (viii) Inspection of the outlet might not stop tampering; but this would be indicated by an excess area being irrigated. Hence the area irrigated would lead to the detection of tampering and false gauge readings.
- (ix) If excess water were taken—either by tampering or by making a cut—there would then be no record of the excess water used and this could only be estimated by knowing the excess area irrigated.
- (x) Though it would be advantageous for advanced cultivators with very large areas to be able to distribute water as they wished; this would be a double-edged tool and it is obvious that it would be exceedingly disadvantageous, not to say disastrous, for the small cultivators, who would only get what was left over by their more powerful neighbours.

11. There is no reason why—even with area assessment—distribution should not be done by the people themselves; indeed this may be said to be the present method in Sind; but experience shows that Irrigation Officers are called in from time to time by the cultivators to settle disputes and draw up revised share lists, and that if this were not so, conditions would become intolerable for the small cultivators.

The fact is that in India "public spirit" has not yet reached the stage at which the rights of the small men are respected.

12. To sum up:—We find that assessment at volumetric rates instead of by areas irrigated, though advantageous to the big cultivators, is quite unsuited to the interests of the smaller men.

We find also that there is no meter obtainable at a reasonable cost which will eliminate the human element, nor give measurements of equal accuracy to area measurements; nor is there any meter which cannot be tampered with, so that with quantity measurements the temptation to dishonesty would be enormously greater than with area measurements. In addition to this, charges would not be in proportion to the profits of the cultivators, which has hitherto been considered the fair basis for assessment. Consequently the rate would vary with the position and soil of a man's holding.

Finally, the staff would lose touch with the conditions of the cultivators, and their difficulties; and irregular practices—due to laziness or dishonesty—would arise which would reduce the general efficiency and cause damage in adjoining areas.

The arguments against sale of water at volumetric rates—except possibly where there are enlightened cultivators with very large holdings—are unanswerable, and even in these cases it should be borne in mind that if a Gauge Reader were dishonest the other cultivators and Government would suffer to a much greater extent than under the present system of assessment on areas irrigated.

We require meters, modules and semi-modules to enable us to distribute water as efficiently and as fairly as possible; but under present conditions and for many years to come assessment by area will in the majority of cases be preferable to the volumetric system of assessment.

Thursday, October 28th, 1926.

POONA.

PRESENT:

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

Sir HENRY STAVELEY LAWRENCE,
K.C.S.I., I.C.S.

Sir THOMAS MIDDLETON, K.B.E.,
O.B.

Rai Bahadur Sir GANGA RAM, Kt.,
C.I.E., M.V.O.

Sir JAMES MACKENNA, Kt., C.I.E.,
I.C.S.

Mr. H. CALVERT, C.I.E., I.C.S.

Raja Sri KRISHNA CHANDRA GAJAPATI
NARAYANA DEO of Parlakimedi.

Professor N. GANGULEE.

Dr. L. K. HYDER.

Mr. B. S. KAMAT.

The Hon'ble Sir CHUNILAL V. MEHTA. } (*Co-opted Members.*)
Dewan Bahadur A. U. MALJI.

Mr. J. A. MADAN, I.C.S. } (*Joint Secretaries.*)
Mr. F. W. H. SMITH.

Dr. HAROLD H. MANN.

Further oral Evidence.

5631. *The Chairman:* In answer to a question by Sir Chunilal Mehta, you mentioned the existence of a Provincial Board of Agriculture in this Presidency, and I have asked you to be good enough to come back in the chair for a few moments to tell the Commission a little more about this Provincial Board of Agriculture, and particularly as to whether you think it is an active, useful body?—The Provincial Board of Agriculture was formed in 1919, on the suggestion of the Imperial Board of Agriculture, as a consultative body for the Government of Bombay in connection with agricultural matters. It was decided at that time that it should consist of about 40 members, comprising the heads and representatives of all the departments which were associated with agriculture, including co-operation, veterinary, irrigation, public health, and so on, together with about 25 officials of various sorts and about 15 non-official representatives of the agricultural interests in various districts. This was to be an *ad hoc* body, formed each year and was to meet once a year, generally for 3 days, to discuss an agenda framed by Government. In other words, it was a body which was asked to give advice to Government once a year on specific questions on which Government was desirous of getting advice. Since that time, it has met sometimes once a year and sometimes once in two years, the actual membership being determined anew for each Board. The last one was held in 1925.

5632. In your view, is a body of that nature, which meets only once a year, capable of bringing about co-ordination between the various departments which touch agricultural interests?—So far, as a co-ordinating body it has not been of very much value. It has been useful, however, in the sense that you have to gather on specific questions various types of opinion, and the combined opinion has been valuable to Government; but as a co-ordinating body between the different departments, I do not think it has done very much.

5633. During the course of your evidence, you adumbrated the possibility of some central advisory and consultative body for research purposes being formed?—Yes.

5634. If some such body were formed, would it not be important that a like body should exist in each Province?—I think it would be extremely valuable for such a body to exist. I have not thought really about what form such a body should take, but I think its existence would be extremely valuable.

5635. There is no other body in existence which would be capable of taking the widest possible view of agricultural progress and rural improvement generally, is there?—None. There is no other body which would do it at all, and I think a development of this Board of Agriculture might serve the purpose that you have in view. You may have a body like this meeting once a year, with a permanent committee just as in the case of the Indian Central Cotton Committee, which meets twice a year, and has a permanent sitting executive committee, which deals with matters between meetings, and has powers to deal with a very large proportion of the questions that arise.

5636. That Committee might keep in view the general interests, economic, social and hygienic, of the rural population?—I certainly think so. That would be an extremely valuable addition to our forces; and I think we might retain something in the nature of the present Provincial Board of Agriculture as a body which meets at intervals, say once a year, to which such a committee would report.

5637. Do you think such a body might even achieve a common mind between the Agricultural Department and the Irrigation Department?—Yes. I think there is no reason to suppose that it would not, provided of course the departments were ready to accept what such a body decided upon, subject of course to revision by Government.

5638. It is greatly to be hoped that they would?—Of course, in that matter there is a good deal of difficulty in bringing such a position about, because, as I said in my evidence before, one department is at the bottom a commercial department and the other is not.

5639. *Professor Gangulee*: Could you amplify this idea of a Provincial Board that you have suggested, and give us your views in writing?—I should be much pleased to do so if the Commission desired it.*

5640. *M^r. Calvert*: Is there also a committee on agriculture of the Legislative Council?—No.

5641. *Sir Thomas Middleton*: Following on the last answer which you gave to the Chairman about the difference of opinion between the Agricultural and Irrigation Departments, I listened carefully to the views put forward yesterday by Mr. Inglis, and I know your own views. I quite recognise how the difference of opinion comes in, but I heard Mr. Inglis say at the end of his evidence that he recognised that it was impossible, as a matter of practical canal management, to get such a small quantity as 75 inches of water adopted for sugarcane immediately. He indicated that the minimum he would be able to reach was something like 100 inches. Now, your own optimum is 125 inches, and you do recognise that there is something to be said for keeping the water-supply as low as possible, in the interest of the soil, apart altogether from those of neighbouring cultivators. Do you not think that, with a view to concentrating propaganda of both the Irrigation and Agricultural Departments on the work, you might both agree to recommend 100 inches of water for sugarcane?—I am absolutely ready to go this far. I am ready to recommend to the people not to water excessively, and to lay before them the facts, that by watering with 100 inches they can, with care, get the same results as they get with 125 inches. The trouble comes in, however, when the department comes and says, "You shall not have more than 100 inches." If it is a matter of propaganda, I think we can work together, but when a department says "You shall not, and the Agricultural Department supports us and says you shall not," all our propaganda in other directions becomes impossible. If it

* See Appendix B, page 271.

is a matter of propaganda by both departments, then I am entirely with the Irrigation Officer, but if behind that there is the sense that "We will compel you, and that on the advice of the Agricultural Department, to take not more than 100 inches," then you are ruining all my work.

5642. *Sir Chunilal Mehta*: The Provincial Board of Agriculture met in 1922, and we had then a good many cultivators from the irrigation tracts who came in and took part in the vernacular in the discussions of the Board. Is that not so?—That was hardly a meeting of the Board. It was a separate conference which followed it, and then we had a large number of cultivators who came in and took part in the vernacular in the discussion.

5643. There was a meeting of the Board in 1921 and also in 1922. Did you then notice that, as a result of the discussions, which were very general in character, in these Board meetings, it was thought that it was necessary, if we were to do any practical work, to have smaller bodies underneath that Board, or, let us say, that the general work of the Board should be done by these Divisional Boards of Agriculture?—That was the scheme which we worked out there, that the general detailed work which such a Board might do would better be done division by division by a special board created for each division.

5644. Yes, and which was more or less worked on the same principle, with four non-officials and two officials on the Divisional Board?—Yes.

5645. And those really have worked very satisfactorily?—On the whole, they have worked very satisfactorily. I am disappointed in some respects with them, but they have worked, I think, enthusiastically. My only criticism is that they have not taken to the detailed supervision of the propaganda work district by district and area by area in the way I hoped. Apart from that, they have done well.

5646. Can you conceive the General Board of Agriculture taking on detailed work such as the co-ordination of the Irrigation and the Agricultural Departments?—Not as a Board, no.

5647. It would be extremely difficult for them to do that as a Board?—I think so, but the idea of having a standing committee of such a Board might be useful in that direction.

5648. The point I want to be understood is that merely by the creation of a general Board we are not going to advance towards practical results?—No, I do not think so.

5649. You get advice from them which Government would be glad to have, but for getting practical value you must have these smaller boards?—We must have a smaller body.

5650. Acquainted with the local conditions?—I agree.

5651. *Sir Ganga Ram*: I was much surprised to hear the evidence of Mr. Inglis. What business have you to interfere in the work of the Irrigation Department? In the Punjab, the Agricultural Department's work is to advise the people what crops to grow and what seeds to sow. In the Punjab the Irrigation Department has nothing to do with the Agricultural Department, and vice versa. I do not know why in Bombay this non-co-operation between the two departments should exist?—I do not think there is any non-co-operation and I do not think that we interfere in the least with the work of the Irrigation Department.

5652. You are responsible to the people for the production of the soil; you are not responsible to the people for getting them enough water?—I am responsible for giving them information as to the best methods of cultivating their land, the best amount of water to use and the best methods to adopt generally.

5653. And the most economical way of using the water?—Yes.

5654. Do you endorse the view of Mr. Inglis that the people have no right to water?—In the Deccan, here, nobody has any right to water.

5655. What is the water for if the people have no right to it?—Let us be quite clear. No individual has a right to water, but the people as a whole

have. There is not enough water for everybody. There is only, in fact, enough water for about a quarter of the people. That is to say I, who have a piece of land here, have no special right to water as against my neighbour, and according to the conditions at any time the Irrigation Department or the Government can give it to me or to my neighbour as they please.

5656. It is not your department's duty to determine who shall have it?—No.

5657. It is neither your duty nor that of the Irrigation Department?—It certainly is not mine.

5658. I do not understand how you come to advise them to use 140 inches of water for sugarcane, which means that they could grow, with the same water, a food crop ten times as great. On what agricultural ground do you allow them to ask for 140 inches of water?—I could grow with 140 inches of water ten times the area of wheat. I have nothing to do with determining whether it be wheat or sugarcane that is grown on the canal.

