

ROYAL COMMISSION
ON
AGRICULTURE IN INDIA

Volume XI

EVIDENCE

TAKEN IN
SIND



CALCUTTA: GOVERNMENT OF INDIA
CENTRAL PUBLICATION BRANCH
1928

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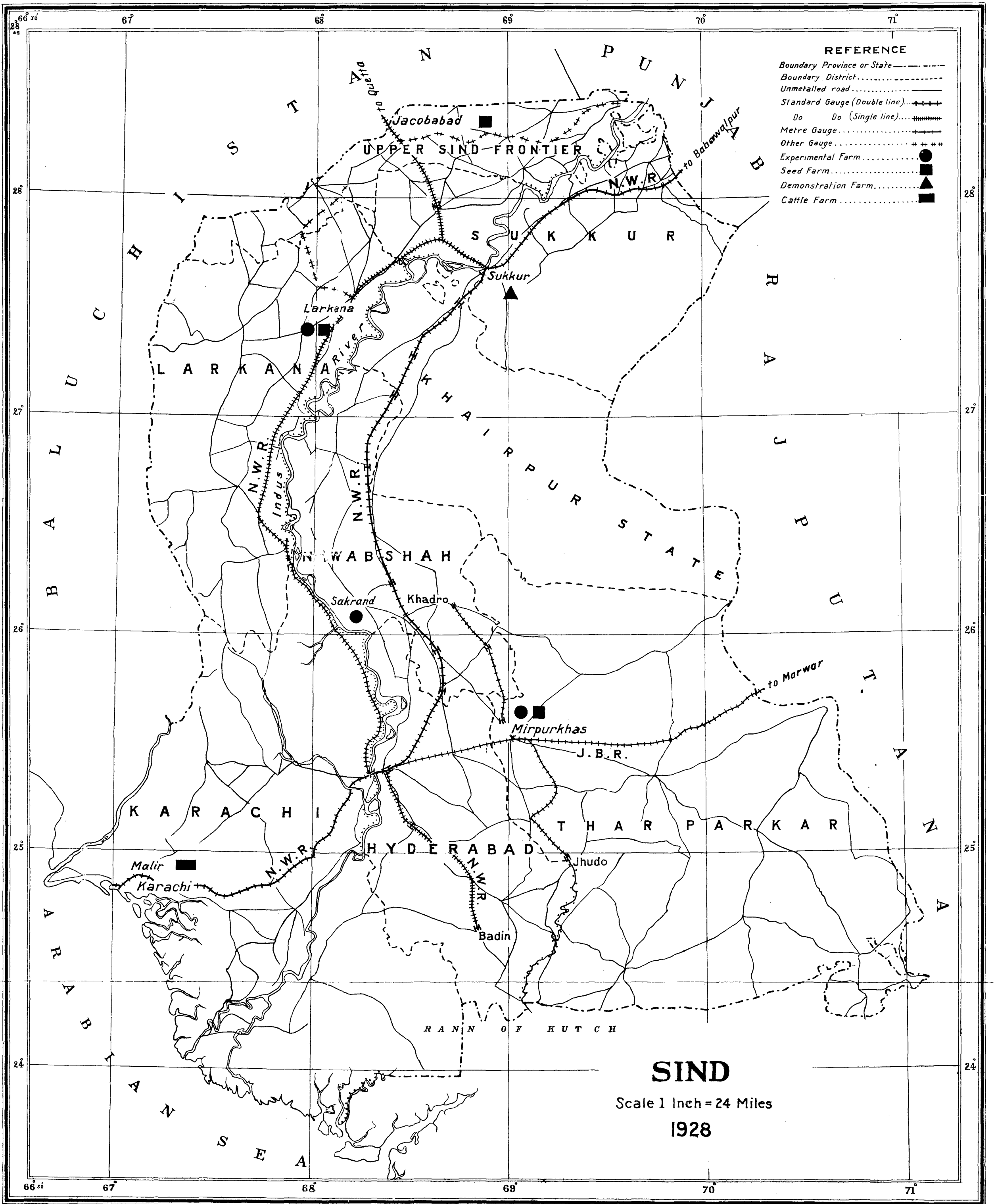
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INTERIM REPORT

To

THE KING'S MOST EXCELLENT MAJESTY.

May It Please Your Majesty,

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

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

(Signed) LINLITHGOW,

Chairman.

(„) H. S. LAWRENCE.

(„) T. H. MIDDLETON.

(„) J. MacKENNA.

(„) H. CALVERT.

(„) GAJAPATI NARAYANA DEO.

(„) N. GANGULEE.

(„) L. K. HYDER.

(„) B. S. KAMAT.

(Signed) J. A. MADAN,

(„) F. W. H. SMITH,

Joint Secretaries.

26th January 1928.

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TERMS OF REFERENCE

Generally,

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

In particular to investigate—

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

and to make recommendations.

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

QUESTIONNAIRE**PART I**

Question.

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

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12. Cultivation.
13. Crop Protection.
14. Implements.

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QUESTIONNAIRE

PART I

1. Research.

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

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

(ii) Veterinary research ?

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

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

2. Agricultural Education.

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

- (i) Is the supply of teachers and institutions sufficient ?
- (ii) Is there an urgent need for extension of teaching facilities in any district or districts known to you personally ?
- (iii) Should teachers in rural areas be drawn from the agricultural classes ?
- (iv) Are the attendances at existing institutions as numerous as you would expect in present circumstances ; if not, state reasons. Can you suggest measures likely to stimulate the demand for instruction ?
- (v) What are the main incentives which induce lads to study agriculture ?
- (vi) Are pupils mainly drawn from the agricultural classes ?
- (vii) Are there any modifications in existing courses of study which appear to be called for ; if so, what are they ?
- (viii) What are your views upon (a) nature study ; (b) school plots ; (c) school farms ?
- (ix) What are the careers of the majority of students who have studied agriculture ?
- (x) How can agriculture be made attractive to middle class youths ?
- (xi) Are there recent movements for improving the technical knowledge of students who have studied agriculture ?

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

3. Demonstration and Propaganda.

(a) What are the measures which in your view have been successful in influencing and improving the practice of cultivators ?

(b) Can you make suggestions for increasing the effectiveness of field demonstrations ?

(c) Can you suggest methods whereby cultivators may be induced to adopt expert advice ?

(d) If you are aware of any striking instances of the success or the failure of demonstration and propaganda work, please give particulars and indicate the reasons for success or for failure.

4. Administration.

(a) Do you wish to suggest means towards the better co-ordination of the activities of the Governments in India or to indicate directions in which the Government of India may usefully supplement the activities of the local Governments ?

(b) Is it your opinion that the expert scientific knowledge required in the development of agriculture in the different Provinces could be supplied to a greater extent than is the case at present by increasing the scientific staff of the Government of India ? If so, indicate the types of work which would benefit by pooling the services of experts, and suggest how that work should be controlled.

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

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

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

5. Finance.

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

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

6. Agricultural Indebtedness.

(a) What in your opinion are :—

- (i) the main causes of borrowing,
- (ii) the sources of credit, and
- (iii) the reasons preventing repayment.

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

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

7. Fragmentation of Holdings.

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

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

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

PART II

8. Irrigation.

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

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

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

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

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

9. Soils.

(a) Have you suggestions to make—

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

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

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

If so, please give full particulars.

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

10. Fertilisers.

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

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

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

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

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

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

11. Crops.

(a) Please give your views on—

- (i) the improvement of existing crops,
- (ii) the introduction of new crops including fodder crops,
- (iii) the distribution of seeds,
- (iv) the prevention of damage by wild animals.

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

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

12. Cultivation.

Can you suggest improvements in—

- (i) the existing system of tillage, or
- (ii) the customary rotations or mixtures of the more important crops ?

13. Crop Protection, Internal and External.

Please give your views on—

- (i) The efficacy and sufficiency of existing measures for protection of crops from external infection, pests and diseases.
- (ii) The desirability of adopting internal measures against infection.

14. Implements.

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

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

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

PART III

15. Veterinary.

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

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

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

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

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

(ii) Is full use made of touring dispensaries?

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

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

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

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

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

(i) an extension of the Muktesar Institute, or

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

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

(i) officers of the Muktesar Institute, or

(ii) research officers in the Provinces?

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

16. Animal Husbandry.

(a) Do you wish to make suggestions for—

(i) improving the breeds of livestock,

(ii) the betterment of the dairying industry,

(iii) improving existing practice in animal husbandry

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

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

PART IV

17. Agricultural Industries.

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

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

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

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

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

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

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

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

18. Agricultural Labour.

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

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

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

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

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

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

19. Forests.

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

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

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

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

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

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

20. Marketing.

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

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

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

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

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

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

21. Tariffs and Sea Freights.

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

22. Co-operation.

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

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

(b) Have you any observations to make upon—

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

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

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

23. General Education.

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

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

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

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

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

24. Attracting Capital.

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

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

25. Welfare of Rural Population.

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

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

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

26. Statistics.

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

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

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

SIND

CLASSIFICATION OF TOTAL AREA AND AREA UNDER VARIOUS CROPS

(5 Year Averages)

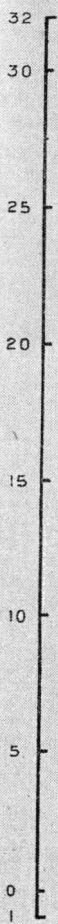
NOTE - The difference between the Gross Area Sown and the Net Area Sown represents the area sown more than once.

1908-13

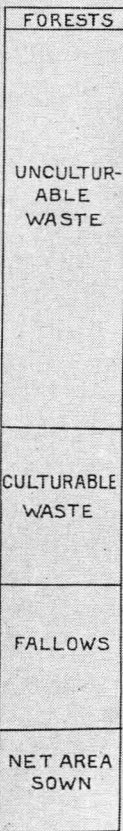
1921-26

Millions of acres

Millions of acres



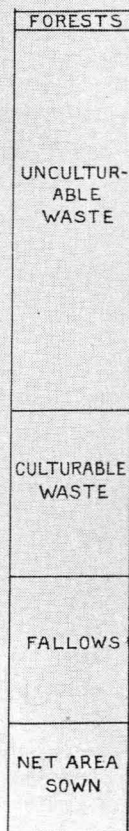
Area of Sind



Gross Area Sown

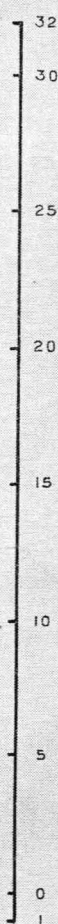
Rice
Jowar
Bajra
Other Foodgrains and Pulses
Other Crops

Area of Sind



Gross Area Sown

Rice
Jowar
Bajra
Other Foodgrains and Pulses
Other Crops



INTRODUCTION

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SIND

1. GENERAL FEATURES

The Province of Sind, lying between 23° and 28° north latitude, forms the extreme north-western portion of the Bombay Presidency and consists of the lower valley and the delta of the Indus. It is bounded on the north by the Punjab and the Bhawalpur State; on the east by Rajputana; on the south by the Rann of Cutch and the Arabian Sea; and on the west by Baluchistan. The province, excluding the State of Khairpur, consists of seven British districts and covers an area of about 47,000 square miles.

The soil of the province is almost entirely alluvial, having been formed by the detritus of the Himalayas carried down by the river Indus from which it takes its name. For much of its length in the alluvial plain, the river bed is most unstable and the river prone to alter its course, sometimes by many miles, in a single flood season. There are traces of ancient river beds in many parts of the tract, and the Indus is known in past ages to have discharged its waters into the sea at a point about 200 miles east of its present mouths. For about five months in the year the level of the river rises above that of much of the surrounding country and thus enables the water to be drawn off for irrigation by canals which take off from the main river at points where its banks have for long been stable. To the west, the level valley of the Indus is bounded by the Kirthar Range of mountains which separates Sind from Baluchistan; this range has an average elevation of 2,000 ft. with some peaks rising to 7,000 feet. The hills are stony and barren but support a characteristic vegetation and afford grazing to large herds of cattle, sheep and goats.

The forests which consist mainly of *babul* (*Acacia arabica*) fringe the banks of the river for 300 miles.

The finest and most productive region lies in the neighbourhood of Shikarpur and Larkana in a long, narrow stretch extending 100 miles from north to south, enclosed on the one side by the river Indus and on the other by the hills of Baluchistan. Another great alluvial tract with an average width of 70 to 80 miles stretches eastward from the Indus. Sandhills abound near the eastern border, and large tracts remain sterile for want of irrigation.

The soil of Sind consists of a plastic clay strongly impregnated with salts and is remarkably fertile under irrigation.

No soil survey of the province has been made. But five types of soils are usually distinguished: (1) *wariasi*, loose sand fit only for melon cultivation, (2) *kacha*, land resulting from recent inundation, (3) *chiki* or *paki*, hard black soil which has been under water for some time and which is usually very stiff and heavy to work,

(4) *rao* or *raewari*, soil enriched by the detritus of hill torrents, and
 (5) *dasar*, a term widely used for soft or light coloured but productive soil. Besides these, there is also the *kallar* or salt-affected land.

Owing to the absence of monsoon rainfall, the climate of Sind ranks amongst the hottest in India. On the coast, sea-breezes render it equable but, in northern Sind, variations of temperatures are extreme. For the whole province, the average mean temperature of the summer months is 95° and that of the winter months 60°. In the north, the summer maximum frequently rises to 114° and occasionally to 125°; while in the winter, frost occurs at night and, even in the day time, the temperature falls to 40°. Nowhere in India is the hot weather so prolonged.

The rainfall of Sind is very scanty and irregular; in some years, there may be no rain, and in others cyclonic storms may bring 16 inches in a day. The average is about 8 inches. Except in the two areas noted below, cultivation depends not upon the rainfall, but upon the river Indus. These areas are the hilly tract of Kohistan on the west, and the tract to the south-east of the province known as the Thar desert. These tracts are above the river valley and cannot be reached by canals; rainfall is uncertain and the cultivation is most precarious. The inhabitants are chiefly nomadic cattle and camel breeders, and, to them, agriculture is only a subsidiary industry.