5659. You leave that to the people?—That is between Government, the Irrigation Department, and the people. What I do is to say, "If you are growing sugarcane, this is the best method to grow it, and if you are growing wheat this is the best method to grow it."

5660. Does Government dictate to the people what to grow? Who dictates to the people? In our part of the country, we are accustomed to the Irrigation Department saying "You have got so much gross area; you are entitled to so much water," and the Agricultural Department advises as to the best way of making use of that water. I do not see that there is any ground for non-co-operation between them?—I am sorry the word non-co-operation has been used, because there is no such thing.

5661. We understood distinctly from Mr. Inglis that there was?—All we do is to indicate the best methods of growing the crops, when the nature of the crop is determined. We do not say so much water should be given for wheat, and so much for sugarcane at all. That is not our business.

5662. *Dr. Hyder*: Do the irrigation people press the people to grow any particular crop?—The Irrigation Department invites, at the beginning of the year, applications for water for sugarcane, for other perennial crops, for *rabi* crops, for eight-months' crops, and for *kharif* crops, and having got the figures they determine how they shall utilise the water. We do not have anything to do with it.

5663. *Mr. Kamat*: Do you think the Provincial Board of Agriculture meets often enough to be of sufficient use?—In recent years, it has met once in two years. I should prefer it to meet once a year and have, as I said before, a standing committee.

5664. The two improvements necessary are that it should meet oftener, and should have a standing committee?—Yes.

5665. About this irrigation controversy, we were told that the motto is the greatest good of the greatest number. I want to know whether it should be for the greatest number of people or the greatest number of acres under sugarcane which the supply of water may justify?—Of course, to me the purpose should be the utilisation of that water in order to produce the largest value of material, whether it is to be produced on a limited number or a very large number of acres.

5666. As a matter of policy, from the business side to the agriculturist, is it better to allow him water for 5 acres and starve those 5 acres or to give him water only for 4 acres, but give it in sufficient quantities to ensure a good outturn?—I do not believe in restricting water so that you cannot produce a first class crop.

5667. *Mr. Calvert*: With good cultivation?—Naturally. I do not believe in restricting the water so that you cannot produce a first class crop. But naturally if you can get a first class crop with less water, I am absolutely in favour of doing so.

5668. *Mr. Kamat*: Is it possible for the Manjri farm to make experiments in co-operation with the Irrigation Department, and come to definite results?—Perfectly.

5669. About the co-operative movement, we were told by Mr. Collins that he had reached about 12 per cent. of the total number of agriculturists so far as finance was concerned. As a whole, what is your general impression? Are these societies well managed in the majority of cases, or are some of them, a large number of them, only one-man societies?—I think it is generally recognised that a very large proportion of the societies are one-man societies; that is to say, the co-operative element is comparatively small. Most of the members belong to them for the sake of getting loans. Of course, there are a few exceptional ones like Hadapsar, which we saw this week, and I could name others. But a very large proportion of them are societies run by one or two enthusiasts.

5670. So far as useful work is concerned, mere statistics that we have reached 12 per cent. of the population are not a good index?—Not a complete index.

5671. *Professor Gangulee*: I have a suspicion that this desire for excessive waterings on the part of the cultivator may be due in part to his desire to make up the deficiency caused by bad cultivation?—I think that is to a very considerable extent true. I think that water, and I may say in the Deccan, manure are both used in excess in order to make up what might be made up by good cultivation.

(The witness withdrew.)

APPENDIX A.

Trees which do not seriously damage crops near which they are grown.

1. *Prosopis spicigera* (*Shami* in Marathi, *Kundi* in Sind) is well-known as injuring crops very little.

2. *Albizzia stipulata* is grown among tea and coffee regularly, with benefit to the crop.

3. *Dalbergia latifolia* is likewise grown among tea and coffee with benefit.

4. *Erythrina indica* is used all over the Deccan as the support for grape vines, with considerable benefit to the vines.

Nos. 2, 3 and 4 are usually used where there is plenty of water in the soil.

5. *Thespesia populuea* (*Bhend*, the cartpole tree or the Indian tulip tree) is grown largely near rice fields in the Konkan, without injury. It grows on well-drained soil, and in a damp atmosphere.

6. *Pongamia glabra* (*Karanj*) has the same reputation as the last, but I have myself not tested it.

7. *Polyaltha longifolia* (*Ashok*) is an erect tree with more or less short branches. It is planted near other crops in Gujarat, without very great injury.

8. *Mimusops hexandra* (*Khirni* or *Rayan*) is a large spreading tree, and grows well in the Konkan and Deccan. Mr. Paranjpye states:—"In Ahmednagar district, I have seen a good banana plantation, growing near a large tree."

9. *Eucalyptus* seems to allow *jovar* fodder crops to grow satisfactorily quite close to it.

APPENDIX B.

Provincial Board of Agriculture, Bombay Presidency.

The formation of the Provincial Board of Agriculture in Bombay had its origin in a suggestion from the Government of India (dated September 18, 1918) based on discussion in the meeting of the Board of Agriculture for India, that such Board should be formed in all the major Provinces. The suggestion was approved and it was decided that a Board should be constituted as follows (Government Order, Revenue Department, No. 9565 of 15th September 1919):—

1. A member of His Excellency the Governor's Executive Council (Chairman).
2. The Director of Agriculture (Secretary).
3. The Registrar of Co-operative Societies.
4. The Director of Industries.
5. The Superintendent, Civil Veterinary Department.
6. The Superintending Engineer, Deccan Irrigation Division.
7. Twelve officers of the Agriculture, Co-operative, Veterinary and Irrigation Departments selected by the officers under Nos. 2—6 above, and approved by Government.
8. Two other officers selected by Government from any department.
9. Ten non-official members from various parts of the Presidency proper, selected by the Director of Agriculture and approved by Government.

The total number of members was, hence, thirty. The members under 7, 8 and 9 were to be selected *ad hoc* for each meeting, according to the agenda proposed.

A separate Board was to be formed for Sind, but this has never come into existence.

Under this scheme meetings of the Board were held in 1920, 1921, 1923 and 1925.

The resolutions of each meeting were placed before Government, and decisions taken on the recommendations of the Board.

Now there is no doubt that these meetings of representatives of most of the departments concerned with rural development, with a number of leading non-official gentlemen interested, directly or indirectly, in rural affairs, have been of considerable value, and have, to a certain extent, guided policy in the various departments concerned. On the other hand, the co-ordination of work thus induced has not been, in my opinion, so effective as it might have been if there had been a small standing committee which, under the Presidency of the Minister for Agriculture held together the threads of the work in the interval.

Hence I would suggest to the Commission, that to enable the Provincial Board to be of the full value of which it is capable, it would be wise to provide as follows:—

1. Between the meetings of the Board of Agriculture, there should be a standing committee consisting of the Minister for Agriculture, the Director of Agriculture (Secretary), the Registrar of Co-operative Societies, the Director of Industries, the Superintendent, Civil Veterinary Department and two other officers selected by Government,—and five non-officials elected by the Board itself to act on the standing committee until the next meeting of the Board.
2. The standing committee should meet at least once every six months under the chairmanship of the Minister for Agriculture.
3. This standing committee should be the ordinary body consulted by Government on all questions of public importance concerned with rural development and especially on the co-ordination of the work of the various departments concerned in such rural development.

Such a standing committee would form a link between the different meetings of the Board itself, even if the personnel of the Board changed considerably at successive meetings, and the standing committee would report to the Board on its opinion stated and advice given on all matters referred to it and on which it was consulted between the meetings of the Board.

**Mr. R. T. HARRISON, Secretary and Chief Engineer for Irrigation,
P. W. D., Bombay Presidency.**

Oral Evidence.

5672. *The Chairman:* Mr. Harrison, you are Secretary to Government in the Public Works Department, and Chief Engineer?—Yes, for Irrigation.

5673. I understand you desire to make a statement of a general character before the Commission proceeds to question and answer?—May I be given a few minutes? I am having it typed, to be more concise. I can answer any general questions in the meantime.

5674. Do you favour the plan of a central research station for irrigation in India?—I do.

5675. Would you care to develop that idea?—I think it should be the natural outcome of the formation of this Irrigation Board.

5676. You also favour the creation of an Irrigation Board?—Yes.

5677. What will be the function of that Irrigation Board?—It will be purely a body of Engineers, a panel chosen from the Chief Engineers for Irrigation of all Provinces. The Board will never sit as a whole, but from it will be chosen a sub-committee, generally of two Chief Engineers, with the Consulting Engineer to the Government of India as chairman, and projects will be submitted to them. The Engineers will be chosen with regard to the projects which they have technically to advise on. That is to say, if we put up an irrigation problem, we would have, say, the Chief Engineers of the Punjab and United Provinces to advise on it. It would be no use bringing in the Chief Engineer of Bengal, Burma, or possibly Madras. They would only deal with the subjects which they know most about, and be chosen in relation to that fact.

5678. The prime function of this Board, I take it, will be to advise the Government of India in irrigation matters touching the interests of more than one Province?—Yes.

5679. Would it also be at the disposal of Provincial Governments for advice in the matter of schemes which were within the limit of provincial sanction?—Of course, that would depend on the Provincial Government desiring that information.

5680. If they so desire it?—Yes. That is the idea, and I hope it will fructify.

5681. Do you definitely prefer the proposal of a Board constituted in the manner you have suggested, to a single officer appointed in the capacity of Irrigation Adviser to the Government of India?—Yes. It will strengthen the Provincial Government a very great deal, politically principally. It will strengthen the Government of India in the same way, and it will finally strengthen the hands of the Secretary of State.

5682. Is it your view that, on the whole, it would be an advantage to India and the cultivator if the Government of India were in a position to take a more active part in large schemes and more active direction in cases where two or more Provinces are concerned with one particular scheme?—Answering for myself, I think it would. I do not think that this squabble (if I may so describe it) between ourselves and the Punjab could have arisen under the old régime. But I hold that it is not fair to put all the blame on it. I think the Government of India should have adjusted themselves to the new conditions, and in this particular question between ourselves and the Punjab, I would suggest the formation of some such Board as exists on the Nile; an Indus Board. That river was not given by the Divinity to the Punjab or to ourselves. It was given to the whole country, and it is impossible to deal with it in parts. I have not worked out the scheme altogether but I have some idea as to what I would like.

5683. You do not think the Central Advisory Board could deal with cases of difference of interest or opinion as they came along?—No, not on a ques-

tion like that. It is much too big. The issues are so immense, especially to us, though not perhaps to the same extent to the Punjab.

5684. I understand that you are anxious to make a statement on this question in a moment or two, and I will return to it then. On quite a different point, have you any views which you care to put before the Commission as to the relative advantages of the system of acreage charge and charge by volumetric system?—Yes. I consider that the volumetric system is in the present conditions in this Province impossible. We have tried co-operation, that is, giving out distributaries to the zamindars or cultivators on it, and in only one case have we had anything like satisfactory co-operation. In another case we have had a sufficiently satisfactory trial to extend the conditions by three years, but in several other cases we have had to take back the distribution into our own hands as the cultivators could not arrange matters properly amongst themselves. On the general question of volumetric sale of water, we would have no hold over the area of land that would be cultivated. The present cry all round is for more water. It is most likely that if we sold our water by volume we should have a considerable decrease in the area at present cultivated.

5685. That would involve also a decrease in the total crop produced?—Yes.

5686. What are your views as to the possibility of developing minor irrigation schemes in this Presidency?—My general view on minor irrigation is that where we cannot construct major irrigation works, we should unquestionably go in for minor irrigation works. (There are several parts of the Presidency, such as the district of Bijapur, where it is almost impossible, from the physical nature of the country, to consider any practical major irrigation schemes, and therefore in such cases, from the irrigation point of view, minor irrigation works such as tanks are most necessary. We can only meet the situation in that way. There is also the question of village water-supply and there they are extremely useful and indeed necessary.)

5687. When you speak of minor irrigation works, would you include small schemes of improvement carried out by one or more cultivators?—Yes, within the limits laid down. One of our officers, a Superintending Engineer, has been put on special duty to investigate these minor irrigation schemes. He is not under my control now, except technically. I think the monetary limit put to his efforts is 1½ lakhs of rupees.

5688. *Sir Henry Lawrence*: That is the limit of his budget?—No, the limit of an individual work.

5689. *The Chairman*: Have you any experience of the capacity of co-operative societies to initiate, carry out and control such minor schemes of irrigation?—No, I have not.

5690. Do you think there is any prospect of their being able to do so?—I think so. Answering casually, I think it should be tried. It is a question of leadership.

5691. *Sir Chunilal Mehta*: Have you not an example in the co-operative distribution of water in Nasik?—Yes. I was thinking of the department now run by Mr. Collins and which used to be run by Mr. Rothfield. I thought the Chairman referred particularly to that. I mentioned that we have tried co-operation in the matter of handing over the distribution to the cultivators.

5692. *The Chairman*: I was not thinking of the department under Mr. Collins carrying out this work. I was thinking of the co-operative societies which it is the duty of Mr. Collins to foster and encourage carrying out this work?—Yes, but it will come within his purview.

5693. Have you had experience of the working of District Local Boards?—I have been *ex-officio* member of the Local Boards of all districts where I have worked as Executive Engineer. But that is some years ago now, and I can hardly speak with any confidence of them at the present time.

5694. Have you any views about District Boards in relation to their control of roads under their charge?—That is not my sphere. You will probably get better information from Mr. Framji, but the opinion I have formed is that we

should be chary about handing over roads in any great quantity. The demand of the Local Boards should not be granted as quickly and inasmuch quantity as they want.

5695. What about roads in canal areas?—We have made special roads called service roads. Those, of course, are always maintained and will be maintained by us, and are rather outside the question of handing over roads to Local Boards.

5696. They are but of course any extension of your responsibility in the matter of roads would touch District Boards?—We could not hand those roads over. It would not be fair to expect us to do so.

5697. One of the officers of your department has suggested that more roads should be taken over by the Irrigation Department?—In our own area?

5698. Yes. What do you think of that idea?—That is a question of opinion and expediency. We have done that in some districts. We have done it chiefly because, as I have said, it is a question of expediency, and we get our repairs done when we want them, and also it is economical as it prevents overlapping of duties.

5699. Have you commenced recruiting for the new Superior Provincial Engineering Service?—Yes, we have; it is in full blast.

5700. How about the training of officers for that service? Do you suggest any change there?—Not particularly. For the Provincial Engineering Service, I think the class of men we now get is quite good. The education that is given now is merely an improvement on that given to what we used to call Upper Subordinates. In many particulars it has been merely a change in name. These men used to be called Upper Subordinates and they are now called Assistant Engineers, but the improvement in their status and pay does react naturally on the quality of the men we get and it is improving.

5701. Has it ever occurred to you that by means of a short examination paper or by means of a short period of attachment to the Agricultural Department or by both means, young officers of your own service might be brought into much closer touch with agricultural problems?—I have not considered it, but I was listening yesterday to the examination of Mr. Inglis, and I think it would be sound. It would correspond to what was done at Cooper's Hill. I am a Cooper's Hill man. We were always given a vacation task. As one such task I visited the Shaft and Axletree Company at Wednesbury and learnt how steel was manufactured. I think it would be a very good thing if these men were called upon to give up a period of their vacation for such training, if it cannot be fitted into the term, but I think the idea is very sound and it is necessary.

5702. The Army obtain co-ordination between various arms by sending them for training to other branches. It is a close parallel, is it not?—Yes, I agree.

I think now my colleagues will ask you questions. They will ask questions confined to matters other than this difference of opinion between your Province and the Punjab, as I understand that the statement you are going to deal with covers that matter alone.

5703. *Sir Henry Lawrence*: You mentioned that in one case the sale by volumetric measure was satisfactory?—No, I did not; not by volumetric; it has never been tried anywhere. I mentioned that we tried co-operation on the acreage system; that is handing over the distributaries to the cultivators and leaving them to run them.

5704. I thought in that case the water was measured volumetrically?—No.

5705. Where was the case where the cultivators carried out the distribution satisfactorily?—I think that it was in the territory of the Raja of Malegaon.

5706. Near Baramati on the Nira Canal?—Yes.

5707. In that case it succeeded?—Yes.

5708. In others it was a failure?—One is being given another trial.

5709. How many cases have you tried?—About five altogether.

5710. And in the other cases, the cultivators quarrelled among themselves about the distribution?—Yes, it was satisfactory only in one case.

5711. I think you said that if you introduced sale by volume that would decrease the crop produced. Can you explain why it should?—In the present mentality of the people and their lack of agricultural sense which is based on their lack of education, they would not, I consider, use the water with the discretion that we do, and the tendency would be to over-water, and naturally with a fixed discharge that would mean a reduction in area.

5712. *Dr. Hyder*: What control have you got at present over the area irrigated?—We have the control over the discharge into the distributary and we see that some water goes to every man. Take Sind which I know specially well; we guarantee some water to everybody and it is our duty to see that it gets to everybody. But if it was handed over to the control of the cultivators themselves the big man would grind the face of the poorer and smaller men.

5713. *Sir Henry Lawrence*: I take it that your view is that your control of water and distribution is the best thing for the country and for the taxpayer?—I do

5714. It improves the condition of the crop and brings in more revenue incidentally, but it is actually for the benefit of the general taxpayer?—Certainly.

5715. You are quite certain about that?—That is our object.

5716. It is not merely for the sake of tyrannising?—No, I hope not.

5717. That is the suggestion?—That is what we are suspected of doing, but I repudiate and resent that strongly.

5718. You suggested that it would not be fair to hand over roads in irrigation areas to the control of District Local Boards. Was that your statement?—I should not like to see it done.

5719. To whom would it not be fair?—It would not be fair to us as a department. We built these roads, and we built them for a particular purpose. If they will keep them in the repair as we do and if they will appoint the skilled men we have to run them, all well and good; but in the present state of things, I know of very few District Local Boards where there is any man with any engineering knowledge fit to be called such.

5720. Then your point is that these roads would fall into disrepair, under district control, and that would be injurious to your irrigation?—It would be to us and to the cultivator who use these roads.

5721. It would not be fair to the cultivator, is that your point?—It would not be fair to the people in general, and ourselves.

5722. Do you draw any distinction between your departmental point of view and the point of view of the cultivator?—Not very marked, no. We want our roads primarily for our own use. We built them for the management and control of the canals, and incidentally they are useful to the people in that tract.

5723. Then if these roads fell into disrepair it would interfere with your management of irrigation canals?—It would.

5724. That would be detrimental to the interests of the taxpayer?—Yes.

5725. I want to be quite clear; it is no question of departmental prestige?—No, no question of departmental prestige.

5726. *Sir Ganga Ram*: Are you the Engineer of the Sukkur Barrage?—I am Chief Engineer for Irrigation of the whole Presidency of Bombay.

5727. Is Mr. Inglis under you?—Yes.

5728. Mr. Inglis has told us that the people have no right to water. Do you endorse that opinion?—I do not know if he said that. What he said, I think, was that no guarantee could be given. A guarantee is a different thing.

5729. I understood him to say that it was at the will of the Irrigation Department to supply water as they liked and to whomsoever they liked. Do

you endorse that view?—The conditions in Sind and the Presidency proper are very different. Down here it is a question of applying for water.

5730. Generally the civil department will settle beforehand the area to which the irrigation should be extended?—We lay down our area of command.

5731. Is the right of the people to claim water determined by the Revenue Department or your department?—It is done by us.

5732. Not by Revenue Department?—No.

5733. I do not think the question of volumetric system was rightly understood by Mr. Inglis, or, if I may say so with deference by yourself. The volumetric system is not intended to give a man as much water as he applies for, but to give what he has a right to get. Have you any basic principle on which you give the water? Supposing a man has got a gross area of 1,000 acres, how much water is he entitled to?—Take Sind in which the conditions are analogous to those in the Punjab. We endeavour to give a man water for a third of his area. Suppose a man has 900 acres, we endeavour to supply water for 300 acres, and then we fix the duty for *kharif* and *rabi*, and we supply that quantity of water.

5734. If I may explain to you the volumetric system, supposing you fix 2 cusecs, under the volumetric system they will not give more than that quantity. Many people would take more, but Government will not give more because it would affect the interests of other zamindars. In the Punjab they have got a modern machine, which cannot be tampered with, to measure the water. It works clock-like, and only gives 2 cusecs. I am willing to pay double the rates but I cannot get more water than what I am entitled to. In that area in which you said it has been a success, did you give them as much water as they wanted?—We handed over the distribution from the distributary to the cultivators; we fixed the discharge going into the distributary, we did not hand over the control of the discharge into the distributary, but after that the distribution was left to the cultivators themselves.

5735. One or two questions about the Sukkur Barrage. I am not asking you anything about the controversy between Bombay and the Punjab. I am only asking you what was the estimate of the Sukkur Barrage when it was first sanctioned?—There is no revised estimate.

5736. There have been articles in the papers about your having revised estimates?—No. The estimates for works is 17,82 lakhs and for indirect charges another 53 lakhs. That is about 18,35 lakhs.

5737. Do you find these draglines economic?—Very.

5738. May I know the cost?—I cannot tell you exactly, but I can send you that information. My brother is in charge of the works, and I have heard from him on this point.

5739. Oh, it is your brother; I thought you were in charge of it. That is why I asked you that question. There is no possibility of your sending a revised estimate?—I hope not. I should be very sorry if it came to that. I think I should probably depart with it.

5740. Your calculations were based on so much water being required for paddy. Can you tell what it was?—I cannot give you a lot of figures without notice. I had some supplementary questions and if this question had been included I should have been able to answer it. Taking rice, we want an average depth of 4.5 inches and 10 to 15 waterings. That would give a total of 4 to 5 feet.

5741. It is 4 or 5 feet?—I cannot definitely give it.

5742. *Sir Thomas Middleton*: There is one expression which you used about which I am not quite clear. You stated that the sale of water by volume would result in a decrease in the area irrigated?—The area cropped.

5743. Would you agree that that statement would only apply to conditions in which the supply of water is much less than would be required by all the cultivators in the area commanded? It is a statement which refers to your special conditions?—Yes, it is.