The height and duration of the inundation of the river is dependent on the melting of the snows in the Himalayas and on the rainfall in the Punjab, and varies greatly. If the river remains high from May to September, a bumper harvest may be reaped over an area of 4·5 million acres. If the river fails, as it did in 1918-19, the area falls to 2·75 million acres and the outturn is very poor.

The most important crop in Sind is rice (1,000,000 acres). The next in importance is *bajri*, which covers almost the same area. The other important food crops are *juar* (600,000 acres), wheat (500,000 acres), and gram (200,000 acres). Amongst non-food crops, cotton was cultivated last year in 326,000 acres and oil-seeds in about the same area. During the decade, 1911-21, the minimum annual value of the crops in the whole of Sind was, according to an estimate made by the Agricultural Department, Rs. 11 crores in 1918-19 and the maximum Rs. 24·5 crores in 1916-17. The relative importance of the chief crops of Sind is shown by the diagram which precedes page xiv.

Rotation of crops is little practised in Sind. Large areas are kept fallow every year. The area privately owned but not cultivated exceeds the net cropped area. Government waste land including forest forms two-thirds of the entire area of the province and of this about a third is culturable waste,

A census of cattle is taken every five years; the following Table gives a summary of the results of the last five censuses :—

No.	Details	1905	1909	1915	1919	1924
		No.	No.	No.	No.	No.
				(Figures in 000's)		
1.	Plough cattle	551	582	601	554	582
2.	Breeding Bulls	8	10	8		22
3.	Cows	537	717	705	617	792
4.	She-buffaloes	223	282	283	259	329
5.	Cattle for other purposes	390	515	581	390	600
	Total cattle	1,709	2,106	2,178	1,820	2,325
6.	Total horses	78	84	81	71	79
7.	Total sheep	302	424	514	564	624
8.	Total goats	909	1,074	1,101	1,028	1,511
9.	Total camels	113	116	117	117	169

The decrease in the census of 1919 was due to the removal of cattle to other regions owing to the absence of grazing in the rainless year of 1918-19. One noticeable feature is the large proportion of milch cattle and cattle for other purposes. The Sindhi drinks milk in large quantities, and when suffering from dyspepsia finds a remedy in camels' milk. The desert and unirrigated parts of Sind are pastoral tracts in which the keeping of cattle is the principal occupation of the population.

According to the last census, there were in 1924, 13 plough cattle, 25 milch cattle, and 13 cattle for other purposes for every 100 acres cropped. Throughout the province, the general condition of the cattle is good.

2. PROVINCIAL INCOME

GOVERNMENT OF

(Figures are in

Revenue and Expenditure)

Revenue Receipts				
Receipt heads	1921-22	1922-23	1923-24	1924-25
<i>Revenue Receipts</i>				
Principal Heads of Revenue—				
Land Revenue	144·2	83·5	72·1	62·0
Excise	31·0	35·5	40·3	39·1
Stamps	16·0	19·4	20·2	19·8
Forest	8·0	6·2	6·3	6·9
Registration	1·8	1·6	1·5	1·5
Scheduled taxes .. .. .	....	....	0·2	0·6
Irrigation—				
Works for which Capital accounts are kept. (Net receipts after deducting working expenses.)	24·0	36·5	39·3	39·2
Works for which no Capital accounts are kept	0·5	0·5	0·1	0·1
Interest	1·7	3·6	2·7	1·8
Civil Administration—				
Administration of Justice	1·5	2·1	1·9	1·8
Jails and Convict Settlements	0·8	0·8	1·0	1·2
Police	0·2	0·3	0·2	0·4
Education	0·7	1·0	1·0	1·5
Medical	0·2	0·4	0·4	0·3
Public Health .. .. .	....	0·1	0·1	0·2
Agriculture (including Veterinary and Co- operation).	0·4	0·4	0·7	0·7
Miscellaneous Department	0·1	....	0·1	0·1
Civil Works	0·5	0·9	0·7	0·9
Miscellaneous	1·8	2·2	3·2	2·6
Total ..	185·4	195·0	192·0	180·7

N. B.—1. As there is no separate budget for Sind, the above figures have been extracted from
2. Figures for Capital Receipts in Sind are not available.

AND EXPENDITURE
BOMBAY (SIND)
 lakhs of rupees)
charged to Revenue

Expenditure charged to Revenue				
Expenditure heads	1921-22	1922-23	1923-24	1924-25
<i>Expenditure charged to Revenue</i>				
Direct Demands on the Revenue—				
Land Revenue	23·0	46·1	30·2	13·8
Excise	2·5	1·3	1·3	1·9
Stamps	0·7	0·9	0·8	0·7
Forest	4·2	3·5	3·6	4·1
Registration	0·8	1·0	0·9	0·9
Irrigation—				
Works for which Capital accounts are kept	11·4	12·9	16·2	21·5
Miscellaneous Irrigation Expenditure ..	38·2	23·1	13·5	23·1
Civil Administration—				
General Administration	14·3	20·7	19·6	44·8
Administration of Justice	10·0	9·6	10·0	11·5
Jails and Convict Settlements	6·3	5·9	5·2	5·9
Police	40·8	36·1	35·1	36·0
Ports and Pilotage	0·1	0·1	0·1	0·3
Education	23·4	23·0	26·6	23·8
Medical	5·9	4·6	5·3	5·3
Public Health	3·1	3·5	2·9	2·9
Agriculture (including Veterinary and Co-operation.)	3·5	3·3	3·3	3·4
Miscellaneous Departments	0·3	0·3	0·3	0·3
Civil Works	22·2	10·4	6·5	8·0
Miscellaneous—				
Superannuation Allowance and Pensions ..	5·9	6·1	6·9	7·1
Stationery and Printing	1·2	1·3	0·9	1·0
Miscellaneous	1·5	1·3	4·0	5·2
Total ..	219·3	209·0	202·2	221·5
CAPITAL EXPENDITURE				
<i>Capital Expenditure in Sind</i>				
Construction of Irrigation Works ..	5·6	19·1	51·5	124·0
Capital Outlay on Improvement in Public Health.	....	5·3	0·5	....
Civil Works not charged to Revenue	....	7·1	5·5	12·2
Total ..	5·6	31·5	57·5	136·2

the budgets for the Presidency of Bombay.

3. REVENUE ADMINISTRATION AND LAND RECORDS

Sind is a province of the Bombay Presidency and is under a Commissioner, who has considerably larger powers than those of an ordinary Commissioner of a division. Under certain Acts he has the powers of a local government, whilst under others he has powers which in the rest of the presidency are exercised by heads of departments. There are seven districts in Sind, of which six are under Collectors and one under a Deputy Commissioner. The Collector or Deputy Commissioner is in charge of the revenue administration of the district and, is also the chief magisterial authority, and the district registrar. For each taluka in the collectorate, there is an officer called the *mukhtiarkar* who, in addition to his revenue duties, is in charge of the sub-treasury and exercises magisterial powers. An assistant or deputy collector is in charge of a revenue sub-division comprising several talukas. The collection of the land revenue is performed by the *tapedars*, each of whom is responsible for a group of villages which varies in number from five to ten. Between the *mukhtiarkar* and the *tapedar* there is a staff of inspecting officers known as supervising *tapedars*, of whom there is one to every four or five *tapedars*. The Manager of Encumbered Estates is an officer of the Indian or the Provincial Civil Service. He is appointed under the Sind Encumbered Estates Act, which was passed to provide relief to *jahagirdars* and *zamindars* in debt. The management of their estates is undertaken by the Manager upon an application by the landholders.

The functions of the Land Records Department are to provide statistics necessary for sound administration in all matters connected with the land, to reduce and simplify litigation in the revenue and civil courts, to provide a record of rights for the protection of all who have interests in land, and, lastly, to simplify and cheapen periodical settlement operations. A branch of the provincial Land Records Department is located in Sind and is under a Superintendent of Land Records. The work in the district is carried on by district inspectors, *tapedars* and supervising *tapedars*. Control over the district staff is exercised by the Collectors, the functions of the Superintendent of Land Records being limited to inspection and advice. A complete record of rights and interests in land has been prepared for the unalienated villages in the province except the Kohistan tract of the Karachi district and the desert tract of the Thar and Parkar district, and has proved of great value to the public.

Before the advent of the British in 1843, the land revenue was levied in kind as a share of the produce. The system was continued for some time but payment in cash was introduced at an early date. Later, a survey and settlement on the lines of what had been adopted in the Bombay Presidency was introduced in Sind, but had to be altered to suit the special conditions of a province where a large part of the land is left fallow every year. The assessment is fixed by the method known as irrigational settlement. In this settlement, the villages of a taluka are divided into groups arranged in accordance with the facilities which they enjoy for

obtaining water and for the disposal of produce at a market. Rates are then prescribed for the different methods of irrigation in each group of villages. The pitch of the assessment is governed by the trend of prices, the value of land, and the state of the canals. This system has the merit of leaving the occupant the choice of the best method of irrigation, season by season, suited to the height of the river and the water-supply available. Assessment is levied on each survey number only when it is cultivated; the size of the number has been reduced to the area cultivable with one pair of bullocks. No assessment is collected on lands which are not cultivated, but to prevent the land lying idle, a fallow assessment is charged once in five years. The period of settlement is normally fixed at twenty years, except in areas where important irrigational projects are under consideration or which are particularly exposed to the vagaries of the river.

There are few tenant rights in existence. The bigger zamindars cultivate the lands through *haris* who are tenants-at-will and usually pay rent in kind. The smaller zamindars cultivate themselves.

4. THE CULTIVATOR

The census of 1921 gave Sind a population of 3,280,000 which was only slightly in excess of the population of 1901. There had been an appreciable increase between 1901 and 1911 but this increase was wiped out by the influenza epidemic of 1918 which took a great toll of life in Sind, especially in rural areas. The decrease in rural population between 1911 and 1921 was highest in the Karachi district, (14·7 per cent), and lowest in the Nawabshah district, (6·6 per cent).

There are 27 towns in Sind and 5,107 villages. The province is sparsely populated, the average number of persons per square mile being 71. Of the population 2·4 millions or 75 per cent are Muhammadan and 800,000 or 25 per cent are Hindus. If the population is classified by occupation we find that 1·9 millions are landholders and tenants or agricultural labourers and their families. The non-agricultural population is 1·4 millions. The agricultural population can be divided into three classes, (1) the big zamindars, a small but very influential class, (2) the small zamindars or peasant proprietors and (3) the *haris* or ploughmen who have no direct interest in the land.

The number of holdings in Sind is about 220,000. Their size and distribution is shown in the following table:—

1. Under 5 acres	..	..	68,819
2. Between 5 and 25 acres	..	..	93,959
3. „ 25 „ 100 „	..	..	42,015
4. „ 100 „ 500 „	..	..	11,596
5. Over 500 acres	..	..	2,251

The total area in these holdings is a little over 8 million acres; the average area of the holding is 38·7 acres and the average assessment per

holding about Rs. 54. The proportion of holdings in each class varies from district to district. The Upper Sind and the Thar Parkar districts have large estates. In Larkana and Sukkur, the proportion of large landholders is very small, but in the former they hold a considerable proportion of the land.

The *hari* is a tenant who pays rent usually on a share basis, the share being half the crop on flow land and one-third of the crop on lift land. He is, as a rule, financed by the landowner himself, who also directs what is to be grown and how it is to be grown, while the *hari* provides his own men, bullocks and implements.

The problem of the consolidation of holdings was investigated but it was found that the evil of fragmentation does not exist in Sind to any large extent and that as large areas of land are still available, the problem has not yet become important.

In years of good inundation, the economic condition of cultivators in Sind is favourable. They are not so well off in the delta, as the region is malarial. The position of the farm labourer has improved very much in recent years, as there is a greatly increased demand for labour. The extension of peasant proprietorship under the Sukkur Barrage system will also benefit men who have the necessary industry and ambition to take advantage of the new conditions.

The staple food of the agrarian classes is either *juar* or *bajri*, except in the delta and the rice-growing parts of the north where rice is generally used. The consumption of wheat is increasing. All classes, except a few Hindus, eat flesh, fowl and fish. The ordinary villager lives in a low hut consisting of mud walls and a roof of thatch, with a hedge round it. Large sections of the people, however, especially in the delta, live in movable shelters of brushwood and thatch. The house of the zamindar is built of dry bricks and with a flat roof, and is usually surrounded by a wall enclosing the court-yard.

The Sindhi is very hospitable and inclined to improvidence in his expenditure; and, in consequence, large numbers are in debt. Where there are no co-operative societies, the cultivator resorts to a *bania* who is both a shopkeeper and a moneylender. He advances to the cultivator whatever he requires on condition that the crop is brought to him for disposal. Wherever the co-operative movement has taken root, the cultivator is being freed from this incubus and is becoming independent. The cultivators have ample leisure after their agricultural operations are over; but are reluctant to leave their villages and go to towns to seek employment. Occupations, such as the care of livestock, goats, sheep and cattle are largely in the hands of special classes. For large works, labour has often to be imported from outside Sind. When the Sukkur Barrage is completed in 1931, and the irrigation system under it developed during the next generation, irrigation will be available for the whole year over the greater part of Sind instead of for four months, and full employment will thus be available for a large proportion of the population.

5. THE AGRICULTURAL DEPARTMENT

The department in Sind is an integral part of the Department of Agriculture in the Bombay Presidency and is, therefore, under the control and guidance of the Director of Agriculture, Poona. Work in connection with agricultural problems in Sind began with the establishment of an experimental farm at Hyderabad in 1884, when experiments were made with American cotton and the Egyptian date palm; the distribution of wheat and rape seed in the Nara Valley was also commenced. Very little headway was, however, made until 1903 when the construction of a perennial canal (the Jamrao Canal) suggested the possibility of growing long staple cotton and experiments were also undertaken with wheat, *berseem* and the irrigation systems in vogue.

In 1906, a special officer was appointed to carry out investigations into Sind conditions and especially to study the problems of cultivation of Egyptian cotton. This led, in 1907, to the appointment of a deputy director of agriculture for Sind. Since then, work has developed in several directions. Excluding the lower grades of assistants and the special staff employed in connection with the experimental work undertaken in view of the Sukkur Barrage, to which reference is made below, the staff now consists of—

- (1) one deputy director of agriculture ;
- (2) one botanist. Although he is designated cotton breeder, he is also in charge of rice breeding and wheat breeding ;
- (3) a divisional superintendent of agriculture who is in charge of work in east Sind ; and,
- (4) thirteen graduate assistants.

The Livestock Expert for the Bombay Presidency has control of a farm in Sind for the maintenance and improvement of the red Sindhi or Karachi breed of cattle. Sind can also indent on the services of expert officers of the Bombay Government, such as the Agricultural Chemist, Economic Botanist, etc.

The main lines of experimental work have been the following :—

(1) *The introduction of long staple cottons.*—Attempts to introduce Egyptian varieties have for the present been abandoned ; and attention is now concentrated on the introduction of American cottons. The two Punjab types, 4 F. and 285 F. have now been introduced on a large scale, especially in the Jamrao area. These are high yielding cottons, but the cotton breeder in Sind has succeeded in isolating still higher yielding strains from the general Punjab stock. These Punjab and American cottons are being multiplied as fast as possible ; and it is hoped that Sind will shortly be self-dependent in the matter of American cotton seed.

(2) *The improvement of Sind deshi cotton by selection.*—Of the several strains isolated during the last few years, the variety known as 27 W. N. has been selected for distribution and has become popular.

(3) *The improvement of wheat.*—Here the work being done is the introduction of Pusa and Punjab wheats as well as the development of high yielding strains of Sind wheat. Pusa 12 has become the standard type of wheat in upper Sind. Two new strains have, however, now been evolved which are doing even better than Pusa 12. It is now possible to recommend different varieties and improved strains of wheat for different parts of Sind, and these have already become very popular. A wheat seed farm is maintained at Jacobabad.

(4) *The improvement of rice.*—Experimental work on rice has been recently taken up; and early and more prolific types have now been isolated which, on experimental areas, give an increased yield of 20 to 30 per cent. These are now being tried on a large scale in cultivators' fields.

(5) *Work on agricultural implements.*—Agricultural implements used in Sind are generally very crude. An appreciable advance has now been made by the department in the introduction of the Egyptian plough and various types of implements of economic value.

The establishment of the Sukkur Barrage canal system will revolutionise the character of the agriculture in Sind. When the scheme is completed, the cropped area in Sind will be increased by two to three million acres annually, and cropping will be possible throughout the year. New and difficult problems will arise when perennial irrigation is introduced into a country which has hitherto been watered only during a small part of the year. The Government of Bombay, therefore, appointed, in 1923, a committee to make suggestions as to the best way in which such problems should be tackled. The committee recommended the starting of experimental work at once under the best and most scientific direction obtainable and the finance thereof on a liberal scale; and, in particular, (a) the establishment of three first class experimental stations: one on the right bank of the Indus, preferably at Larkana, another on the left bank of the Indus at Sakrand, and a third at Shadipalli for the Eastern Nara tract; (b) the establishment of five subsidiary stations; (c) experimental work on fruit culture and cattle breeding; (d) larger expenditure on propaganda, the provision of higher agricultural education in the province itself, and the separation of the Agricultural Department in Sind from that of the presidency proper, the former being placed under the sole control of a local Director of Agriculture. The total capital cost of this scheme is estimated at Rs. 7,69,000; and the recurring cost, Rs. 4,10,000. The Government of Bombay accepted the recommendations with certain reservations but have not yet succeeded in finding the finance necessary. For the present, provision has been made only for the new experimental station at Sakrand with a Director and a botanist, a soil physicist and chemist, a horticultural expert and six graduate assistants under him; and also for an agricultural engineer for Sind. The land at Sakrand is typical of large areas in the country. The problems which the station is required to solve are mainly three; (1) to determine what crops can most profitably be grown under Barrage conditions in

central Sind, and to breed types of such crops; (2) to find the best way of using the water in the prevailing conditions and (3) to find out the effect of perennial irrigation on the soil. Experimental work on all these problems was started at the station in 1926.

Demonstration and propaganda.—Two difficulties in the way of introduction of agricultural improvements in the past have been the illiteracy of the people and the want of proper finance. The close co-ordination of the departments of Agriculture and Co-operation in Sind is helping the solution of the question of finance. Since 1922, the carrying out of agricultural propaganda in northern and central Sind has been entrusted to the Assistant Registrar. The general control of the work is in charge of a divisional board composed of six members of whom four are non-officials and two officials—the Deputy Director of Agriculture, and the Assistant Registrar. Taluka development associations have been particularly successful in Sind, and there are fourteen such associations now in existence. They have demonstrated the value and extended the use of improved seed, implements, and modern methods of cultivation, have distributed large quantities of cotton and wheat in many areas, and are becoming an essential part of agricultural propaganda in the country.

Agricultural education.—As there is no provision for the imparting of higher agricultural education in Sind, scholarships have been given since 1907 to enable students from Sind to go to the Poona Agricultural College. Selections are made by the Commissioner, and each scholar signs a bond that he will work in the Agricultural Department for five years after graduation if his services are required by the department. From 1918 to 1922 these scholars were sent to the Punjab Agricultural College at Lyallpur instead of to Poona; but since 1923, the scholarships have again been transferred to Poona, as the Punjab authorities demanded the full cost of their training. The number of scholarships awarded at present is six per annum. Besides these scholarship-holders, there are a few private students from Sind at the Poona Agricultural College.

In 1912, a school for imparting vernacular agricultural education to boys belonging to cultivating classes was opened at Mirpurkhas with the object of enabling them to improve their own lands, to manage the estates of zamindars, or to enter agricultural service. The school never became popular and was closed in 1922. Since 1924 nine agricultural bias schools have been opened in Sind.

The cost of the department in Sind last year was Rs. 1,55,908. This is exclusive of the cost of the Sakrand farm, for which the amount budgeted was Rs. 1,35,000.

Livestock—Cattle breeding and dairying.—Sind is the home of three breeds of cattle of considerable merit:

- (1) the Red Sindhi or Karachi, the best milking breed in India;
- (2) the White Sindhi or Thar Parkar, a good milker and an efficient draught animal;

(3) the Bhagnari from the borders of Baluchistan, one of the best draught breeds in India.

The department has started a farm close to Karachi for the maintenance and breeding of the Red Sindhi. This farm contains the best milking stock in the country. A few Thar Parkar animals also are kept on it but a proposal is under consideration to start a separate farm for that breed in the Thar Parkar country. There is no provision for a similar provision for the Bhagnari breed of cattle. A small herd of Murrah or Delhi buffaloes is kept at Sukkur.

Cattle breeding in Sind is under the control of the Livestock Expert who works in co-operation with the Deputy Director of Agriculture. Premium bulls are given out by the department to selected cultivators on certain conditions and this system is now specially used for the provision of good Bhagnari bulls in upper Sind.

6. THE VETERINARY DEPARTMENT

The Veterinary Department in Sind is independent of the department in the Presidency. Sind has a separate Superintendent who is also in charge of Rajputana. His staff consists of two veterinary inspectors and 21 assistant surgeons, 18 of whom are in charge of dispensaries and 3 are on reserve duty. Of the 18 assistant surgeons in charge of the dispensaries, one is a local board servant.

The number of veterinary dispensaries is 18; the total number of patients treated at these dispensaries last year was about 26,500; medicine and advice were also given in the case of 3,800 other animals not brought to the dispensaries. The dispensaries are under the control of the district local boards, the assistant surgeons in charge being supplied by Government.

Besides supervising the work of the dispensaries, the Veterinary Department is also engaged in the prevention and cure of contagious diseases, among which rinderpest is the most common. Other prevalent diseases are foot-and-mouth disease and hæmorrhagic septicæmia. Anthrax and black-quarter also occur at times. The number of animals inoculated in 1926-27 was nearly 13,000.

The Veterinary Department in Sind also supervises horse breeding operations. There are 9 stallions in the province towards whose maintenance Government contributes half the cost.

The total cost of the department for last year was about Rs. 1,84,000 out of which Rs. 90,000 came from provincial revenues and Rs. 94,000 from the local authorities. The latter amount includes a sum of Rs. 24,000 paid by the Wadia Trust.

7. IRRIGATION

Practically the whole cultivation in Sind depends on irrigation by canals from the river Indus. The inundation of the river, which begins in May and subsides in September, depends on the melting of the snows in

the Himalayas and to a large extent upon the rainfall in the Punjab and the consequent accretions to the Indus flood from the five tributaries of the Punjab. The water carried by the river varies from 20,000 cusecs in February to 950,000 cusecs in August. The water is gauged at several points and when the level reads above 13 feet at Bukkur and 17 feet at Kotri for the greater part of the three months June, July and August, the canals receive an adequate supply. If the level of the river rises to this height in May and does not fall below it till September, the cultivating season is prolonged and the harvest is bountiful, but such years are rare.

For some 400 miles from Kashmor in the north to below Tatta in the south, the river is confined by almost continuous earthen embankments; the height of these embankments varies from ten to twenty feet according to the height of the bank of the river; it is only at rare intervals that the bank is so high as to require no embankment. When the river level rises above 16 feet at Bukkur or 22 feet at Kotri, there is serious danger of breaches in the embankment and of grave damage by flood. As the Indus runs through soft alluvial sand in most places it is liable to change its course by several miles in rapid movements and the task of protecting the embankments calls for constant vigilance and involves heavy expenditure by the State. These embankments have been constructed and gradually improved and strengthened in the last fifty years: at dangerous points, the earth wall is faced with brick or stone.

The system of irrigation from inundation canals existed before the British assumed control of Sind in 1843. These canals have been continuously extended and improved and new canals have been constructed so that, at the present date, 7,925 miles of canals are under the administration of the Irrigation Department. The supply of water is controlled by masonry head works. For the most part, the water runs on a higher level than the surrounding fields and flows on to them through distributaries which are also controlled by masonry outlets. Dams and regulators are constructed at suitable intervals to raise the height of the water in the canals. In certain tracts, particularly in the centre of Sind on the left bank, the land is higher than the canals and the water has to be raised by lift. The method commonly adopted is that of the Persian wheel worked by bullocks or camels.

In order to guard against the erosion of the embankments, a channel several miles wide has been left for the swings of the Indus and, in this tract, considerable areas are cultivated on the moisture left in the soil after the subsidence of the inundation. These are the winter crops, wheat, oil-seeds and pulses. Of the total present cultivation of Sind, 72 per cent is *kharif* and 28 per cent is *rabi*.

The irrigation system in Sind is now in process of being converted from an inundation to a perennial basis by the construction of the Sukkur Barrage and of a new system of canals which will run from the Sukkur Barrage on both sides of the river; on the right bank to the west for 132 miles until the Kohistan hills interpose a barrier close to Sehwan; on the left bank to the east over 205 miles

past Hyderabad to the Rann of Cutch and to the elevated sand-hills of Thar Parkar. It is estimated that this scheme will alter the irrigation of two-thirds of the present irrigated area of Sind, rendering water available for the whole twelve months of the year instead of for the short inundation period of four months. The system will also supply water by flow to large tracts now irrigated at considerable expense by lift. It will also provide water to 3·5 million acres which now have no available supply for irrigation. The area commanded by this scheme is 7·5 million acres, of which it is anticipated that 5·5 million acres will eventually be cultivated annually. This area of 5·5 million acres cultivable by this scheme exceeds the present culturable area of Egypt by 500,000 acres.

The project is estimated to cost nearly Rs. 20·25 crores, of which 5·5 crores are debited to the Barrage and 14·75 crores to the new canals. The Barrage is located three miles below the gorge of the river Indus between Sukkur and Rohri. It is to be equipped with movable gates which will be raised when the inundation rises and will be lowered when it falls so that the level of the water may be retained at a height sufficient to fill the canals which take off above the Barrage. It is anticipated that with the supply of water throughout the year the cultivating season will be largely altered and two-thirds of the area will be brought under crops in the winter season and one-third in the summer season. The cultivating season for cotton will be prolonged from four months to eight months, enabling the substitution of long staple cotton for the less valuable short staple varieties. It is also anticipated that wheat and oil-seeds will also be substituted for the less valuable crops of millet, while the area under rice will remain unchanged. The main difficulty of the cultivator at the present time is the lack of employment for many months of the year and it is hoped that, in this tract, this difficulty will be wholly relieved.

The plain of Sind is so level, having an average slope of six inches to the mile from north to south, that there are few natural drainage channels; and the problem of supplying drainage in conjunction with the new irrigation scheme is receiving the attention of the engineers.

8. FORESTRY IN RELATION TO AGRICULTURE

The area in charge of both the Forest and Revenue departments is only 1,171 square miles. The forests which are situated along the banks of the Indus run in narrow strips from a quarter of a mile to two miles in breadth. They are liable to erosion and are seriously affected by changes in the course of the Indus.

The indigenous trees consist of *babul* (*Acacia arabica*), *kandi* (*Prosopis spicigera*), *bahan* (*Populus euphratica*) and two kinds of tamarind. A valuable tree, sometimes found, is the *tali* (*Dalbergia sissoo*).

Babul trees produce wood suitable equally for building, fuel and ploughs; seed pods useful for feeding cattle; bark for tanning; and leaves and thorns as a favourite fodder for camels and goats; and

within the limits of central Sind are a host for the lac insect. *Bahan* yields light soft wood for building purposes.