5744. *Dr. Hyder:* At present I am not prepared to accept the argument which you have advanced that if this volumetric system were introduced it would result in a diminution of the area cropped. I take it water is precious and you have to make it go as far as you can. I make a clear distinction between your works in the Punjab and in Sind. Take Sind where you have perennial supplies?—Unfortunately we have no perennial supply yet..

5745. For instance, where you have a system such as that at the Sukkur Barrage, which is a copy of the Punjab model; even there I am prepared to admit that no amount of water would cultivate the whole area in Sind; that is to say, the water is limited and the demands for it are excessive. But at the present time you know the extent of the irrigated area in Sind; in the Deccan you know the area that is irrigated and which you can irrigate with your limited quantity of water. On the canal you have different people with different amounts of land; add them up and you know what your present revenue is and what is the present area irrigated. You put a price on your water and say, "This is going to be our water rate; we are going to deliver on both sides of the canal to the cultivator so much water and the water rate is going to be so much." You as canal officer and as Head of the Irrigation Department would not lose the canal revenue. The cultivators then say: "Of course we can indent indefinitely upon the Irrigation Department and tell them to send us so many million cubic feet of water." But you say, "I cannot give you that amount, because, even if I were to satisfy the demands of people situated at the head of the canal what about these people lower down? I could not meet the demands of all these people." I suggest to you it need not necessarily follow that there will be a diminution in the area cropped; because you know what your area at present irrigated is, and you add up all these demands and say, "Yes, we are going to deliver so much water to the people in that locality; now you can do anything you like with it." I take it that the one disadvantage of the present system is that it is a wasteful and uneconomic system, otherwise there would be no need for the introduction of the volumetric system. We want to make the water go as far as possible, and the cultivator probably wastes a good deal of water; but what change will take place if you merely deliver a certain amount of water to the cultivator? He cannot become more wasteful?—Are you not assuming that this man is highly intelligent?

5746. No, I am assuming he is as ignorant as he is; that there has been no change either in his intelligence or his methods. The only change is that they have taken a certain quantity of water and you put the price on that quantity. I cannot see why a reduction in area need necessarily follow, because they cannot become more uneconomical after you have introduced this system?—I do not altogether follow you; the speech you have just made is a very big thing to digest. But the point is this that if we supplied that water and just got the money for it, how would we protect ourselves afterwards? If the cultivator did not cultivate the area that we expected, how are we to get him to do so?

5747. You protect yourself by selling a certain quantity to him; you sell a certain quantity of water to all the people combined in a particular tract. There is a combination in one village, and you say, "You have to pay so much; we are not so much concerned with what you do with the water." My point is that these people, though remaining as ignorant after the event as they were before, would be induced to spread out their water as much as they can in order to have a larger area irrigated. I thought that was the only merit of this volumetric system?—If I were to admit this argument of yours, the whole case against this volumetric system would go to pieces.

5748. *The Raja of Parlakimedi:* As regards the rate for crops, do you change it year by year or have you fixed it once for all?—The rates are fixed for a period of years.

5749. Does your department ever consult the Agricultural Department in fixing the rates?—I cannot say that there is any direct and ordered co-opera-

tion of that kind ; I think it is left a good deal to the Irrigation and Agricultural Departments to co-operate at present.

5750. Would you welcome the idea of co-operating with the Agricultural Department?—I think it is very necessary.

5751. As regards roads, is the present system of handing them over to the District Boards working satisfactory?—I am not in charge of that sphere of work. My colleague Mr. Framji is. But I must say that it is doubtful unless you improve the professional side of those bodies that it will lead to efficiency. I fear under the present conditions it will lead to neglect and inefficiency.

5752. As to the trunk roads I want your opinion as to whether it would work well if a central fund were raised and the whole management put into the hands of a central body?—I fear that is altogether out of my province.

5753. *Professor Gangulee*: Was not the considered opinion of the Irrigation Commission in favour of the volumetric system?—Yes.

5754. What were the difficulties in adopting that system? I could not quite follow your arguments. First you say it would reduce the acreage?—Yes.

5755. What is your second point?—That is my chief and main objection. I am quite ready to think it over and let you know, but that is my chief objection at present.

5756. *Mr. Calvert*: Can you give us any figures regarding the interest position of some of your major works?—Yes. These figures I showed you yesterday are susceptible of great reduction. I got a list of your supplementary questions from Mr. Inglis; I did not get the list myself; but when I looked up these points I was struck by the extraordinary accumulation of arrears of interest. But I have discovered since working things out last night that this must be reduced by the amount of revenue that has been obtained. Therefore the proper debit is the balance, the accumulated arrears of interest.

5757. What are the accumulated arrears of interest?—These are found in the Administration Reports for the various years. Taking the Godavari Canals, the area actually irrigated is, say, 51,800 acres. The actual cost of constructing the system was 105 lakhs. That would give us 203 rupees per acre irrigated. The accumulated arrears of the interest to date would work out to 25½ lakhs. It would bring the figure per acre irrigated up to about Rs. 247.

5758. *Sir Ganga Ram*: Interest at what rate?—That is laid down by the Accountant General. It varies.

5759. *Mr. Calvert*: It is 25 lakhs accumulated interest on a construction cost of 105 lakhs?—Yes.

5760. Is the Godavari Canal paying interest?—No. All the Deccan irrigation schemes are worked at a loss. There is only one canal, the Nira Left Bank Canal, which pays.

5761. So that your debit for accumulated interest is rising?—Yes. Now we will take the Nira Left Bank Canal. That is the only one in which the figure is decreasing, because that pays something like 7 or 8 per cent. We have got 77,000 acres irrigated; the actual cost works out at Rs. 87 per acre irrigated and allowing for the accumulation of interest charges, we get Rs. 99 or about Rs. 100 per acre. The Mutha canals give us 18,000 acres and with the accumulated arrears of interest the cost per acre irrigated works out at Rs. 583. I only bring that in to show you that it is not altogether as simple as perhaps you think, to take the actual figures. It is not all plain sailing because in the latter case we have to supply Poona with water and there is a very great demand. That curtails our expansion of irrigation. So that that figure should be considerably less, but you can take it as I have given it you. That from 99 to 250 rupees is the cost per irrigated acre including actual arrears of accumulated interest.

5762. Has the accumulated arrears of interest in any case exceeded the capital cost of the canal?—No, that is wrong. I showed you those figures, but I discovered afterwards that the Accountant General for accounts purposes had calculated the whole of the interest up to date. Why he did this I do not know but he had not made the deduction in those figures for the revenue that had been received.

5763. Under the Bombay system the accumulations of interest are being steadily debited to your department?—Yes.

5764. They are not being carried to the Famine Insurance Fund?—No.

5765. I think you prepared the answers to some of the supplementary questions?—Yes.

5766. Is there anyone of those on which you would like to help the Commission with your opinion and advice? Could you, for instance, compare the capital costs and recurring costs per acre irrigated, with other sources of irrigation of land, such as wells?—No, I could not.

5767. *Mr. Kamat*: What is your view, as to whether the Irrigation Department should be in the hands of the Minister of Agriculture?—I feel strongly about that. I do not think it can possibly be for many years a Transferred subject. I hold that it is most necessary to have continuity and the control must be, I think, out of the hands of the Ministers.

5768. What particular difficulty do you apprehend, that your projects would not be properly understood from the technical point of view?—No, not at all.

5769. That is not the difficulty?—No.

5770. Then what precisely is the difficulty?—All our money would be subject to a vote. That has a particular bearing upon major irrigation works. In the past we used to provide for these major irrigation works and Government used to provide for them out of revenue. I remember the first year I came to occupy my present position I was given 45 or 50 lakhs of rupees for these Deccan works. The rains held off very late and I was asked to give up, I think, 28 lakhs. So that you never knew what amount you would get. The result was that our works cost an immense amount of extra money in overhead charges. Sir George Lloyd instituted the present system of borrowing the money, which is very right, so that posterity will pay for the benefits they will receive. If this money is subject to vote there would be a very grave liability of its being subject to the chance of political favour.

5771. In other words, you fear that the legislative bodies would turn down your proposals although the Minister may advocate them?—Undoubtedly. I do not care under whom I serve. I am at present under Mr. Cowasji Jehangir.

5772. In answer to Sir Henry Lawrence you stated that the present system is based on the good of the public and is not intended to tyrannise over them. Do the people ever suggest for a moment that it is a tyranny? Is not the clamour merely for improvements in the present system?—Speaking quite candidly, I think, they regard the rules we institute as oppressive and they think we institute the *bund* rules and other rules purely for our own pleasure and profit as a department. I think the feeling is that we do harass them, and I would do anything in my power to remove that impression.

5773. Whenever you issue any new rule, do you publish the proposed rule for criticism or suggestions in the same way that motor vehicle rules, for instance, are notified by the Government?—No. We are, after all, only a department of Government. The matter is first of all threshed out between ourselves and the local Revenue Officers who are very closely in contact with the people. After the matter is decided, the rules come up to Government for sanction. Thereafter they are published.

5774. But so far as the public are concerned you take them unawares?—The Reforms have only been in operation for five years. Before that we did not consult cultivators to the same extent as we do now.

5775. Is this one of the causes of the dissatisfaction we find generally amongst the public and could it be avoided?—Yes, I suppose that is one of the reasons; but I suppose we all dislike taxes and various necessary restrictions.

5776. Do you concentrate your attention on the major irrigation works? Do you also pay attention to the development of tanks and minor irrigation works in different districts?—Yes, our ideal now is major irrigation; but of course until Mr. Lowsley was appointed the Ordinary Divisional Irrigation Officer did it.

5777. You give all possible facilities to the minor irrigation works?—Yes. We would not omit constructing necessary tanks if we could get the money to do so.

5778. You are perfectly equitable towards all districts?—As far as possible. They do not think so however.

5779. *Dewan Bahadur Malji*: When determining the quantity of water to be supplied to cultivators, have you ever consulted the Agricultural Department as to the quantity?—I do not think so. The Agricultural Department is a fairly modern growth.

5780. Do you think it should be done?—We must do it. There must be much more co-ordination between the two.

5781. Mr. Inglis told us that one department talks in one language and another department in another language. I think you can speak in English and finish the matter?—Yes. Co-operation will break down many barriers.

5782. *Sir Ganga Ram*: Are you in favour of lift-irrigation?—No.

5783. Would you encourage lift-irrigation because if a man has to lift water he will not waste it, as he has to spend some effort to lift it?—From the technical point of view we endeavour to get all flow for the facilities for the distribution of the water. Also, lift is objectionable because it requires so much labour.

5784. Do not people like lift-irrigation?—Not if they can get flow.

5785. Do you make any use of the falls in the canals?—No, we have no demand.

5786. Have you considered that by the force of the fall you can raise the water automatically?—We take our hats off to the Punjab in many respects and we hope they will give us a chance of emulating what they have done.

5787. Suppose there is good land one foot high close by and there is a fall, cannot you make use of it to lift the water by the force of the fall?—Yes, we might easily, but we would have to charge more. In the Punjab they do not mind what they pay, but there is very great difficulty in getting even the small rates we charge now.

5788. We were told by Mr. Inglis that lined canals have been successful here?—Yes, but it is a very expensive method.

5789. Can you give me an idea of the cost per mile?—No, not at present, but may I send you that?

5790. Will you do so?—I will with pleasure.

5791. What value do you get for one cusec of water? We get about Rs. 1,200 per cusec in the Punjab?—Much less than half that on inundation canals in Sind.