The number of cattle admitted to grazing in the forests in 1925-26 was nearly 100,000, equally divided between horned cattle and sheep and goats. About 2,000 camels were also admitted to browsing. The average expenditure on the forests in Sind for the last quinquennium came to Rs. 3·75 lakhs, while the revenue was Rs. 6,85,000.

Besides the State-owned forests mentioned above, it is not uncommon in Sind for zamindars to have private groves of their own. These are known as *kuris* which are well preserved and are a source of appreciable profit to their owners.

9. GENERAL EDUCATION

Educationally, Sind is very backward : the percentage of literacy for all communities is 4·1 only ; but in the case of Muhammadans it goes down to 2·7 and amongst the advanced communities rises to 12·6. The fact that the population is widely scattered is a great obstacle in the spread of literacy. The main reason, however, is the general apathy to education of the Muhammadans who form three-fourths of the total population. Recently, however, this community has shown greater interest in educational matters, and more rapid progress may be expected in the near future.

The educational system in the province is identical with that of the presidency proper. The superior staff of the department in Sind consists of an educational inspector, an inspectress for girls' schools, a senior deputy inspector for each district except Thar and Parkar where there is a deputy inspector and a special deputy inspector for Urdu and Mullah schools.

The changes in the administration of primary education which have been made by the Primary Education Act of 1923 have been described in the introduction to the volume of evidence for the presidency proper. All the district local boards in Sind, with one exception, have taken over the control of primary education in accordance with the terms of the Act.

Institutions for higher education are confined to :—

- (1) two arts colleges at Karachi and Hyderabad ;
- (2) a special Medical School at Hyderabad, where men are trained for the subordinate medical service ;
- (3) an engineering branch of the Arts College at Karachi ; and
- (4) a Law College at Karachi.

Sindhi students also attend the institutions in the presidency proper.

The total number of students in primary schools last year was a little over 100,000, of whom girls numbered one-fifth. Thus about 21 per cent of the school-going population was at school. There is the same wastage in primary schools in Sind as in the other parts of the presidency, the attendance falling rapidly in the upper classes. Of 100 students

attending primary schools, less than nine reach the upper primary (vernacular middle) standards.

As Sind is predominantly a Muhammadan province, special reference may be made to education amongst that community. The number of Muhammadan pupils receiving instruction in Sind last year was 66,818 of whom about 17 per cent were girls. Fifty-four thousand of these were in primary schools, 2,700 in secondary schools, 86 in colleges and 365 in special and training schools. Of the students in primary schools, about 36 per cent were in Mullah schools, in which, under the control of religious teachers, religious instruction as well as secular is given to Muhammadan boys. These schools are recognised by the State and receive grants graduated according to their efficiency. There are now 724 of these schools, and the grants-in-aid amounted to Rs. 3·25 lakhs. The expenditure on Muhammadan education in Sind was roughly estimated at Rs. 22 lakhs out of which Rs. 12 lakhs were met from the provincial funds. The total expenditure on education in Sind last year was Rs. 50 lakhs out of which Rs. 27 lakhs were contributed from provincial funds.

10. CO-OPERATION

The co-operative movement in Sind is comparatively new. Attempts at the formation of societies started with the passing of the Co-operative Credit Societies Act of 1904. Little progress was, however, made until a separate Assistant Registrar for Co-operative Societies was appointed in 1918. Up to that date, only 65 societies had been organised, which had a membership of about 3,000 and a working capital of Rs. 1,63,000 only. Many of these societies existed only in name and did little work. The Assistant Registrar, on his appointment, carried on vigorous propaganda, secured the co-operation of all classes of agriculturists, revised the constitution of existing societies, and drafted by-laws to suit the existing conditions in Sind. The by-laws were modelled on those in force in the Punjab where conditions were more or less akin to those prevailing in Sind. The chief difference in the constitution of the societies in Sind and those in the presidency proper is that the former are organised on a share basis—a system which is described below.

The difficulties in the way of organising societies were many. The Registrar of Co-operative Societies, in 1917, reported that the societies were still "at too elementary a stage to justify a prophecy that the movement will ever take firm root in Sind." The general illiteracy prevailing in the province, the aversion of the bulk of the population, which is Muhammadan, to the taking of interest, the predominating influence of the big zamindars, and the prevalence on a large scale of the *hari* system under which the cultivator has no direct interest in the land, as well as the absence of big villages were great handicaps in the rapid development of the movement, but since 1918 the movement has developed rapidly in the province. The co-operation of the educated leaders of the people has assisted this development. The number of societies increased from 65 in 1918 to 481 in 1923.

During the same period the membership and working capital increased from 3,000 and Rs. 1,63,000 to 19,000 and Rs. 38 lakhs respectively. At the end of March 1927, the corresponding figures were 863, 39,247, and Rs. 137 lakhs. The results of the working of the movement have been very striking. Not only are members financed for their current needs, but, in a very large number of cases, they have been freed from their debts. Mortgage bonds and conditional sale deeds have been redeemed, habits of thrift have been inculcated, and several members have purchased fresh plots of land out of their savings. Most of the members have severed their dealings with the moneylender altogether. A striking feature in the movement in Sind is the large percentage of owned capital of primary societies and the large amount of share capital of the members, showing how well the lesson of thrift has been inculcated. The by-laws of these societies provide that the minimum holding of each member shall be one share of Rs. 20 payable by yearly instalments of Rs. 2. But from the beginning each member has taken up a substantial number of shares, increasing his contributions from year to year. The result has been that in practice each member holds a considerable number of shares. It is a common thing in a society of five years' standing for a small zamindar to hold Rs. 150 to Rs. 300 and for a *hari* to hold Rs. 100 to Rs. 150 in shares. The reserve fund of the societies now amounts to nearly Rs. 4.5 lakhs. It has reached a substantial figure in the older societies. Some of the societies on the Jamrao Canal now have sufficient owned capital to meet the total needs of all without any outside borrowing.

The co-operative movement in Sind had until recently catered for the needs of the small zamindars only. The big zamindars in Sind, however, are as heavily in debt as the smaller ones. These, in two districts, have now been organised into two zamindari banks on the co-operative model. Although they have been in existence only for two years, these banks have now a working capital of over Rs. 5 lakhs and have been of substantial benefit to their members.

The progress made would have been impossible of achievement, had arrangements for financing the movement through the organisation of central banks not been made. Till 1918-19, the societies obtained finance from the Bombay Provincial Co-operative Bank. Since then central banks have been established in Sind itself. The first to be established was the Central Bank at Karachi. At present not only is there a bank for every district, except the Upper Sind Frontier, but the Karachi Bank, besides acting as a central bank for the district of Karachi, also serves as an apex bank for the whole province. There is now a complete net work of central financing institutions in the province, and there is no difficulty in getting sufficient funds to finance the primary societies. The total working capital of the six central banks in Sind was Rs. 64 lakhs last year.

The ideal of spreading agricultural improvements through co-operative societies has also been fulfilled to a considerable degree in Sind. There are eleven seed societies organised for the distribution of improved

varieties of seed. The main work of improvement, however, has been done through taluka development associations, and the few simple but substantial improvements which the associations have been able to demonstrate have been largely adopted by the members of co-operative societies. Amongst the improvements introduced may be mentioned the distribution of improved varieties of wheat (Pusa 12) and cotton (27 W. N.), the large distribution of the Egyptian plough, and the introduction of the Raja and monsoon ploughs, the Archimedean screw and various clodcrushers. The work of these associations is done almost entirely through members of co-operative societies. They appoint *kamgars* and supervisors to visit villages, to hold demonstrations of improved seed, implements, and modern methods of farming. Experiments are also being made to get the associations and supervising unions to indent for the agricultural and other domestic requisites of agriculturists and to distribute them amongst their members. So far, the experiments have proved very successful.

The whole work is done under the general supervision of the Registrar of Co-operative Societies, by the Assistant Registrar stationed at Hyderabad. He has a deputy working under him and also six auditors. The Assistant Registrar is helped in the work of organisation and supervision by honorary organisers as well as by the supervising unions into which the societies are now being organised. The Bombay Provincial Co-operative Institute has also a divisional branch in Sind, which has been doing valuable work in the way of carrying on co-operative propaganda, holding conferences, and training classes for members, secretaries, and honorary organisers, and conducting a co-operative magazine. District branches of the Institute are also being established.

11. COMMUNICATIONS AND MARKETING

In 1851, Sir Bartle Frere found in all Sind "not a mile of bridged or metalled road, not a masonry bridge of any kind; in fact, not five miles of any cleared road." The sandy nature of the soil, the difficulty of getting metal, the liability to inundation make the construction and upkeep of roads a very difficult and expensive matter; and, in consequence, even now Sind is badly served in the matter of roads. There are no doubt recognised routes by which traffic is carried in the dry season between large towns; e.g., from Karachi to Shikarpur and from Hyderabad to Jodhpur and Multan. These routes, however, were, and still are, mere tracks suited to the camel but bad for wheeled traffic. In north Sind, the use of carts is more common, but in the other parts camels, pack bullocks, donkeys and horses form the usual means of transport. Where carts are used they are very heavy and primitive and are a great strain on the bullocks.

Before the advent of the railway, the river was one of the chief means for the carriage of produce over long distances and it is still used for that purpose. It was under the charge of a special government department known as the Indus Conservancy Department which, however,

was abolished in 1906. It is now under the charge of the Indus River Commission. Although the navigation of the river has engaged the serious attention of Government since the time, nearly a century ago, when it was necessary to use the river for the passage of troops to Multan and Afghanistan, the conservancy of the river really commenced only with passing of the Bombay Act I of 1863 which provided for the registration of vessels and the levy of pilotage fees, the sums so realised to be expended in removing obstructions on the river and improving its navigation.

Sind is now connected by rail with all parts of India and through Baluchistan up to the Afghan and Persian borders. By sea, there are regular services to Bombay and to the Persian Gulf; while passenger steamers leave the port of Karachi regularly for Europe. Karachi is now becoming the port of call for air traffic.

The main arteries of traffic are now the railways, the most important of which is the North Western Railway which connects Karachi with the Punjab. A new broad gauge connection with Delhi through Rajputana is again under consideration. The first railway to be started was on the right bank of the Indus. As this line was frequently breached an alternative line on the left bank was constructed and this has now become the main route to the Punjab. A line was opened from Hyderabad to Badin in 1904, and an extension is now proposed across the Rann of Cutch to meet the Bombay-Baroda and Central India Railway at Viramgam, thus affording through communication, without break of gauge, from Sind to Bombay. At present there is a meter gauge connection from Hyderabad to Ahmedabad by the Jodhpur-Bikaner Railway.

There are a number of feeder lines in Sind which connect important marketing places and carry a large part of the export produce of the country. These are the Hyderabad-Badin, Mirpurkhas-Khadro, Mirpurkhas-Jhudo, Larkana-Shahdadkot, and Jacobabad-Kashmor lines.

Marketing

Crops are ordinarily sold in the field. The trader goes round to collect the cotton, wheat, rice or oil-seeds and brings it by camel load to the nearest market or railway centre. Rice is purchased locally from producers, husked and parboiled in the chief local centres like Larkana, and then exported. A large number of rice mills have now been erected in all the rice growing centres. No grading is done for the internal trade, but traders sometimes grade for their own benefit or under pressure from the ultimate buyers.

The chief hindrances to proper marketing are the bad condition of the roads, the lack of carts, the want of standardised weights and measures, and the lack of storage accommodation.

12. LOCAL SELF-GOVERNMENT

Local self-government in rural areas dates from the year 1884. The proportion of elected and nominated members on local boards was

originally fixed at two-thirds and one-third respectively. The system established by the Local Boards Act of 1923 for the Bombay Presidency holds good for Sind, and the description need not be repeated here. The income of all the boards in Sind in 1925-26 was Rs. 34·25 lakhs, while their expenditure was Rs. 32·5 lakhs. Income from local rates came to Rs. 10 lakhs, the grants from Government amounted to Rs. 16 lakhs of which Rs. 9·5 lakhs was for education, Rs. 50,000 for medical purposes, and Rs. 5·25 lakhs for civil works. The total expenditure on education was Rs. 12·75 lakhs; on hospitals, dispensaries, etc., Rs. 2·75 lakhs; on veterinary charges Rs. 42,000, and on communications Rs. 6·75 lakhs.

The greater part of the revenue is usually spent by the district local board on works of general utility to the whole district; but each taluka local board has funds at its disposal to enable it to carry out and maintain works of purely local utility for which it is primarily responsible. At least one-third of the revenue derived from the one-anna cess must be spent on education.

Local boards are bound, so far as their funds permit, to make adequate provision for education, water-supply, construction and maintenance of roads, hospitals, dispensaries and markets. They have also the discretionary power to spend money on the establishment and maintenance of model farms, the improvement of breed of cattle, and the advancement and improvement of agriculture and local industries generally.

13. PUBLIC HEALTH AND SANITATION

Malaria is the most prevalent disease in Sind. The proportion of deaths ascribed to this cause in Sind is greater than in the presidency. While the death rate from malaria for the presidency as a whole in 1926 was only 2·83, in Sukkur it was 15·13 and in Thar and Parkar 14·50. In that year, all districts in Sind suffered heavily from malaria owing to the high floods and heavy rainfall. Quinine can be obtained through post offices and is also distributed free to school children. The efficacy of quinine in the prevention and cure of malaria is now well recognised in the province and the free distribution of the drug is popular.

Other prevailing diseases are small-pox and cholera. The latter as well as plague, which used to take a large toll at one time, have now been brought under control and Sind has practically escaped from them during the last few years. Small-pox, however, often occurs. The attacks during each of the last two years from this disease were between 5,000 and 6,000 each year and the deaths varied from 1,100 to 1,200.

The birth rate in Sind in the years 1925 and 1926 was 20·58 and 24·32 per thousand respectively, the figures for rural areas being 21·69 and 17·80 respectively. Faulty registration as well as the nomadic habits of part of the population make the figures unreliable. The death rate in the same two years was 19·29 and 16·96 respectively as compared with a rate of 15·20 for the quinquennial period. The urban rate (29·97) greatly exceeds the rural death rate (17·37), but this again is probably

due to faulty registration. Infantile death rate is very high, 185 for 1,000 registered births.

Every district except the Upper Sind Frontier has a Civil Surgeon. For sanitation and vaccination there is an Assistant Director of Public Health for the province who has his own staff of inspectors and vaccinators. There are several hospitals in the district towns and numerous charitable dispensaries in the smaller towns. Vaccination has made satisfactory progress.

ROYAL COMMISSION ON AGRICULTURE.

MINUTES OF EVIDENCE

TAKEN BEFORE THE

ROYAL COMMISSION ON AGRICULTURE.

Friday, March 25th, 1927.

BOMBAY.

PRESENT :

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

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

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

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

Raja SRI KRISHNA CHANDRA GAJA-
PATI NARAYANA DEO OF PARLAKI-
MEDL.

Professor N. GANGULEE.

Dr. L. K. HYDER.

Mr. B. S. KAMAT.

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

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

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

Oral Evidence.

58,626. *The Chairman:* We have a great deal of information about the Department of Agriculture in Bombay and the agricultural education and research in the Presidency, particularly at Poona. Since we examined you last, we have had an opportunity of seeing something of the country that is to be irrigated by the Sukkur Barrage and incidentally of seeing the site of the barrage itself. You were a member of the Committee which sat to consider the special problems arising out of the new irrigation scheme. It will be useful to have from you some idea of the rate at which the recommendations of that Committee, in the matter of research, demonstration and agricultural education, are to be given effect to. First, may I ask you whether the suggestions that that Committee put forward are, broadly speaking, the policy of the department at the moment to cope with the new conditions in Sind?—The proposals put forward by that Committee are the policy of Government in connection with developments in Sind, but they have been very, very much curtailed from what the Committee proposed. The lines of policy have been accepted by Government.

58,626A. I, at any rate, and I daresay some of my colleagues, have been impressed by the difficulties which have faced Agricultural Departments

NOTE.—This evidence has been reprinted from Volume II, Part II, and renumbered.

owing to fixed customs, established practices and even vested interests, and I think we have felt that in Sind you have a wonderful opportunity of being ahead of time instead of astern of time; are you satisfied with the proposals as they stand and with the rate at which the various elements in these proposals are to be given effect to?—No, I am not satisfied with the rate of progress at which it is intended to carry them out and which has been already sanctioned. The proposals made in 1924 were, I think, fully justified by the importance of the issue in the next few years; but they did cost a very great deal of money which the Presidency was not prepared to face at the time when the decision had to be made in 1925. I was at that time asked by the Minister what were the more important things and what were the more important lines of development, which should be taken up first. I then laid down those lines of development, and they were accepted *in toto* both by Government and by the Legislative Council. But I presented them as a makeshift and as representing merely the more important parts of what I considered were necessary. In passing those it was stated definitely in the Legislative Council that they must be looked upon as the maximum scheme for which money was then available, and that nothing further in this direction would be considered until and unless the matter had been previously discussed by a predominantly non-official committee from Sind. It has taken all my time since then to get the scheme, as actually sanctioned, on foot. In fact, it is not actually on foot at present, and I am not pressing for any further development at present because I do not think I am ready for it. But when we are ready for it (we shall soon be ready for it), I certainly feel that it ought to be undertaken, at any rate ahead of the time when the water will become available in the Province.

58,627. Will that be in 1931?—Yes; in 1931 water will be available.

58,623. After which, development will take place very quickly?—The engineers estimate that it will take forty years before the project will be absolutely complete, but the big developments will take place in the fourth, fifth, sixth and seventh years after 1931.

58,629. Now, in the meantime, you have a station in Sind called Sakrand; is the proposal to start various sub-stations or to extend that?—That station at Sakrand was established as representing as nearly as we could, the largest section of the Barrage, namely the Left Bank Rohri Canal area, about which we felt that we knew least. That was looked upon as a central experimental station essentially for scientific work. When results have been obtained, sub-stations would be established both in the north and south, in order to attempt to work out those results in other stations.

58,630. *Professor Gangulee*: So that you have two stations in view; you have one already?—So far as a central experimental station is concerned, we have only this one; but the idea is to have two sub-stations, one in the north and one in the south.

58,631. What about Larkana?—I am now speaking about the Left Bank area. The Committee proposed a similar central station, one for the Right Bank canals in Larkana; it also proposed a third for the Nara Valley, representing Eastern Sind, without specifying any place.

58,632. Conditions vary from one bank to the other?—The conditions vary very much, both under the proposed method of cultivation and under the existing method of cultivation. Sakrand represents the area which is at present very markedly a cotton area. Now, on the Right Bank, there is practically no cotton, and that has to be developed as a rice and *bosi* wheat area. So that the problems facing the Right Bank are

Dr. Harold Mann,

entirely a different series of problems from those that face the Sakrand area where we are working at present; not only are they different because the crops grown are different, but at present cultivation on the Left Bank area is essentially based on one cropping in three years, and cultivation on the Right Bank area is based on annual cropping, which means the whole organisation of agriculture is entirely different.

58,633. *Mr. Calvert*: What are the crops?—On the Right Bank it is now rice and *bosi* wheat; on the Left Bank it is one crop in three years, either cotton or grain.

58,634. *The Chairman*: What is *bosi* wheat?—A *bosi* crop is a crop grown with flood water, and not with irrigation water, applied direct to the crop.

58,635. What about the officers required to man these rather substantial extensions when they come along in Sind? Will you be able to find them?—That is a matter of very great difficulty; but so far as the Sakrand centre is concerned we were allowed to have three first-class research officers there, and I think we have got good men. I am one of them; I have spent pretty well half my time there (about five to six months a year) under the present organisation.

58,636. *Professor Gangulee*: The proposal is to have an independent man?—Yes, a whole-time man at Sakrand; that is what Government have agreed to. That is perhaps not quite the way to put it. The Legislative Council insisted that I should take personal responsibility for the actual work at Sakrand; they granted the money only on that understanding. On that, so long as I am here Government have allowed me to take personal responsibility for the work there. When I go, of course, then naturally there will be a separate Director for the Sakrand station for this experimental work, with two first-class research officers.

58,637. *The Chairman*: Independent of the Director at Poona?—It was not originally intended that he should be independent, but it may come to that. I may perhaps tell you what is the present proposal. May I do so? (*Sir Chunilal Mehta*: Yes.) The present proposal is that I am going to retire from the Presidency next October, but Government have asked me to take charge of Sind, as a special charge independent of Poona, for the next three years, to have my residence at Sakrand and be in charge of the whole work at Sakrand and in Sind. That is the proposal; I have not yet agreed to it.

58,638. *Professor Gangulee*: Who are the scientific workers working at Sakrand?—I have got two men, a Soil Physicist and Agricultural Chemist, and an Agricultural Botanist.

58,639. *The Chairman*: How soon do you expect these developments in the organisation to be completed?—I reckon that within the next 12 months the present scheme will be completely ready; then, I shall be prepared to put forward the next stage in order to complete the organisation which the Committee originally proposed. What Government will do I do not know. I shall put forward within the next 12 months proposals for the carrying on of the next stage.

58,640. Have you been able to procure officers who are Sindhis?—Of the two men, in addition to myself, in first-class positions at Sakrand, one is a Sindhi and the other I have taken from the Presidency.

58,641. As regards your future demonstration staff, will you make an attempt to man that with local men?—Yes; entirely with Sindhis so far as it is possible; as far as demonstration work is concerned, with Sindhi Mussalmans, because the agricultural classes in Sind are almost entirely Mussalman.

58,642. Will they be trained at Poona?—Their training will be at Poona; then I shall take them to Sakrand or some other station in Sind for a year or two for special training; and then they will work in the areas.

58,643. And ultimately you hope, I suppose, to provide facilities for training in Sind itself?—I hope that will be done. The Committee of which I have spoken recommended to Government to have a special agricultural college in Sind. That was turned down as being a matter which they could not face at the present time, but it is being at the present time taken up by others, and there is now a local movement independent of Government to establish an agricultural college in Sind. How far that will come to anything within the next couple of years I do not know, but at any rate there is a very strong local movement in that direction.

58,644. Do you think that there is an active, local demand in Sind in favour of research, demonstration and education?—Yes, I think there is quite an increasing demand. Within the last three years the increase in local support and local enthusiasm towards demonstration and towards improvement has been very remarkable indeed. In the year 1922, as Sir Chunilal Mehta knows, there was a very great deal of local apathy; now, I am astonished to find how extreme is the desire to have further help, and help in directions which, three years ago, people would not have.

58,645. *Professor Gangulee*: Is it due to the presence of the Sukkur Barrage?—No; the cause of it, we imagine, is the alteration in the method of demonstration in Sind; the alteration, which was done at Sir Chunilal's direction, has been marvellously successful.

58,646. *The Chairman*: At the present time the prospect of new irrigation has awakened public opinion all over Sind, has it not?—Yes, indeed; everywhere there is a state of expectation now, extending even among the small cultivators.

58,647. Do you anticipate that the new irrigation and the consequent increase in the population will produce an extension in the amount of land under petty ryotwari cultivators?—I hope it will.

58,648. Have you been consulted from the agricultural point of view on that?—No; not on the question of distribution of land. But my feeling, judging from the existing state of things, is in favour of the encouragement of the small holder if possible.

58,649. Do you think that particular aspect of the problem has an agricultural side to it, as to which you may be expected to be consulted?—I do think so.

58,650. *Professor Gangulee*: Has Government formulated a definite policy with regard to the distribution of land?—They have not published any policy; in fact, I understand that the matter is still under discussion in our Government. I have repeatedly referred to the Revenue Officer in connection with the Barrage, and up to date he has always told me that the matter is still unsettled.

58,651. *Sir Henry Lawrence*: On what point?—On the method of the distribution of land.

58,652. *Professor Gangulee*: You told us a little while ago that you have now two men engaged in scientific research in Sakrand, that you have a Botanist there. What special line of work is he engaged on?—His work is chiefly on three crops, cotton, wheat and *juar*, and in all those three directions there is a very considerable amount of promise.

58,653. With regard to the work of the Soil Physicist, he is concerned, I suppose, with the problems of alkali soil?—I may say that on this matter the Central Cotton Committee have given me a grant of Rs.20,000 a year to be applied at Sakrand as a centre for this particular type of problem;

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it is intended primarily to be applied to cotton, but incidentally to be applied to everything which is grown on the land. I have not been able to find a suitable Physiologist to undertake physiological work as yet, but I hope to do so before the coming inundation season; I have got the laboratory ready for it.

58,654. *Mr. Kamat*: Supposing the principle of auctioning land were ultimately adopted, do you not think it would be detrimental to the small holder?—I am getting a little bit outside my own subject, but personally I do think so; I think it would very much encourage the speculator, especially if land is auctioned now.

58,655. So you think the land speculator is likely to come in?—I think there is evidence that he is ready to jump at the first chance.

58,656. Have you considered the system in the Punjab of having squares of 27 acres and the system of leasing them out?—The whole of the land under the Sukkur Barrage is going to be squared almost according to the Punjab system, but I do not think that they have decided exactly how they are going to deal with the squares when they are made; but eventually the Punjab system is going to be adopted.

58,657. *Sir Henry Lawrence*: You mentioned that the proposals which have been already sanctioned will be in working order in 12 months from now?—In full working order. All the expenditure which was sanctioned then I shall be able to utilise during the coming 12 months.

58,658. For the following year, 1928-29, when you will put in your proposals to Government?—If all goes well, I propose to put in my proposals about next October, in time to be included in the next year's budget. That would be the next stage. Even then, I do not propose to put the whole of the original committee's scheme, but only a certain stage of it.

58,659. Can you give us any idea what you have in view as to the possibilities of next year?—The next most important stage is the investigation in connection with the Right Bank conditions, the conditions represented by the rice and wheat area on the west bank of the river.

58,660. The Larkana farm has already been in existence for a good many years?—Yes; certainly, before my time; since 1906.

58,661. Do you propose to extend that?—That was the scheme recommended to the Committee, that this farm could be made the basis and extended.

58,662. Is water available there now?—We can get water from the Ghar canal most of the year. Bores have not been a great success there; they have generally given us salt water. But some of the bores there have been a success, and they give us a supply of water which we can use during the time of the year when the canal is not running.

58,663. Would you propose to make any expenditure on tube wells there?—I certainly should. At Sakrand we have been forced to do that in order to supplement the Sakrand *dhand* supply. We have got a tube well down there between 140 and 150 feet deep, and we have got 80 feet of the strainer actually in water.

58,664. Is that giving you water now?—We are not actually using it but by the end of April we shall have to use it to supplement the supply from the Sakrand *dhand*.

58,665. Is there any station besides Larkana and Sakrand that you would propose to start off next year?—Not next year. I think it will take us another two years to get the West Bank into full working order.

58,666. Is that primarily for want of staff?—Not necessarily. I find it takes a great deal of organisation to establish a first-class experimental station, even if you have got the staff.

58,667. Have you got the staff?—I could get it, and that without going out of India. I think I can get men who can do it, partly from other Provinces and partly from men who have been trained in England and who are now available.

58,668. In the open market?—Yes, in the open market.

58,669. All that you require is to get Government sanction to the demands to be made, and you can find the men?—Yes. It might take me a good deal of time. I had a disappointment in connection with the grant from the Central Cotton Committee. I had a Physiologist in view, and at the last moment he dropped out. But I think I can get a man even for this; it will take a few months.

58,670. You think they would be able to start work straight away? You would not require them to go through any course of training before they begin work?—I do not think so. Most of the men are either Cambridge men or men of equal standing. I think they can go straight ahead. For the first years they will want direction, but they have got the technical knowledge. All that they want is a little more experience than they have. As long as I am there, I try to supply it, well or otherwise I do not know.