5792. *The Chairman*: Do you want to read your statement?—May I?

5793. Before you do that I should like you to state in a few words a general indication as to what this statement is?—The statement I wish to place before you is to explain the attitude of the Bombay Government towards the Punjab Government. I should not have asked to do so if Mr. Sangster had not brought this question up.

5794. I do not propose to stop any statement of that kind, but I think you ought to know that, speaking for myself at any rate, I cannot envisage the Commission expressing any views on a dispute which after all is founded on purely technical questions. I think the limit of our responsibility is to

come to some conclusion as to whether the existence of this dispute and the fact that it has not already been settled is not a strong indication that some *ad hoc* body advising the Government of India in these matters ought not to be created?—I quite understand the position. All I wish to do is just to state briefly what are the points of difference between us; I do not mean in a technical way, but to explain our attitude which is dubbed by the Punjab Government as captious. May I read this statement?

The Chairman: Please.

The witness read the following statement:—

Mr. Sangster, Chief Engineer for Irrigation to the Punjab Government, is reported by the papers to have given evidence that future irrigational expansion in the Punjab is obstructed by the Bombay Government. The impression created is that our attitude is unnecessarily captious and I am here to endeavour to remove this impression. They clamour for the immediate construction of what is known as the "Lesser Thal Canal Project" requiring a *kharif* supply of 6,355 cusecs and a *rabi* supply of 3,085 cusecs. It is necessary to envisage the position. To the Punjab situated as they are at the head of the Indus it is a question of extracting more water from the Indus or its tributaries and of adding one more great scheme to their already fine record of irrigational achievement. To us however situated as we are on the lower portion of the Indus and dependent wholly on the supplies of water in that river the question is of vital importance. It is to us, if the supplies are not available, a failure of the Sukkur Barrage Scheme and in general a matter of life and death. Nor does this note of alarm originate from this Government. In the despatch from the Government of India to the Secretary of State (dated 16th December 1920) at the time of submitting the Sukkur Barrage Scheme to him for sanction frequent references are made to the supplies of water available in the Indus. They admit that there is likely to be a shortage to the Sukkur Barrage Canals in the *rabi* period which is our critical one in the months of February and March, though on the admittedly small data available they consider that the supplies available were generally sufficient for the simultaneous construction of both the Sukkur Barrage and Sutlej Valley Schemes then before them. They lay emphatic stress however on the point that there is no sufficient data before them and that before embarking upon any further schemes in either Province these data must be collected.

In their own words: "We propose to regulate the construction of new canals in the Punjab according to a programme which will ensure that undue demands are not made on the Indus without due consideration of the observations of discharges that gradually become available."

In January 1921 a note compiled by the Inspector General of Irrigation, Sir Thomas Ward, dated the 10th December 1920, was sent to us by the Government of India. This note called on both Governments for the immediate appointment of a special staff for systematically and scientifically collecting all data on the question of the supplies available.

I would quote the following from Sir Thomas Ward's note to put the position clearly as it appeared to him:—

"Such records of discharges as exist have however been carefully examined and analysed and on the information before them the Government of India are satisfied that the Sutlej Valley Project can be put in hand without prejudicing the supplies necessary to secure the area of irrigation contemplated on the Sukkur Canals.

"More than this it is impossible to assert and the question of collection of reliable data for the disposal of the problem has become one of the first urgency. It will obviously be necessary once construction commences on the Sukkur Scheme, for any future projects put forward by the Punjab to be very carefully examined in relation to the possible effects of further withdrawals from the tributaries of the Indus upon the rights to irrigation from the Sukkur Canals upon which the Government of Bombay are now enter-

ing. I have no hesitation in saying that the data for such an examination do not at present exist.

"Again there are two points to which I would specially invite attention. The first is the extreme importance of the work to all the parties concerned; to the Government of Punjab because all future schemes in that Province will have to be examined with an eye to the rights of Sind to irrigation, to the Government of Bombay because projects for extension in Sind will similarly have to be analysed with reference to the prescriptive rights which would thereby be acquired by them as against the Punjab, to the possible prejudice of extensions in that Province and to the Government of India as arbitrator in inter-provincial differences."

Both Governments duly appointed a special staff and they have been working on the collection of the data for the last four years. Actually however due to the differences in the methods of observations of discharges it is only in the last two years that it has been at all possible to co-ordinate results. They were using surface floats, and we were using current meters. Now we are both using current meters for the last two years. Recently a joint report has been received from the two Executive Engineers in charge of the work stating in effect that the results so far obtained are inconclusive. Latterly we have received from the Government of India two letters, one suggesting the formation of an Irrigation Board and the other suggesting that until this Board is formed an *ad hoc* committee might be instituted to investigate and if possible to dispose of this vexed question between ourselves and the Punjab. In reply to the latter proposal we have pointed out that the data collected are, we regard, insufficient.

We have said:—"Sufficient data are not as yet available to determine whether there is actually a regeneration of supply in the Punjab rivers due to the return of water used for irrigation. Further any quantitative determination of the effect of the Sutlej Valley withdrawals on the supply at Sukkur is at present impossible and accurate data as to the discharges of the various rivers concerned are not to hand.

"In the circumstances this Government fear that if the proposed Committee proceed to investigate the insufficient data which have already been collected there is great danger that that Committee may form incorrect theories and inferences from these data and thus much time and labour may have to be utilised later on to correct those inferences.

"The Governor in Council would therefore much prefer that a definite decision be given by the Government of India to the effect that the Thal Canal Lesser Project 1925 shall not be further considered until accurate data as to the discharges and regeneration of water in the various rivers concerned have been collected for a sufficient number of years to enable reasonable deductions and inferences to be drawn from them.

"At the same time the Government of Bombay do not desire to be unreasonable or to take up any *non-possumus* attitude; but trust that the Government of India will give every consideration to the arguments against any premature reconsideration of the Thal Canal Project in view of the facts stated above."

That is how the position stands and all we ask for is a policy of caution and justice.

5795. *The Chairman*: How soon do you anticipate this matter will be settled by the Government of India?—I fear they will never settle it under present conditions.

5796. You think they will never settle it?—No. The two Provinces are in this state. What we feel intensely is, that they say: "What are the rights of Sind?" In their last letter they have suggested that if it comes to the point, the area under the Sukkur Barrage should be reduced.

5797. I am not quite certain about your last answer. Do you suggest this controversy will never be settled?—Not unless some form of control is

devised and exercised. We have been given the assurance by the Government of India that no schemes will be permitted, no large irrigation schemes will be permitted in the Punjab, until we have been consulted, and accept the position.

5798. *Sir Henry Lawrence*: What was the date of that despatch from the Government of India which you quoted in your note?—16th of December 1920.

5799. With that there was a note by the Inspector General for Irrigation?—No, not attached to this. The date of the Inspector General's note was some days earlier and was sent to us in January 1921.

5800. You told us it was December 1920?—It was written in December 1920 but sent to us in January 1921.

5801. Can you put in copies of that note and the despatch for the information of the Commission?—Yes, with pleasure.

5802. We would like to have them for reference, as you have quoted from them?—Yes.

5803. The complaint from the Chief Engineer of the Punjab was the Government of Bombay not stating their case, and giving no indication of what their objection was to the Punjab scheme?—Yes.

5804. Is that view, in your opinion, not correct?—It is not correct. We have kept them fully informed, right up to date, of all our objections. We have not corresponded direct with them. We have corresponded with the Government of India, but the Government of India presumably sent our replies to the Punjab Government, as the Government of India have sent on to us the replies from the Punjab Government.

5805. When did you last address the Government of India?—About a week or 10 days ago.

5806. But before that, was the Government of India not in possession of the reasons for which you objected to the proposal of the Government of the Punjab?—The Government of India have been in possession of all our reasons. I have made a précis of the whole of our correspondence up to date. Shall I hand it over to you now?

5807. The only point is this; we were told that the Government of Bombay had not replied to the Government of the Punjab or to the Government of India regarding the proposal of the Government of the Punjab. What is your answer to that point?—That is quite incorrect.

5808. Have you only replied since the complaint was made by the Chief Engineer of the Punjab Government? Is that correct?—I presume he refers not to one letter, but to several. The date of our actual reply is 25th October.

5809. Two days ago?—Yes.

5810. You do not get my point. The Chief Engineer of the Punjab says that for a long time the Government of the Punjab have been pressing for this scheme, and that the Government of Bombay have not given their reasons in opposition to it. Do I understand that last year, or the year before that, the Government of Bombay have been withholding any reply to the Government of India?—No. It is only this last letter that they can complain of.

5811. What previous letters have you addressed to the Government of India?—Here is a list of them. May I run through it?

5812. You told us that you have addressed certain letters to the Government of India on the subject. What are the dates of those letters? That is all we want to know?—We addressed the Government of India on the 15th of May 1923.

5813. Could you send in a statement of the correspondence that has gone on?—Yes, I will; there has been a great mass of it. All I can tell you is that every letter we have received either from the Government of India or from the Punjab Government we have replied to.

5814. The matter has been under discussion for some years?—All the time from 1920 up to the present day.

5815. *Dr. Hyder*: I know nothing about the official correspondence, but I suppose in this particular matter of Sind and the Punjab, you are in the same position as the Sudan and Egypt?—Yes.

5816. The Punjab is the Sudan and you are Egypt in this matter?—Yes.

5817. That is to say, Sind could not exist without there being adequate irrigation?—It could not exist.

5818. You would not object to the Punjab Government constructing some canals in the Sind Sagar Doab, provided those schemes did not interfere with your schemes lower down in Sind?—Yes.

5819. Is there any third party to the dispute, that is, the North-West Frontier Government?—They are not interested as far as I know.

5820. They have not been mentioned at all in this correspondence?—Not to my recollection.

5821. *Sir Chunilal Mehta*: I will try and refresh your memory, Mr. Harrison, about the dates. The Government of India forwarded a copy of the Punjab Government's letter on the 28th of November 1924. To that the Bombay Government replied on the 3rd of February 1925. You will find it on page 8 of your précis. In that letter of the 3rd of February, the Bombay Government stated their reasons for objection to a small section of the Thal Canal?—Yes.

5822. The Government of India again replied on the 13th of April 1925, forwarding a note of the Officiating Consulting Engineer, Mr. Harris. To that letter the Government of Bombay replied on the 12th of June 1925, furnishing the requisite figures in a statement contained in two parts?—Yes.

5823. And so on. This matter has been under discussion with the Government of India and the Punjab Government ever since then, and the replies have been promptly given?—Yes, as promptly as we possibly could.

5824. *Mr. Calvert*: Is the present point that you do not agree about the discharges from the rivers?—No. The Punjab Government claim that their *kharij* withdrawals are returned to a large extent in the *rabi* months, which are our critical months, in the form of seepage. We say that it may be, the conditions are totally different in the Punjab. Their rivers flow in a valley, whereas the Indus flows on a ridge. Seepage may occur in the case of their own rivers, but the formation of Sind is such that we do not get any at all. We have two gauging stations, one at Mithankote and the other at Sukkur. The Mithankote *rabi* discharge may be more than that at Sukkur; but all the extra water is lost in transit. We estimate that whatever extra water comes down from Mithankote is lost in transit on the way to Sukkur. We get nothing extra at all. They say that we shall get a great deal of seepage water back, but we say we shall get none.

5825. If the Punjab went in for a project like the damming of the Jhelum so as to utilise the monsoon water for irrigation, would you object?—No. It will not affect us. We should not object to that.

5826. When was the Sukkur Barrage project first considered?—It has been under discussion for 50 to 60 years. It has been actively under discussion before it was sanctioned, for 3 or 4 years.

5827. You are a new-comer on the scene so far as the Sukkur Barrage is concerned?—Yes, that is what they say, that we are new-comers and have no rights. We have a similar position constantly before us in the case of our water-courses. The zamindars at the head consider that the zamindars at the tail have no right to any water. They say they never got the water before, and they have no right to more than they had in the past. This contention is obviously untenable.

5828. The Punjab Government is not objecting to anything Bombay is doing?—They are not objecting. They have got nothing to object to. They are at the top of the river.

5829. But Bombay objects to the Punjab Government's schemes?—Yes.

(The witness withdrew).

Mr. H. F. KNIGHT, I.C.S., Collector of West Khandesh, Bombay.

Replies to the Questionnaire.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(a) Undoubtedly propaganda by the Revenue Department and by the Agricultural Department, backed up by field demonstrations, have been to some extent successful. But the ryot is intensely conservative, and unless he can be shown that an improvement proves both successful and profitable he will not take it up. Probably financial success is the greatest lever. The adoption of cotton growing in Khandesh is due to the profitable nature of the crop and recently the profit from ground-nuts has caused in this district an increase in the ground-nut area from 9024 acres in 1921-22 to 46,816 acres in 1925-26. At present Taluka Development Associations are doing very good work here, the Dhulia and Sindkheda Associations run field demonstrations and the former Association's "dry farming" plot of cotton at Morana was a most valuable object lesson last year when late rains were short. But on the other hand the shortage of rain prevented a Sindkheda plot to demonstrate artificial manures, giving any results.

I would emphasise the necessity of the Revenue, the Co-operative and the Agricultural Departments combining in the work, e.g., at "Jamabandi" when all the village officers of a taluka are assembled, I have held agricultural demonstrations of, e.g., iron ploughs, use of copper sulphate, etc., and Agricultural Department Officers have lectured. Many of the *patils*, I admit, view the affair with something akin to good-natured contempt or pity for a misguided official who thinks a Government Officer can teach them their business, but general discussion with them does help to indicate the main difficulties of the agriculturist and to induce him to consider improved methods. As far as possible I consider Government must work through and with Taluka Development Associations—Associations of which the Committee purports to be local agriculturists, though often it is found that an energetic local official is the motive force. No Government demonstration will have the influence of a demonstration by a local committee of *patils*, actual agriculturists, but again I would emphasise that in backward districts such as West Khandesh, official help and official patronage must be ungrudgingly given.

(b) In my opinion the effectiveness of field demonstration can be improved—

- (a) by grant of more funds to Taluka Development Associations, to enable them to do more propaganda work,
- (b) by making a fuss of such field demonstration holding parties to see them, etc.

(d) I know of no striking instances of success or failure of demonstration work but in this district,

- (1) I have been told by many cultivators that the reason they do not sow Akola *bajri* which gives a heavier grain yield and resists drought, is that the straw (*Kadbi*) is so thick and hard that their bullocks cannot eat it. The remedy appears to be the pushing of chaff cutters.
- (2) The number of packets of copper sulphate as a preventive of smut in *juar* sold in this district in—

1923-24	. . . . .	3,257
1924-25	. . . . .	4,426
1925-26	. . . . .	8,160

This increase is largely due to "pushing" by the Revenue authorities. It is not as good as it should be because the *Bhils* in the west consider grain so treated unhealthy, also I under-

stand that at least one zealous but misguided Revenue subordinate instructed the cultivators to *boil* the *juari* seed in copper sulphate mixture. This indicates the difficulty of convincing an ill-educated community and the need of supervision of the propagandist.

QUESTION 4.—ADMINISTRATION.—(c) (iii). There is room for a very large expansion of made roads in this Presidency. In parts of this district, the black soil area, "Kaccha" roads are impassable for weeks together in the rains and when the dry weather comes they are almost impassable as an iron-hard mass of poached cattle prints. Their impassability in the rains reacts on the cultivator who is practically out of touch with everything for that period, and their badness during the dry weather is a great hindrance to getting his crops to market. As far as my experience goes it is usually villages on made roads that are most "go ahead" in every way and I am an advocate of every possible extension of made roads.

(I might perhaps call attention to the Akrani Mahal of this district, to which no wheeled vehicle can go, and where all export or import has to be carried by men or minute donkeys. The result of course is that the country is a secluded backwater, where the inhabitants have absolutely no inducement to improve their methods of agriculture.)

QUESTION 5.—FINANCE.—(a) I would emphasise the fact that conditions even in this one district vary so greatly that methods of finance desirable in one part, may be entirely impracticable 50 miles away.

Along the Tapti Valley in this district we have an industrious, capable, and prosperous population of Gujar agriculturists whose richer members do much to finance the tract. Also in the Tapti Valley and in the east of the district the co-operative movement has made progress and there are 157 societies which, in the villages where they exist, finance largely the more respectable village cultivators. These societies are financed by the Dhulia Co-operative Bank. The less prosperous or less respectable cultivators in this area are financed by the traditional village *sowcar* on traditional lines. (In the west and north of the district we find the Bhil, Mauchi, Pavra, etc.,—all tribes extremely backward and entirely illiterate, and quite incapable of financing themselves, often living from hand to mouth on jungle produce. In the Nawapur taluka a population of 62,310 is financed almost entirely by immigrant moneylenders settled in the headquarter town of Nawapur. the *sowcar* advances the Mauchi or Bhil money against his crop before it is even sown, and provides seed; when the crop is ripe the *sowcar* takes the whole of it and credits the cultivator with what may, or may not, be the value less advances, the Mauchi then draws on account from the *sowcar* what money he wants or what he can get, and the account is kept running indefinitely. The *sowcar* cannot sell up the Mauchi's land as it is on inalienable tenure, the Mauchi will not go to the courts to dispute the *sowcar's* accounts, and the *sowcar* makes an easy and profitable living, and the Mauchi may perhaps be said to be saved from the temptations of having more money than is good for him. Personally at present I see no alternative to the system. The inhabitants are far too backward to run co-operative societies successfully, finance by Government *taccari* would be an enormous task, and in my opinion we can only wait till education has filtered into Nawapur taluka and meanwhile by the inalienable tenure ensure that, when the Bhil and Mauchi does by education realize that he can do better, he still has his land and that it is not acquired by his *sowcars* in the meantime.)

In the same way I see no alternative to the village *sowcar* for many of the cultivators. Their holdings are uneconomic, their reputations in the village bad, and beyond the *sowcar* who will often, though at usurious rates of interest, advance money on very frail security, they have no hope of getting credit anywhere else. Personally I am not against the *sowcar*, he performs a most useful part of rural economy (a note by Mr. Simcox, late I.C.S., is probably still in the Bombay Secretariat elaborating this view)

✓ and with his local knowledge and inherited customs he undertakes business that no bank or properly run co-operative society would look at. (The outcry against him is really the result of our police and judicial system—formerly (and in parts not so very long ago) the overgrasping *sowcar* ran a real risk of having his nose cut off and his account books burnt by a mob of infuriated debtors, and this exercised a moderating effect on his exactions. Now his features and his accounts are safe and the Civil Courts will give him legal aid to the letter of his bond. We can only hope that growth of public opinion and the competition of co-operative credit societies may eventually take the place of the older and more direct check.)

For the cultivator with a decent holding, I see no better help in finance than co-operative credit societies and backed by the spread of co-operative banks, I consider these should provide both short and long-term credit. I admit, however, I have not studied the question in detail, as in this matter I am rather a believer in non-official agency.

(b) I do not wish to make suggestions as to cultivators making fuller use of Government *taccavi*. On the contrary I would discourage it. I admit of course there are exceptions, e.g.,—

- (1) Where the tenure is inalienable and ordinary credit is therefore restricted. Here in the interest of keeping decent cultivators going, *taccavi* is imperative.
- (2) Among backward tribes, who can only raise loans at usurious rates, if at all, and who must receive somewhat paternal help from Government if they are to survive. In Taloda taluka this year I had to distribute *taccavi* liberally to Bhiils to keep their cattle alive as the rains were late in breaking. They could not get money elsewhere, as they had exhausted their small credit with the *sowcars* last year when crops were poor.
- (3) At present *taccavi* is I consider justifiable for permanent improvements such as digging wells, making embankments, etc., as the cultivator often cannot raise the money otherwise on reasonable terms. But co-operative credit societies and banks ought to undertake this eventually.
- (4) Where a cultivator is taking up new land for cultivation and has yet no security for the credit he needs.
- (5) In famine times when ordinary channels of credit are closed.

But for the ordinary financing of agricultural operations I do not think Government should allow *taccavi*; my objections are—

- (1) that to make any progress, the cultivator must be taught not to rely on official help or on the *sowcar*, but on mutual self-help in the form of co-operative credit.
- (2) The *taccavi* system is inelastic, and difficult to supervise, i.e., to ensure that all the money reaches the cultivator.

✓ (QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(a) This is no new problem. I quote from Captain Elphinstone's Settlement Report of 1862 dealing with part of Dhulia taluka of this district,

“In conversing with the people I gathered that they are very happy and contented under our rule, but that they still look back with fondness to olden times, when they say the *sowcar* was only a moneylender, but that he has now become so powerful and so grasping that he has literally become their master. These moneylenders appear to be the cause of more misery than heavy taxes or even famines could possibly bring about, and the people earnestly entreat that the power of these men may be curtailed. All over the country you hear the cry of ‘the Courts are ruining us!’ ‘They reduce us to penury!’ ‘We shall never be independent or feel secure in our homes until the *sowcars*’ hands are tied!’ ‘The feeling of being in the power of the native merchant has a very depressing effect upon the minds of the people, and it makes them sullen, discontented, and

indifferent to their own interests as well as to those of Government. In former times, when the fulfilment of contracts between creditor and debtor was not enforced, and the former could not always obtain redress, if the latter refused to pay, the moneylender was very circumspect in his dealings, and would not lend more to an individual than he knew or imagined could be repaid by the borrower; and contrary to our accepted rules of political economy, which would indicate the very opposite result under such circumstances, the interest demanded by the creditor seems to have been most moderate—in fact commensurate with the debtor's means. At the present day, however, when the Civil Courts are so easy of access to the wealthier classes, the *sowcar* has it in his power, owing to so few of the cultivators being able to read or write, to falsify his debtor's accounts to any extent, and to sue him for any amount he pleases. Could not some means be devised to restrict within more limited bounds the almost absolute power of the *sowcar*? All our endeavours to benefit the cultivators and render them a prosperous and contented people will, I fear, prove fruitless until this is done. I must here apologize for having apparently digressed so far from my subject, but the financial prosperity and individual happiness of the agricultural population appears to me so important a subject, and so closely connected with the future prospects of the Government revenue, that I could not well pass over this subject in silence."