58,671. At any rate, you are convinced of the necessity of getting through this work with the least possible delay?—I feel so, very strongly indeed.

58,672. You do not anticipate any difficulty from the financial point of view?—That is where I do think there will be difficulty. We shall have to put up a very good case to the Finance Department before they will be prepared to give us more money.

58,673. *Professor Gangulee*: What is your present budget?—For this special development work, it is Rs.1,35,000.

58,674. *Dewan Bahadur Malji*: How much is allotted?—This is the amount actually passed by the Council.

58,675. *Sir Henry Lawrence*: For the Sakrand station?—It is for agricultural development under the Sukkur Barrage. That is to say, it is money in addition to the ordinary Agricultural Department expenditure in Sind. It is granted on account of the development under the Sukkur Barrage, partly for research, partly for propaganda, in order to prepare the people for the system under the Barrage, and so on.

58,676. With that Rs. 1,35,000 you have Sakrand working satisfactorily? You want another equal amount for Larkana?—It will not cost more than another lakh. Of course, there is another point, and that is the question of agricultural education in Sind. What I shall have to ask for will depend on what local support there is. At present there is a move to establish an agricultural college in Sind under private auspices, and if we can get that, there will not remain the necessity to ask Government for so much money.

58,677. According to this report of 18 months ago, the capital expenditure required is about Rs.9½ lakhs and the running expenses about Rs.4 lakhs?—When I said one lakh for Larkana, I was really considering the question of running expenses; I was not thinking of the capital expenses.

58,678. But do you expect to be able to get the capital expenditure from Government in addition to the later other current expenditure?—Yes.

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58,679. And that capital expenditure would be in the region of Rs.2 lakhs?—Something like that.

58,680. You mentioned that on the West Bank you did not expect to grow any cotton?—Yes.

58,681. Would you explain why cotton should be barred on the Right Bank, when it is the crop on the Left Bank? Are there climatic reasons?—In part, yes. But I have really taken the scheme of the Sukkur Barrage as developed by the Baker-Lane Committee as being my basis. They have barred this on the West Bank. They have taken the whole of their scheme on the West Bank as based on rice and wheat. I have taken that as the basis.

58,682. Do you agree with it?—It is very difficult to say. It has usually been considered that cotton will not grow successfully on the West Bank.

58,683. Have you tried it?—We have tried it at Shikarpur and Jacobabad successfully. We tried it in Jacobabad last year, and with very considerable success, and I do not see any reason why it should not grow. It is usually considered that the conditions are too hot for cotton, but I do not see any reason why it should be so. Even my own Deputy Director, only last year, did not think it was much use trying cotton up in those regions.

58,684. Cotton has been substituted for rice in certain other districts of the Presidency in the last 20 years?—Very much so.

58,685. There is nothing actually in the soil of rice land that prevents cotton being grown?—Nothing at all.

58,686. You will carry on some experiments to see whether cotton would not also be possible on the Right Bank? That would mean very much less expenditure of water?—Surely it would. The water for rice gives a duty of 50, for cotton it gives a duty of 100. That means to say one cusec (one cubic foot of water per second) will irrigate 100 acres.

58,687. If you could carry it through successfully, it would be a very considerable agricultural improvement?—It would mean that there would be a lot more water for general use.

58,688. Some reference was made to the proposals for small holdings. You know that Mr. Baker, as Revenue Officer, had some scheme for putting small holders on certain areas in the Barrage?—I know, but I never knew the details of the scheme.

58,689. Do you know whether those proposals are being accepted by Government or at what stage they are now?—I do not know. I would rather you asked the Government.

58,690. At any rate, you know that that point has not been neglected?—I do know that, because Mr. Baker himself told me.

58,691. *Dr. Hyder*: You said you were going to engage, as demonstrators and propagandists, men from the Lower Subordinate Service, men who were Sindhis. The only possible source of supply would be the Agricultural College at Poona?—Yes, for the better class of man.

58,692. How many students coming from Sind have you on the roll of the college?—We generally have on the roll of the Agricultural College at Poona somewhere between 12 and 20 such men.

58,693. You think next year you would be able to get 12 to 20 men?—That does not mean 12 to 20 every year. It is a three years' course; we may turn out 6 every year.

58,694. I do not know whether it is a purely agricultural question, but you suggested something about the distribution of land, and you were giving

answers to Sir Henry Lawrence about the institution of small holdings. What is the intention of the Government or the people of the Bombay Presidency? Do they want to relieve the congestion in over-populated areas and transfer the surplus population to the districts in Sind, or do they want to do this operation in Sind itself?—I think there are a great many different points of view. One point of view, which I hear constantly in Sind, is that Sind should primarily be for the Sindhis, that is to say, the Sindhis should have the first claim on all available land. There are others who say that it should be purely on a financial basis, that is to say, people who will pay the biggest money, wherever they come from, should get the land. What has been accepted by Government or what is being accepted, I do not know.

58,695. The Government of Bombay could only go by the experience of the Government of the Punjab? That is the only other Government that has had the same problem?—I know that they might go by that experience. The Revenue Officer, Mr. Dow, has been up to the Punjab in order to make special enquiries into the matter.

58,696. I was wondering whether the experiences of settlers taken from one part of the Punjab to another were known to the people of Bombay?—I think to those who are interested in the subject it is well known, especially since the book "The Punjab Peasant in Prosperity and Debt," has been published, which gives a sketch of what happened in the canal colonies in the Punjab.

58,697. *Professor Gangulee*: As you know, irrigation is not an unmixed blessing; do you think there is any great danger of alkali formation resulting from the Sukkur Barrage? What is the condition of the substrata?—I think there is a distinct danger but I think it is a danger that can be met. Mr. Howard, in his Presidential address at the Science Congress in Bombay last year, put one or two points before the public; he insisted that under the Sind conditions, which are either deltaic or semi-deltaic, you would be very liable to have extensive areas of salt development, and also there would be a tendency for the soil to get dead or unaerated. I certainly consider there is some danger of this, and one of the primary objects of the Sakrand undertaking is to try and meet these dangers in advance. We picked out one of the few places in Sind where I can get river water under conditions which correspond with what will be available after the barrage is constructed. I am taking the Baker-Lane scheme, which is the scheme on which the whole Barrage developments are based, as the basis of all my investigations. We are applying water in exactly the quantity and by the method which the Baker-Lane scheme lays down, and many variations from that; we are taking exactly what happens under the original scheme and under variations which will occur.

58,698. From the analyses of soils which you must have made, what have you found? Sodium chloride or sodium carbonate?—There is very little sodium carbonate, but the soils in Sind as a whole are very full of sodium chloride and sodium sulphate. I have placed in the hands of the Commission a bulletin prepared by my assistant, Mr. Tamhane, which gives the results of the investigations into the soil. You will find from that that the quantity of salt actually present in the arid lands in Sind is greater than in almost any part of the world that is actually under cultivation.

58,699. In view of the importance of investigation in matters of formation of alkali soil, do you think that the amount of money you have at your disposal is adequate?—I do not; I think we could profitably utilise a very considerably larger amount than we have got at present; there are many lines of investigation which *may not* be important, but which on the other hand, *may be very* important, which one has to leave on one side owing to lack of funds.

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58,700. You have made a reference to agricultural education; how many students have you now in Poona from Sind?—As a rule we have somewhere between 12 and 20 altogether from Sind.

58,701. You find there is a growing demand for agricultural education in Sind?—If we had a college in Sind I am sure we should have three times that number immediately. After all, it is a long way to go from Sind to Poona, and Poona conditions are not similar to those of Sind. For some years we utilised the Punjab College at Lyallpur, but that was given up after the Reforms, and now we utilise the Poona College.

58,702. *Sir Henry Lawrence*: Why was that given up?—Because the Government of the Punjab insisted that we should pay the whole of the cost which they incurred per student on account of our own students; that the Bombay Government should pay the whole cost of educating those students.

58,703. Why should they not?—We had been accustomed to give a scholarship of so much a month which maintained the student. We gave full welcome as we still do, to students from other parts of India, up to the limit for which we can give space, at the same rate as we do for our own students; but the Punjab Government said: No, we will not admit these students at the same rate as we do our own students, you must pay the whole cost. The Government of Bombay said: No.

58,704. *Dr. Hyder*: When did this happen?—About 1922 or 1923.

58,705. *Sir Chunilal Mehta*: I think they also said there was not room in the College; I think that was one of the reasons. I am only speaking from memory?—I do not remember that being a factor; the other, I am certain, was the main factor.

58,706. *Professor Gangulee*: Where would you locate a college in Sind?—I should locate it in the Indus Valley, if it can possibly be done; any other arrangement I should think would be very much of a makeshift. The Commissioner's Committee recommended Nawabshah, which is about one-third of the distance between Hyderabad and Sukkur; I would like to have it somewhere in the Barrage area.

58,707. *Sir James MacKenna*: It is fairly hot?—Yes, it is hot, but then Sind generally is hot.

58,708. *Mr. Kamat*: In your future scheme on the Sukkur Barrage would you shut out capitalist farming, that is to say, farming by men with capital who would adopt machinery such as tractors, and would have sufficient intelligence and enterprise to adopt improvements?—I would not shut them out, but I would not make them the principal plank in my platform.

(The witness withdrew.)

Monday, October 24th, 1927.

KARACHI.

PRESENT:

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

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

Raja Sri KRISHNA CHANDRA GAJAPATI NARAYANA DEO of Parlakimedi.

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

Professor N. GANGULEE.

Dr. L. K. HYDER.

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

Mr. B. S. KAMAT.

The Hon'ble Sir CHUNILAL V.
MEHTA, Kt.

} (*Co-opted Members*).

Mr. JAMSHED N. R. MEHTA.

Mr. J. A. MADAN, I.C.S.

} (*Joint Secretaries*).

Mr. F. W. H. SMITH.

Mr. C. S. C. HARRISON, Chief Engineer, Lloyd Barrage and Canals
Construction, Karachi.

Replies to the Questionnaire.

Introductory.

I have had the opportunity of perusing the general introductory note which prefaces the replies of Mr. C. C. Inglis, Executive Engineer, Special Irrigation Division, Poona, (pages 226 to 228 of Volume II, Part I, of the Evidence taken in the Bombay Presidency) and would take this opportunity of expressing my general agreement thereto.

I would emphasise the point that action by irrigation and agricultural officers should have as its goal 'the greatest good to the greatest number'.

My experience of twenty-five years leads me to the conclusion that this great desideratum has been lost sight of. Purely local considerations have been given too much prominence in the past and have thereby hampered the general progress of irrigation agriculture towards a higher standard of efficiency.

QUESTION 1.—RESEARCH.—(a) Research and demonstration should be entirely separated. Research in irrigation agriculture must be undertaken hand in hand by the Agricultural and Irrigation departments, special research officers in both departments being available.

Likewise, demonstration work in connection with irrigation agriculture should be carried out hand in hand by both departments.

I have a great respect for many forms of indigenous agriculture and so has, I believe, the Agricultural Department. There should be very careful research into the better forms of indigenous methods and this should be the starting point from which gradual improvements should be made. I consider it most difficult to get the average cultivator to adopt sweeping reforms. Where such are tried there is a great waste of energy. They may win through

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in the end but probably not one whit quicker than if the gradual building up process had been adopted from the first.

Provincial research and demonstration should be assisted by a central research station for all India. Central research results may not be applicable to all Provinces but the co-ordination of knowledge must surely lead to improved agriculture in parts of almost every Province in India.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(a) to (c) I give a full meed of praise to the Agricultural Department for the keenness displayed in research work for the betterment of species of crops and of methods of agriculture in general. I have not, however, always been able to see eye to eye with the methods adopted to increase agricultural efficiency.

I consider that practical demonstration farms fail partially in their object because the arrangements on such farms are generally too elaborate. The ordinary cultivator on being shown over such demonstration farms at once says: "this is all very nice but it is hopeless for me to try and work on these lines as I have not the necessary capital". He gets a wrong notion of the capital required because his attention is first and foremost attracted by the elaborate and costly main buildings erected on the farm. He cannot get this out of his mind and go further and see that the actual field operations are simple and inexpensive. The lesson to be taught him is therefore hopelessly lost.

I advocate the complete separation of experimental from demonstration farms.

On experimental farms, the initial arrangements are necessarily costly but such cost is never required to be borne by the cultivator; he merely has to consider the results of such experiments which are put into practice on the demonstration farms and reap the benefits therefrom if he can seize the opportunity.

I consider it is of little use showing the average cultivator over an experimental farm. He is not the type of man that wants to know the detailed "whys" and "wherefores" of a thing; what he wants are solid facts. He wants to see for himself that, for instance, a particular variety of wheat advocated by the Agricultural Department can be grown under conditions that he can, with little additional expense, adopt himself. He wants to know its yield in straw and grain and he wants to know what price he is likely to get for the produce.

This information he ought to be able to get from a simple type of demonstration farm. But I would not leave the process of education there. I would go much further and to what I consider the root and branch of successful propaganda; I would go into the man's field and demonstrate there that he has all to gain and nothing to lose by adopting the seed and methods of cultivation advocated.

My concrete proposition is that the Agricultural Department should be given sufficient authority to guarantee selected cultivators against any loss that might be incurred by carrying out demonstrations in such cultivators' fields.

The seed should be that which the Agricultural Department has selected and is prepared to back as a winner. The ground and labour should be supplied by the selected cultivator (be he peasant or big zamindar) and in fact, all the operations should be performed by the cultivator and/or his men, the guidance being supplied by the Agricultural Department.

The guarantee should be given that the cultivator will be protected against loss, if he carries out the various operations exactly according to the instructions given on the spot. He should be told that, given normal seasonal conditions, he should expect a minimum of so much fodder and so much grain per acre. If the actual output of the crop is below that minimum then the difference should be made good in cash by Government.

The minimum of any crop to be pushed would, of course, be better than the average yield that the cultivator with his own unimproved seed and methods has obtained in the past.