Again I quote from the Revision Settlement Report of Dhulia Taluka, 1896:

"The signs of well-being are too evident to be mistaken. That the majority of the people is in debt there can be unfortunately no doubt; but except perhaps in one or two of the poorer north-western villages the burden is lightly borne. The fact that the agricultural classes in this country almost universally live up to the extent, not of their income but of their credit, is too often overlooked. A big debt is as often a sign of prosperity as the reverse, and so long as the Kunbis are well nourished, well clothed and well housed, have as many cattle and servants as they want, and enough ready money for the celebration of marriages and feasts on a scale the reverse of economical, indebtedness is no evidence of poverty."

That the agriculturist is indebted there is no doubt but I do not consider any one cause can be given the chief credit or discredit for this. The causes may perhaps lie among the following:—

- (1) The habits and customs of the people which involve considerable expenditure on unremunerative and social objects.
- (2) The climate or rather the uncertainty of the season, a run of bad years must put the ordinary agriculturist into debt and the worse the year the higher the interest he will have to pay. At Hatnur village Sindkheda taluka last year I gathered from the cultivators that taken as a whole the village is indebted to about 20 times the land revenue, partly to *sowcars*, and partly to the local co-operative credit society. If the year is bad, the cultivator must live and must borrow money.
- (3) The judicial system. I do not entirely agree with the extract given above, but certainly the procedure of the Civil Courts does put the ignorant and illiterate agriculturist at a disadvantage. *Per contra* the extremely lengthy proceedings in execution of a decree against an agriculturist, make it necessary for the *sowcar* to keep his rates of interest high, and many agriculturists are not above trying to do the *sowcar* down by any means.
- (4) The uneconomic holding. If a cultivator cannot live on his land, he must either work elsewhere as a labourer or borrow money to keep alive. But the best times for earning money as a labourer are when he must be looking after his own crop. Hence he usually must borrow almost every year in order to keep going, and can never get out of debt. He would economic-

ally be better off as a landless labourer, but for various reasons he hangs on to the patch of land that cannot support him.

I had got from some local agriculturists estimates of the cost to a cultivator of starting fresh on an economic holding, which may illustrate the point. According to these, if a cultivator with an economic holding but without capital has a good year and grows cotton, it will cost him Rs. 750 to get a return of Rs. 1,000, if he grows *juari*, Rs. 625 to get a return of Rs. 660, if he grows *bajri*, Rs. 600 to get a return of Rs. 600. This means that in the first case he has Rs. 250 to use

(a) for paying off the borrowed capital, and

(b) for working expenses until the next crop is ready.

I do not entirely agree with these figures but they do indicate that, even more with an uneconomic holding, a cultivator once he has had to borrow for working capital must have very great difficulty in getting ever out of debt unless he can supplement his agricultural income by, e.g., labour, carting, or other means.

In my opinion this fact of so many holdings being uneconomic, i.e., not big enough to employ a cultivator, his family, and bullocks whole time, and the damaging effect of a run of bad years on the more substantial agriculturist—what one might call the monsoon factor—are responsible for most of the indebtedness.

The latter factor—the monsoon factor—can in my opinion only be combated by extension of improved methods of cultivation, in particular “dry farming.”

(b) I am very doubtful what measures can be taken to lighten the agriculturists' burden of debt beyond the encouragement of co-operative credit societies. The agriculturist must be financed, the *sowcar* must adjust his rates to his returns, and without a considerable change in the system of judicial administration I see no easy method. But I confess I have not considered the matter in detail.

As far as the other causes of debt are concerned, education against wasteful expenditure may do something, but it is idle to expect the Indian cultivator to emulate the penurious saving habits of the French peasant, and personally I have considerable sympathy with his desire to have a certain amount of fun out of life.

(c) With regard to restricting the cultivators' right of mortgaging or selling his land, no one answer is possible. In this district a large proportion of the land is held on inalienable tenure by backward tribes such as Bhils. (Were they to be given the right to sell or mortgage their land, they would, from their improvident habits and lack of education, be ousted at once and their place taken by more acute agriculturists, or they would be reduced to the status of rack rented tenants of *sowcars*. This process is complete in all parts of the district where such backward tribes have held land on alienable tenure, and unless this tenure is continued until such tribes are sufficiently educated to look after themselves they must go to the wall without prospect of recovery.) In this district this problem is important as the landless Bhil is frequently a dacoit, and therefore, though by his idle methods of cultivation his land does not yield an outturn such as it would under, e.g., a Gujar cultivator, it is imperative for the peace and the future progress of the district to keep the Bhil on the land. Though to-day he is a backward tribesman and poor cultivator, yet by preventing him alienating his land, we ensure that in the future if and when he is educated, he will have land to live on. In this case the present agricultural productivity of the district has to be sacrificed to future considerations. I would earnestly suggest that any proposal to make land alienable which is now inalienable, needs very careful scrutiny. In the Nawapur taluka of this district practically the whole area is held by backward tribes on inalienable tenure, this prevents the community of *sowcars*, who live in the headquarter town and fatten on the Bhil, from getting the land for themselves, and therefore I

get petitions pointing out the hardship to the Bhil involved in restricting his credit, and urging, of course, in the Bhils' own interest, that the land be made alienable. This would benefit the *soucar* alone, and it is he who organises such petitions, and compliance with them would ruin a taluka which one day may support an educated community of *ex-backward* tribes.

For cultivators other than backward tribes, I am not entirely convinced of the desirability of restricting the agriculturist right of transfer. The bigger agriculturist can undoubtedly look after himself and he needs the credit which he gets from being able to mortgage his land. The small cultivator with an uneconomic holding needs credit to keep going at all and to keep on getting deeper and deeper into debt. But in my opinion the quicker the uneconomic holder is squeezed out the better and if only we could ensure that his holding would be added to another to make an economic holding, agriculture would benefit by his disappearance. But as regards the holding that will employ an agricultural family—what I would term an economic holding—I am in favour of inalienability—not on the ground that such holding will be better cultivated, nor on the ground that the cultivator will not desire credit he cannot get with an inalienable tenure, but because it is vital in a ryotwari Province to have on the land as many owner cultivators as possible. If the land gets entirely into the hands of non-cultivating moneylenders and the cultivator is reduced to a mere tenant the character of the Province must change for the worse. Further the restriction of credit to some extent prevents the cultivator wasting money on unnecessary social ceremonies, and eventually must have an educative effect on social ideas. I would, however, note two conditions which I consider desirable:—

- (1) Government must be prepared to make special arrangements by *taccavi* or co-operative societies to finance such tenure holders.
- (2) Such inalienable economic holdings should be impartible.

(I would venture to call attention to my letter No. L. N. D. 778 of 9th July 1925 to the Commissioner, Central Division, printed in the preamble of G. R., R. D., No. 4702-24 of 26th February 1926, paragraphs 9, 15, 17 and 20. Copy of G. R.* attached.)

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(a) A Bill to prevent fragmentation and another to encourage consolidation are at present under consideration by the Government of Bombay, and Government have sanctioned the grant of part of the waste area of this district now under distribution, on impartible tenure, and I am at present awaiting Government orders on the form of lease to be adopted in these cases. Both the legislation and the proposed leases should prevent further fragmentation if they can efficiently be watched. But experience with inalienable tenure lands in this district, which among Bhils are often alienated without attracting the notice of any Government authority, makes me doubtful whether it will be possible to avoid further fragmentation for some time. Legislation and leases however afford the possibility of enforcement in future as cases of evasion may come to notice, and only perseverance can educate the ryot. The main obstacle of course is the Hindu law of inheritance and the ryot's sense of "fairness" to his family which prevents him leaving the property to one individual. Personally I consider the effects of fragmentation so disastrous, that I would like to try the experiment of removing land in some areas from the operation of Hindu law, making fragmentary cultivation a criminal offence involving forfeiture of the land. This sounds excessively Draconian, but obviously cultivable land cannot increase *pari passu* with the population and unless fragmentation or the increase of population is stopped, we must everywhere reach eventually the condition of parts of the Konkan where the bulk of the population cannot support themselves on their land, and the possession of this land prevents them ever becoming a permanent and efficient industrial labour force elsewhere. Unless the land can support the agricultural population, the population must be reduced by pestilence or

famine or birth control; in the present state of Indian opinion the last named remedy seems unlikely (though Mr. Devadhar of the Servants of India Society tells me that the matter is beginning to excite interest). Practically it is famine and pestilence we have to attempt to guard against. Personally I doubt whether there would be much difficulty in the working of a law making fragmentation a criminal offence, so far as the cultivator is concerned. Thinking *patils* in this district with whom I have discussed agricultural conditions agree that something must be done to work the land more economically. The opposition is more likely to come from the Legislative Councils, where it sometimes seems penalties of any kind for any purpose are considered *per se* undesirable, and I frankly confess I doubt whether under present conditions effective legislative action to prevent fragmentation is possible. But as far as I can see the result—pestilence or famine—is inevitable. The influenza epidemic with its great destruction of human life has only postponed the day of reckoning.

The problem is of course of varying urgency in various districts. This district (West Khandesh) is infinitely better off than many others but the following figures show that the evil is increasing. The cultivated area of the district (excluding plural holdings, i.e., holdings of persons who hold land elsewhere as well) was—

	Acres.
1917	1,370,322
1922	1,397,977

an increase of 27,655 acres.

The holdings in these two years were as follows for agriculturists:—

	1917.	1922.	
Up to 5 acres	6,272	6,446	+174
„ „ 15 „	17,909	19,130	+1,221
„ „ 25 „	11,903	12,018	+110
„ „ 100 „	15,532	15,020	-512
„ „ 500 „	1,234	1,117	-117
Over 500 „	20	19	- 1

For Non-agriculturists.

	1917.	1922.	
Up to 5 acres	1,415	626	-789
„ „ 15 „	1,159	1,067	- 92
„ „ 25 „	850	615	-235
„ „ 100 „	882	819	- 63
„ „ 500 „	351	302	- 49
Over 500 „	59	59	

These figures referring only to a period of 5 years appear to me to show a very marked increase in the number of agriculturists cultivating holdings up to 15 acres, which, except in a very few soils, is not an area which can economically employ a pair of bullocks, and which therefore means that the holder is wasting part of his time. There is also a big drop in the holdings of 25—100 acres, which means a decrease in the comparatively substantial agriculturist class who can with luck lay by a little capital. The evil even here is sufficient to need attention. *

(b) In my opinion the main obstacle in the way of consolidation of holdings is the cultivators' great attachment to the soil. The ownership of even an acre or two gives a man the status of a cultivator as opposed to that of a mere tenant or a landless labourer. The social prestige attaching

to land is a great factor in the desire to possess it, and a further factor is the absence of any other remunerative outlet for the cultivators' savings. Added to the above is of course the system of Hindu law which insists on each member of a family obtaining his share.

It is difficult to suggest any remedy for the social importance of land holding, beyond the possible restriction on the size of a parcel of land that may be transferred, which would prevent new owners acquiring petty "job lots" of land. This might also help the cultivator to put his savings into postal cash certificates, etc., if he found he could not raise enough to buy land.

For Hindu law, I know no remedy except education and the growth of the leaving of land *by will*. This will take a very long time, and probably be opposed by public opinion. (Dr. Munsiff, Assistant Director of Public Health, recently quoted a case of a rich cultivator at Nasik who disinherited some worthless sons and left his land to a nephew. A prevalent relapsing fever shortly took off both uncle and nephew, but the villagers were convinced that this was a direct judgment on both for the impious *will* disturbing the "natural" disposition of the property.)

For consolidation of present holdings, the main difficulty lies in the disposition of the cultivator. Often in the partition of an estate between say 4 brothers, each will insist on a $\frac{1}{4}$ share of each individual field—lest he feels that the others get an advantage over him, if he takes one particular field. This feeling is equally strong in the village, and consolidation of present holdings by consent would be—as far as my experience goes—practically impossible at the moment.

The only remedy I can suggest is compulsory consolidation in a few sample villages where a majority or even a fair minority of the cultivators can by propaganda be persuaded of its advantages.

(c) Certainly; legislation to deal with dissentients and minors, etc., would be imperative. I once relaid out into decent house plots a large village that had been destroyed by fire. This, though all the house sites were mere blackened ash heaps, took much persuasion and argument for weeks, and to attempt the agricultural relay out of a village, unless some natural calamity had reduced all fields to a like value, would be an appalling task without power to compel dissentients to come in.

QUESTION 14.—IMPLEMENTS.—(a) The iron plough is certainly making headway even in this backward district, but of course is handicapped by needing more or much better bullocks to work it. In my opinion therefore the introduction of this plough depends largely on animal husbandry, and in particular on inducing the cultivator to keep better cattle, and feed them better, and especially in abandonment of the traditional village grazing system. (See my remarks on Question 15.)

The cultivator is interested in improved machinery but he is hard to convince of its advantages. I was watching a modern implement for weeding between rows the other day and discussing it with the local *patils*, but they would not admit it was as good as the indigenous small double hoe for the purpose, and probably in their hands it would not be so satisfactory. But this was on the farm of an agricultural bias school, and the real test will be when the boys who are now using the modern implement come to apply it in their own fields later.

I am anxious to see further experiments with power tractors in this district. The District Local Board had applied for a grant for tractor experiments to be run in conjunction with the Dhulia Technical School as a repair shop and training place for tractor drivers. But unfortunately funds were not available.

I am of course not convinced that tractor ploughing would pay in a country of small holdings and poverty-stricken agriculturists, but I think every experiment ought to be made, not only in the hope of better tillage by deeper ploughing, but because the introduction of tractors would reduce

the number of bullocks that have to be kept and the pressure on the local grazing, and the improvement of cattle or their replacement by mechanical means is I consider an essential to any improvement to agriculture generally. I should like to see also tractors used for moving crops to market, *e.g.*, the bringing in of the cotton crop to Dhulia cotton market by cart, usually grossly overloaded, is extremely hard on the bullocks and if tractors could do this work it would be much to the good.

Tractors appear to be successful in Gujarat and in view of the improvement in tillage and in cattle that I would anticipate, I think there is justification for further experiment in the Deccan. But I suggest that such experiment must be made in conjunction with a repair depôt and training class for drivers, if possible run by some permanent local institution such as a District Local Board.

QUESTION 16.—ANIMAL HUSBANDRY.—(a) In this district there is the usual problem, the shortage of fodder, the keeping of superfluous cattle, and the consequent deterioration of the general level of cattle, and yet there is sufficient grass grown in the district to allow a large surplus for export. The forests in the west and north of the district could provide for the cattle of the district many times over if the grass could be distributed, and in practice in a normal year fodder shortage is confined to the talukas of Dhulia and Sindkheda, the agriculturists of other areas carting grass long distances for their own needs from forest.

(c) In the two talukas mentioned fodder shortage is most acute from about April till the rains have broken for a month—normally say till the middle of July. If the rains are late or there are no early heavy falls, shortage continues. This year grass has been short well into August.

(d) and (e) Personally I consider that the traditional method of keeping cattle in this country is responsible for much of the bad agriculture. The ordinary small cultivator feeds his bullocks decently during the actual cultivating season but thereafter unless he is doing carting work, he turns them out every morning with the mob of village cattle to pick up what they can off the alleged village grazing grounds where they compete for almost non-existent grass with aged and barren cows and useless bullocks. The young stock never have a chance, and the older ones never can recuperate. Government have endorsed this plan by the provision where possible of free grazing grounds in villages and by a fee for forest grazing which is infinitely below the economic value of the grass consumed. Until the cultivator can be taught—as he has learnt in parts—that he must “stall-feed” his bullocks all the year round, I do not see how we can get any great improvement in tillage. For this reason—though in view of the opinion of the Legislative Council I do not hope for my view to be accepted—I consider Government ought to drastically reduce the grazing facilities in Government lands, and, except in areas such as the Satpuras in the north-east of this district which are a valuable grazing reserve for cattle-breeders, endeavour to insist that grass should be cut and taken to the cattle instead of the cattle going to the grass. This in my opinion would tend to reduce the number of useless cattle that now eat the grass the better cattle need, and would encourage the cultivator to keep decent plough cattle—or what is in many cases the most economical method—to sell his bullocks at the end of one cultivating season and buy new ones just before the next.

I know that in view of public opinion and Hindu sentiment, this proposal is not likely to be accepted, but I think it should be recognised that Government is conniving at a ruinous feature of agriculture by continuing the present policy.

Cultivators will never attempt to improve their cattle unless it is made financially unprofitable to continue the present system.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(b) Beyond a certain amount of carting, in this district the ordinary cultivator has no secondary occupation to keep him employed when there is no agricultural work to be performed, unless the attendance at marriages and other festivities can be so termed,

(The Bhil of course turns to wood cutting, collection of jungle produce and illicit distillation of liquor, but that is merely because he does not get enough out of the land to live on. Did he get enough, he certainly would not work otherwise.)

I cannot suggest a secondary occupation for the cultivator which seems likely to succeed. Such should of course not be merely mechanical, such as spinning, but should exercise his brain; it must fit in with his inherited conservative ideas of what a cultivator can and cannot do—here I believe is where chicken farming breaks down—it should be economically profitable. Personally I think the only way of giving the cultivator more to do is the extension of irrigation, especially well irrigation, where raising crops is a whole year job. But that obviously cannot be done for every agriculturist.

QUESTION 19.—FORESTS.—(a) It is rather difficult to say what is the fullest use of forests for agricultural purposes. I have no doubt all villagers would ask for unrestricted grazing and unrestricted permission to cut wood. This, though doubtless of immediate use for agriculture, would obviously not be of permanent advantage to any village. As stated above in answer to Question 16, I am not a believer in free or unrestricted cattle grazing nor in allowing villagers to cut wood without control. I may quote the example of a village I inspected last May, Ghodade in the Sakri taluka. Some years ago the forest area of the village—really pasture forest with a sparse growth of inferior trees—was handed over to a village committee's management. The result has been disastrous to the tree growth, which now is largely pollarded and cannot last much longer, owing to the wasteful method of cutting employed. This forest adjoins other similar forest under departmental control and the difference is striking. In my opinion therefore the control of forests cannot be relaxed, in the interests of posterity.

(b) and (c) The supply of fodder in rural areas can be increased in forest by closure to grazing for a period. The supply of firewood by the closing of forests also. But both these postulate the existence of convenient forests at hand. Something can be done by propaganda, for instance the lopping of trees for Tahal (i.e., to make the ash rice seed beds in the Konkan) when I was in Thana district 10 years ago, was largely being carried on on lines laid down by Mr. J. P. Orr that did not seriously damage the trees. But this needed constant supervision and urging of the cultivator. I doubt whether in the dry tracts of the Deccan anything can make trees grow in village grazing grounds—the casualness of the villager for communal purposes and the ubiquitous goat would not give a chance. Private enterprise too is handicapped. (Young trees in most areas would need laborious watering, fields are not fenced, and grown trees hinder the growth of crops. An exception that may be said to prove the rule, is the Bhils' habit of planting mango trees when possible, but the Bhil has little else to do, he prefers a casual job of watering young mango trees to steady work, and later on the tree will yield him a crop without the necessity of any further work.)

(d) The question of afforestation or deforestation affecting the supply of moisture in the soil is to my mind a problem which needs more research than it has received. At present a forest belt about 14 miles long and 2 miles wide at the foot of the Satpuras is being gradually deforested and given for cultivation. Personally I am rather nervous as to the effect this may have on the rainfall, on the water supply in the lower cultivated lands, and on the subsoil water level in the villages. But I could find no reliable data to guide me to any conclusion as to how much land it would be safe to deforest. In discussion with various cultivators as to the alleged decreasing fertility of the district (of course largely attributable to the fact that some 50 years ago only the better lands were cultivated) various aged cultivators have given the destruction of forests as one reason why the rainfall is less and less constant now than it used to be. (Others attribute the falling off to the wrath of God over some sin committed by the population but could not give me a clue to what the sin was.)

(f) Undoubtedly many forests suffer from excessive grazing—an interesting example is on the Bombay Agra Road 10 miles from Dhulia. Here on the west is a fenced Kuran which has been sold for grass cutting or late grazing for many years. On the east is forest normally open to grazing. On the west after the first really heavy rain grass springs up everywhere, on the east grass is scarce and sparse. Obviously the continual grazing has rooted up much of the grass, and eaten down the rest before it had time to seed and establish itself. The only remedy I can see is a long period of closure in the hope that grass will again spread, and I assume that this applies to many areas where grazing is excessive in this district, especially the pasture forest which is never closed, and a walk over any of the hills will show how erosion is thereby facilitated.

QUESTION 25.—WELFARE OF RURAL POPULATION.—Beyond the subjects referred to in the Questionnaire, I would suggest two matters which vitally affect the welfare of the agriculturist:

- (a) an adequate drinking water-supply in the village and
- (b) malaria.

But these are sanitary rather than agricultural problems.

QUESTION 26.—STATISTICS.—(a) (i) In this Presidency I believe the statistics of areas under crops are comparatively fairly accurate. The area of each survey number is known and the village *patil* and the cultivator can give a very fair approximation to the respective areas under various crops in any survey number. I admit most of the work is probably done in the village "chavdi," and not in the field, but I think the areas are as accurate—or more accurate—than could be expected of the agency which prepares them, i.e., the village headman and accountant.

(ii) I am afraid I view with distrust all estimates of yield that are not based on accurately ascertainable figures, e.g., if so many bales of cotton are known to have been exported from a district, it is easy, saving perhaps an allowance for bales exported from railway stations just outside the district, to calculate the average outturn over a period of years and in the same way if one knows the quantity of cotton ginned in a year one can get that year's outturn. But (my experience of estimating outturn before the crop is harvested is discouraging. I with a number of Revenue and Agricultural officers made some experiments last year in estimating the quantity of various *bajri* and cotton fields ready for harvest, and checked our estimates by actual harvesting. The results not only differed to an extraordinary degree but we could not find any constant personal error attaching to any individual.) The cultivator from experience of his own individual field can often (if he will) give a very close estimate of the probable yield, but I am very doubtful of the estimate of future yield given by either the Agricultural or Revenue Departments.) However it is possible that continued training and practice would make an improvement, but I should never, I am afraid, put full reliance on such statistics.

(iii) In this Presidency, statistics of livestock and implements are, I consider, accurate for all practical purposes.

(iv) The Settlement Reports in this Presidency give practically all available information.