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If the seed and the methods of dealing with its cultivation advocated by the Agricultural Department are really worth pushing, then the actual payment by Government will be nil in ninety-five per cent of the cases so dealt with.

The success of the demonstration will have the fullest possible value and the cultivator will be the best propagandist that Government could possibly have.

Just as experimental farms should be entirely separate from demonstration farms, so should the research officer be entirely separate from the trained demonstrator.

Irrigation and agriculture should go hand in hand both on the experimental as well as on the demonstration farm. I would lay great stress on the type of agricultural officer to be employed as a demonstrator and propagandist. To me it appears that personality is of paramount importance.

What is required of the demonstrator is a man strong physically as well as mentally, a man who is a linguist and, most difficult of all qualities to estimate, a man who will take a very real personal interest in the cultivator. I feel that the ideal is hard to attain but that something better can be done in the future than has been done in the past in the selection of the right type of officer. It appears to me that, in general, too much importance has been attached to the academic rather than the practical qualities of candidates for the service.

I would emphasise that to depend too much on the distribution of pamphlets setting out this and that improvement is to court failure. I have met many cultivators who have read these or had them explained to them who have said: "It may be all right but I want to see it done".

One particular fruit grower, whose garden I visited in Sind, told me he had read of certain improvements in the tending of citrus plants but he had never been able to get any one to come to his area and demonstrate such.

A statement like that (and it is not an isolated instance) led me there and then to believe that the Agricultural Department has so far failed to get sufficiently into personal touch with cultivators. I do not blame the present officers, because there are not enough of them to make their presence felt. This points to the need for considerable expansion of personnel on the demonstration staff.

QUESTION 4.—ADMINISTRATION.—(a) As mentioned in my reply to Question 3, I consider that there should be a central research station. This should be operated by a staff which has on it at least one experienced irrigation officer who would deal with the water problems connected with irrigation agriculture. There should also be one or more research stations in each Province. In the Bombay Presidency two stations are required—one for Sind and the other for the Deccan and other parts of the Presidency. Sind conditions are so different to those in the Presidency proper as to make it futile to expect the Deccan research appreciably to benefit Sind.

(b) Certain branches of the central research institute could deal with subjects common to all Provinces. For example, the study of hydraulic problems immediately connected with agriculture could be done by one man at the central station, for all India; likewise, the problem of general marketing of agricultural products common to most, if not all, Presidencies.

(c) (i) I have dealt with the defects of the Agricultural Service as they appear to me. Their remedy lies chiefly in the provision of extra funds and more, and a better type of, establishment.

I consider that, to a lesser degree, more superior establishment is required in the Veterinary Service.

(ii) I consider that the railway service in Sind is susceptible of great improvement in that feeder lines are required and every step possible should be taken to minimise the nuisance of break of gauge. Proposals are afoot for improving railway facilities as regards feeder lines. I trust that the broadest view possible will be taken by the Local Government of this very important subject.

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(iii) Roads. I attach the greatest importance to good feeder roads. These are conspicuous by their absolute absence in Sind. I attach far more importance to real feeder roads to railways than to through or trunk road communications. The latter are a military necessity but from the agricultural point of view good feeder roads are essential. What strikes one in Sind as a very heavy handicap to agriculture is the bad state of the so-called roads and, as a direct consequence thereof, the hopelessly inefficient and antiquated type of cart. Most of these carts have little more carrying capacity than the common European hand-cart and yet we find them drawn by a good pair of bullocks toiling along bad, dusty or sandy roads. This, to my mind, is a very serious cause of the unnecessarily substantial cost of marketing agricultural produce in Sind.

The question of better roads is at present engaging the serious attention of Government. I trust that practical results will emerge at a very early date from such considerations and that effective action will not be indefinitely delayed on the plea of lack of funds. The problem is so pressing as to require urgent attention to the financing of a scheme for immediate road improvements.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(a) The greatest step that can be taken to check excessive fragmentation of holdings in irrigated tracts is to fix a minimum area that will be dealt with for the purposes of irrigation.

Fragmentation of holdings in the Bombay Deccan is a far more serious problem than it is in Sind and I would fix, for the Deccan, five acres as the minimum area for the purposes of irrigation. In Sind the minimum area for all holdings after a fixed date might well be a square of sixteen acres.

QUESTION 8.—IRRIGATION.—(a) In Sind there is still scope for very great improvements in the irrigation of the area outside the Barrage Canals zone. The initial capital cost and scope of the Barrage Scheme is so great as to make it possible that Government might lose sight of the necessity of further developments in this sub-province. This danger should not be overlooked.

The north-east tract of Sind known as the Ghotki area will require development within the next decade or so and in Lower Sind there is scope for the immediate improvement of irrigation. These improvements would all, for many years to come, have to be of the non-perennial type.

In the Deccan there is a large number of schemes prepared which can be taken up one by one as soon as the vital problem of how to make the Deccan irrigation pay is solved.

I would advocate the taking up of the Mula scheme to irrigate parts of the Rahuri, Nevasa and Shevgaon talukas.

Lift irrigation is a subject that requires very careful investigation and encouragement. In Sind the problem is to lift water from canals, the Indus, or *dhoros* (depressions) rather than from wells. Contrary to the Deccan conditions, the head to which water has to be lifted to enable it to flow on to the land is generally quite small. For instance, lift irrigation schemes in Sind that will each command many thousands of acres of land could easily be investigated.

The solution of the problem of low lift pumps of high discharging capacity requires encouragement. This problem must also be present in other Provinces, especially in the Punjab and the United Provinces.

I know of at least one person who is devoting much time to the evolution of an efficient low lift high capacity pump of economical design. It would seem advisable to let the conditions be known to firms in Europe and America who are prepared to take the matter up seriously.

(b) I am not satisfied with the existing methods of distributing canal water in Sind. The problem is such a great one that any attempt at present to claim a final solution must be looked upon with suspicion. The first step towards solution of better distribution is to module all outlets. By this method proportionate distribution is possible, and pending the evolution of a practical method of distribution of water by volumetric measurement the proportionate module will go a long way to give an equitable supply to all that are entitled to it on a canal.

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As regards evaporation losses in canals, little or nothing can be done to reduce these. As regards absorption losses, our new canals are so designed as to seal themselves as far as possible with silted berms. The silt in Sind being finer than it is in the Punjab, we hope to have less difficulty in water-logging from canals though I hold, as do others, that the main source of water-logging is from the irrigated fields and not the canal itself. Little has been done in Sind, in the past, to prevent waste of water by evaporation and absorption in the soil, so far as water on the fields is concerned. The proper sub-division of fields into smaller plots by means of low *bunds* is essential and the value of proper tilling and inter-cultivation requires to be brought more prominently to the notice of irrigators. If attention is paid to these important points the water logging problem will be greatly simplified.

QUESTION 9.—SOILS.—(a) (i) I consider it essential that great care should be taken to see that effective drainage is provided in all areas subject to perennial irrigation. Sind differs from the Deccan in that defective drainage can be dealt with on a simpler and much larger scale in the former than in the latter tract.

The more or less localised drainage in the Deccan canal tracts is a part of the investigations and work being undertaken by the Executive Engineer, Special Irrigation Division, Bombay.

In Sind, there is no officer on special duty for this purpose. Drainage precautions for the area commanded by the Lloyd Barrage Canals are not being overlooked. There is provision in the project, amounting to nearly two crores of rupees, for this work. The first step to be taken is the provision of main drains, followed by branch drains. The greatest care is necessary to see that the general drainage lines of the country are not blocked and this is receiving particular attention in all the alignments of canals. This very important point was not attended to in the past. Local drainage must be taken up later, after carefully watching the effect of perennial irrigation in what might be, *prima facie*, doubtful areas.

Much can, I think, be accomplished by rather deep open drains. These have not been advocated in the past owing to the great expense of keeping them clear of the choking forms of aquatic growth—in Sind the bull-rush or *pun*. The advent of the small and very handy Diesel drag-line excavators mounted on caterpillars removes the old standing objections to open drains in that these machines will be able to clear muddy drains choked with reeds very quickly and economically.

Soils in Sind under perennial cultivation will require careful tillage and the improvement of the tilth can be effected by the extensive use of green mulches.

The sub-division of irrigation holdings into reasonably sized plots by means of earthen *bunds* or ridges is necessary to provide an even and economical use of the water.

The aim in the Barrage Canals zone is to divide the land into sixteen-acre squares or rectangles and to sub-divide these rectangles further into four-acre plots. The final and ideal condition will be the further sub-division into acre plots. This rectangulation of existing holdings in Sind will be no easy matter but it is hoped that the more enlightened of the big zamindars will lead the way: we will have to depend on sound propaganda to bring in the smaller holders.

(ii) In Sind the two most likely methods of reclaiming alkali lands are leaching and the growth of hardy crops such as red rice. The gradual growth of *babul* trees which are cut when less than a year old is also practised successfully in parts of Sind.

Leaching out of the salts will be more successful in the future than in the past, in the Barrage Canals zone, as there will be adequate subsidiary branch and main drains to carry away the water after washing.

The reclamation of alkali-infected lands has been very successfully carried out in many parts of the rice areas in the Larkana district.

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(iii) Erosion of the soil by flood water is not a very serious problem in Sind for, except in the western parts of the Larkana district and the area to the extreme north-west of the Barrage Canals area on the right bank of the Indus, flood water is not a serious problem. owing to the absence of heavy rainfall in Sind. The particular areas mentioned above are to be protected by flood-diversion *bunds*.

QUESTION 10.—FERTILISERS.—(a) Natural manures have, on the whole, been little used in Sind in the past except where garden crops, tobacco and hemp are cultivated and these, as a rule, are near villages only.

With the advent of perennial irrigation the more frequent use of manures will be necessary as fallows will be less frequent.

There will always be an inadequate supply of farm-yard manures even if greater attention is paid to the conservation of this valuable by-product. I therefore expect to see the extension of green mulching assisted by artificial fertilisers.

The spread of knowledge in this direction by the Agricultural Department might well be considered at an early date.

QUESTION 23.—GENERAL EDUCATION.—(b) (i) I make bold to say that rural education should not aim as high as it does at present. I hold that for many decades to come the best form of education for the agricultural masses is to teach up to, say, the fourth standard in rural schools.

For a start (and it must be a slow start to be thorough) the teaching of the elementary portions of the "three R's", supplemented by the teaching of the important points of agriculture, will suffice.

The simple vernacular readers should all be thoroughly revised or scrapped, and readers with agricultural and moral lessons written in the most simple and interesting way provided.

Only a very small percentage of boys of the agricultural population have either the desire or the inclination for the higher forms of education and there is already scope for these to rise.

The rural masses, especially in Sind, do not, in my humble opinion, desire even a middle school education and, moreover, if any attempt is made to coerce them education will become unpopular.

The agricultural boy requires, and that urgently, to know just sufficient to enable him to do simple arithmetic, keep simple accounts and read very simple literature. With this amount of knowledge he will remain on the land and be contented.

Oral Evidence.

58709. *The Chairman* : Mr. Harrison, you are Chief Engineer of the Lloyd Barrage and Canals Construction, Karachi?—Yes.

58710. Will you tell the Commission what your principal appointments have been in the past and, in particular, whether you have had agricultural experience?—I started my service in the Belgaum district on irrigation on the Gokak Canal; after one year I was transferred to the Roads and Buildings branch of the Public Works Department and continued to serve for three years in the district in that branch. Then I was transferred to the construction of the Godavari Canal and Darna Dam in the Nasik and Ahmednagar districts. After that I had charge of the roads and buildings in the district for eighteen months. Then I again on return from leave did duty on the Irrigation side, taking charge, on the completion of their construction, of the Godavari Canals and Pravara Canals, Deccan irrigation schemes. After that I proceeded on leave, and on return I was posted in charge of the Karachi Canals district which is the southernmost district of the Province of Sind. After two months in that charge, I was put on special duty in connection with the Sukkur Barrage Scheme. After two years, when the scheme was sanctioned, I was made Chief Engineer, and I have been Chief Engineer of the scheme since its inauguration in June 1923.

58711. I judge from your note that you have also interested yourself in the problems of agricultural research in general?—Yes, when irrigation was started in the beginning in the Ahmednagar and Nasik districts. Irrigation of any sort except what they call *bandara* irrigation was then practically unknown. It was very up-hill work trying to teach the people what to do, because the Agricultural Department were under-staffed, for most of the eight years and three months that I was there by myself. I started an agricultural society called the Godavari Canals Irrigators' Association and interested myself in all forms of agriculture, and I used to hold lectures. I introduced the steel plough into that part of the country, and I have been interested in agriculture ever since.

58712. I see from page 11 of your note of evidence that you consider that demonstration on the cultivator's own holding is the most likely to lead to good results?—Yes.

58713. And you think that the cultivator should be compensated against any loss which may result from his adopting the suggestions of the Agricultural Department?—Yes; my idea is to remove suspicion. The cultivator in this country often thinks that methods advocated by Government come from interested sources and that the officers are simply trying to demonstrate that they are doing a job of work, without necessarily benefiting the cultivator; that is why I think the work should be carried right into his field.

58714. That would involve a very considerable staff to check these experiments, would it not?—I do not think so: certainly more than we have got now, because my opinion is that the Agricultural Department is very much under-staffed. Practical demonstration need only be done in certain representative localities.

58715. A guarantee against loss sometimes tends to provoke the loss?—That is a danger, of course.

58716. On page 12 of your note you say you consider that there should be a central research station for irrigation?—Yes.

58717. And you say that this should be operated by a staff having on it at least one experienced irrigation officer?—Yes.

58718. What other staff are you contemplating for this central research station?—I should have my soil physicist and the different plant breeders: experimenters on the different crops, one of the most important being the soil physicist, because there are many problems still to be solved by the soil physicist in India.

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58719. Are you contemplating this central research station carrying out work on plant improvement and also work on the fundamental problems of irrigation?—In addition to the local ones, yes.

58720. You would marry research on irrigation to research on plant improvement and other problems of the soil?—Yes, exactly; I think they are inseparable.

58721. You do not think there is work for a specialised central irrigation station?—Yes, I do.

58722. Would you, at that station, also carry on agricultural research?—Yes, I would.

58723. Turning to page 13, Question 8, on irrigation, you point out that over and beyond the area which is to be developed by the Lloyd Barrage, there are other districts such as the north-east tract of Sind known as the Ghotki area. Would that involve important works?—Yes, on the inundation principle; and, later on, when Government could afford it, it would involve very important works in that there would have to be a weir or a small barrage at Mithankot which is just outside the Sind boundary and sufficiently near it to command irrigation within Sind.

58724. But you say that these schemes would all, for many years to come, have to be of the non-perennial type?—Yes, because of the financial question. I do not think the Bombay Government can be committed to further very heavy expenditure until they have got the Barrage scheme going thoroughly, which will take ten or fifteen years.

58725. Would it mean a weir?—Yes, it would mean a weir for perennial irrigation.

58726. But your idea would be to have inundation irrigation?—Inundation to start with, as no weir is required at all for an improved inundation system, and ultimately I would convert the inundation canals into perennial by having a weir. The same would apply to Lower Sind.

58727. You speak, a little lower down the page, about lift irrigation; and you give it as your view that that subject requires very careful investigation and encouragement?—Yes.

58728. Is there scope in Sind, do you think, for lifting water directly from the River Indus on to the banks?—On a very small scale only, because there are very few points on the Indus which are stable enough to admit of installations being put on the bank with safety; the river changes its course so frequently.

58729. And you may lose your station?—Exactly.

58730. Why should not you put your pumping unit on to a float and pursue the Indus wherever the Indus goes?—That could be done but you may have to pursue it two or three miles; it moves so tremendously.

58731. If you have a float, that is not a very formidable undertaking, is it?—It is, in building up the approach channels or what we call the *katchas*. If there is a bank of fifteen feet, when the river moves away it may leave you another bank of fifteen feet or perhaps a bank of only three or four feet just above the river surface; that would mean that if you did not go in for very high lift pipes you would have to have very high banks to carry your irrigation channels. The cost would be crushing; you would not be able to irrigate more than about 2,000 acres probably by that scheme, because we get as near to the *bunds* as we can with the Barrage scheme; it is only the danger points we leave alone.

58732. There are districts which will not be supplied with water by the Barrage scheme?—Yes; but the same consideration would apply, because the protective *bund* system comes in there.

58733. You do not think that the economic possibilities of irrigating the riparian tracts by means of a pumping unit on a float would be worth investigation?—I scarcely think so; I do not think you could ever get results on a large enough scale to make it worth while.

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58734. One has seen pumping units doing good work on the Nile and in other parts of the world?—Yes, where you get no erosion. There are very few spots in Sind where you get no erosion on the banks. I am not prepared to say off hand that there are not any but I do not think there are a great number.

58735. As I understand it, quite apart from the risk of losing your pumping unit, the arrangements for carrying the water from the point of delivery by the pumps to the arable land are so considerable and so expensive as in themselves to make the scheme not worth while if there is a risk of losing them?—Yes, generally speaking; there may be a few exceptions, but that is the general case. I would like to emphasise the importance of this lift irrigation in case I am not asked further questions. The Government of India should encourage people to go in for research on what I call low lift high duty pumps. There is a great deal to be done on that question. I am talking about pumps that will raise anything up to 50 to 100 cusecs of water per : not the ordinary commercial pumps we have now which only deal with 2 or 3 cusecs. There is one gentleman belonging to the firm of Messrs. Duncan Stratton who is now investigating the question with the help of Swiss experts and I think he, very likely, will solve the problem by means of an internal combustion engine working separately from the plant. The power problem is not the difficult one: it is the pump which is the difficulty; the power is not difficult at all. In a country like Sind there is great scope; I have got a case on the tail of the Rohri Canal, where we have over 40,000 acres of lift land. The maximum lift there is four feet and I just cannot command that without spending enormous sums and re-grading my canals. That is a place where, if a low lift high duty pumping scheme could be worked up, it could probably be made to pay very handsomely.

58736. On page 14 you say: "As regards evaporation losses in canals, little or nothing can be done to reduce these. As regards absorption losses, our new canals are so designed as to seal themselves as far as possible with silted berms." What is the particular grading of the canal bed which encourages silting?—You have the main channel of your canal in the centre and you set your banks back sufficiently to allow the velocity of the water to drop on the sides of the canal; the silt immediately drops and forms what you call a berm, which is more or less water-tight; and in Sind it is very water-tight. Of course, our canals are so designed as not to drop silt in the main channel.

58737. On page 14, in answer to Question 9 on soils, you deal with a very important point, namely, the drainage which would be necessary if the land to be irrigated by the Lloyd Barrage is to be protected against the risk of progressive deterioration as the result of waterlogging. Are those drains being dug now?—No.

58738. How soon are they going to be dug?—I have purposely delayed them until we have practically completed the canals, and we shall start them the year we start irrigation. That will give us plenty of time.

58739. Have you got your detailed plans for drains worked out?—I have all the main alignments worked out.

58740. What other departments have seen them?—No other departments have seen them yet. Before you can design a modern canal you must fix your drainage lines; those lines have all been fixed and have been shown on the maps which were sent to Government with other plans sent up. When I send the plans up for the Rohri Canal I will show, in great detail, all the natural drainage lines.

58741. Would it not be well to protect yourself as soon as possible against the risk of finding, when you come to make your drains, that vested interests are already established: for example that the local authority is contemplating a road where you wish to dig your drains?—We are acquiring those lands as fast as we go along and no Government land will be given out on the main alignments without the special sanction of the Chief Engineer.

58742. So that it is the case that no development can possibly interfere with your drainage schemes?—Exactly.

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58743. Is it definitely a part of your programme to start these drains in the first year that you give the water?—Yes, that is a definite part of my programme which I have put up to Government. Originally, the project contemplated their construction *pari passu* with the construction of the canals; but I pointed out that the danger of that was that we should be so busy with the canal alignments that we possibly might not have sufficient time to study the question of drains adequately. Certainly my opinion is that as soon as we have broken the back of the main problem of the construction of the canals, we shall then be at leisure to concentrate on the drains. The alignments are already settled: nature has done that for us. As soon as the canals are completed we can get our main drains in. But the very important point to remember is that the branch drains are even more important than the main drains, because we have got to study the weaknesses of the country. We have not got sufficient knowledge of Sind to enable us to know where our weak spots are likely to be, at present.

58744. Do you attach great importance to a sufficient drainage scheme?—Extreme importance.

58745. *Professor Gangulee*: Has the possible expenditure on the drainage scheme been included in the total estimate?—Yes, roughly two crores of rupees.

58746. *The Chairman*: Then you go on, in an interesting paragraph, to tell the Commission that the peculiar difficulty of keeping these drains clear of aquatic weeds which might choke them is likely, in your view, to be overcome by the new machines which are available for that work?—Yes, we are using those machines to excavate our canals. The main difficulty in the old days was that you could not get manual labour to stand in two or three feet of water and mud, and in the cold weather work among these reeds and things like that was done under extremely cold conditions. Nowadays, we can bring these machines along on their caterpillars, they can stand on mud and they excavate just as well in the wet as in the dry.

58747. They can stand on mud?—Yes, they can stand on mud.

58748. Can you give us now, or provide us at your own convenience, with any figures of the cost of clearing drains by means of that sort?—Yes, I can give you the cost of excavation of canals which would be the same as the cost of excavation of drains.*

58749. At what depth can these machines work?—I had one instance where we went below sub-soil level and worked as cheaply as in the dry.

58750. They must have solid ground to rest on?—Yes. They want mud or soil to rest on. They are all on caterpillars; the pressure is very little, and you can put a mattress on the mud if it proves very quaggy.

58751. Are you familiar with Bengal?—No.

58752. You tell us that one of the methods of reclaiming alkali lands is the gradual growth of *babul* trees which are cut when less than a year old. Does it mean chopping?—They are cut right down to the ground. In Sind they grow anything up to three feet six inches in a year. They are felled right to the ground and ploughed in. Sometimes they plough it in after a three months' growth, when it is about a foot high.

58753. I do not propose to examine you in any detail upon the other part of your note, which is not concerned with your own special subject, except that I notice, in answer to question 23, you express the view that education should be given in very small doses?—Yes.

58754. Do you think it is possible to arrest a process of that sort?—I do not think it is possible to arrest it, but I certainly do not think we should encourage it beyond the capacity of the people, that is, forcing upon the agricultural masses education of a type which I would call much too high for their capabilities. I have personally had brought to my notice instances of many cultivators who dread education, specially in the Bombay Deccan, who were terrified at the idea of schools as they said it meant that

* Vide Appendix I.

their children would be taken away for four or five years in order to attend school, when they should be working on the fields.

58755. *Professor Gangulee* : You are referring to higher education, and not the primary stage?—I am referring to anything more than the very primary stage, that is, just to stop them from being illiterate; simple reading, writing and arithmetic, simple accounts to enable them to draw up their total costs.

58756. *Sir Thomas Middleton* : In taking into account the development of Sind that will follow the completion of the Barrage project, have you been examining the question of roads and road communications in Sind?—Yes. I happen to be in charge of the Government's enquiry into roads in Sind. We have got a special Roads Division, and I have an Executive Engineer serving directly under me to go into the whole question of roads and communications in general.

58757. Is it the intention to use the canal banks for such purposes?—I think that the canal banks can only be used to a very limited extent, because my idea is to connect up the more important towns direct with the railways. I think that a great mistake has been made in the past in having through communication in irrigated tracts, and that money has been spent which could be ill afforded. The canal itself is a direct communication through the tract, and therefore we could not use much of the canal bank for purposes of inter-communication between the important villages.

58758. When I was in Egypt recently, I was struck by the great use made of canal banks for purposes of communication?—We have provided for it in the project. We have got an inspection road and also what is called a 'service' road right throughout.

58759. I was also impressed with the good quality of the road surface, and with the carts that they employ on these surfaces. I do not know whether you have been considering the character of the vehicular traffic that you have got in Sind?—I have got some interesting photographs which I would like to hand over to the Commission. One shows the Sind type of cart, which is a most hopeless proposition; you will find a pair of fine bullocks drawing a most antiquated vehicle; that is the Sind cart. One of the photographs is of the Punjab cart; that is a different proposition entirely. Then there is a photograph of the Sind town cart; that does not go out into the fields. I can hand you over, along with these photographs, a note† containing a great deal of information as to the measurements of these carts, the weights they will carry and the power required to pull them. I think you would find by a study of this question that Sind loses over a rupee an acre on every acre cultivated per annum, through inferior carts.

58760. *The Chairman* : Have you invented a better one?—No. I think the Punjab cart will be good enough for some years to come.

58761. *Sir Thomas Middleton* : Your view is that the Sind vehicle is destructive of the surfaces of your canal banks?—Entirely so; it is a hopelessly uneconomic proposition.

58762. *Mr. Kamat* : Whose business would it be to invent a better type of cart?—I do not know. It is the business of anybody interested in the welfare of the country.

58763. Have you advertised, offering prizes for better types of carts?—No, but that is a good idea. We have two very good types of cart, the Gujarat and the Punjab types. They are cheap, made locally in the villages, and, as you will see from the photograph, have enormous carrying capacity. They can carry up to 30 *maunds* on an earth road and 45 *maunds* on a metalled road. The Sind cart can carry only from 7½ to 10 *maunds*.

58764. No department has made it its business to introduce and familiarise this type?—Not in Sind.

58765. *Sir Thomas Middleton* : When you referred to the quality of the Punjab and Gujarat carts, were you taking into account the crushing effect of the wheels?—Exactly so.

† Not printed in full. Extract printed as Appendix II.

58766. Have you studied it?—We have studied it; I will put in this note,* which describes the crushing effect.

58767. I think you have been associated with Dr. Mann in some of the experimental work which has been going on on the Sind Experimental farm?—I have been very closely associated with it.

58768. Dr. Mann unfortunately is not here to give us any information. I do not know whether you could tell us the objects he had in view in designing this experimental work?—The objects in view were to see whether we could introduce any new varieties of crops into Sind and improved types of existing varieties, to study the question of a proper rotation of crops, the effect of fallows, the improvement of salt-infected areas, and the question of the amount of water required for irrigation.

58769. How long has the farm been in existence?—Two years now.

58770. Have you yourself derived any useful hints from it yet?—The report was issued about a month ago by Dr. Mann. Not a great deal can be based on it, because it is only one year's result, but everything points so far to greater yields than we expected and the use of less water than we expected.

58771. Reference has been made to the need for a central station for irrigation research. Do you mean a central irrigation station for all India, or a central station for the Province?—I should have a central station for all India, and I have mentioned in my replies to the Questionnaire that there should be two stations for the Bombay Presidency, one for Sind and one for the rest of the Presidency; I call them provincial stations. Those would deal more with our domestic problems.

58772. The domestic problems you have already indicated in the evidence: to begin with, washing out of white alkali, and the amount of water required, which must vary Province by Province and district by district?—Exactly so; that is the great point.

58773. That is one of the most important points which has got to be determined and must be determined locally?—Yes, exactly. It is no good dogmatising from Poona what can happen in Sind, because it does not necessarily apply.

58774. Have you, in Sind, any black alkali?—Yes.

58775. Is there any known method of dealing with that particular cause of barren land?—In the Larkana district there is a great deal of black alkali, and it is very successfully dealt with by the growth of red rice and *babul* plantation. It is very black alkali.

58776. *Professor Gangulee*: You do not use gypsum?—No.

58777. *Sir Thomas Middleton*: Black alkali has proved the trouble in reclamation in most countries?—Yes. Even in Sind nothing can be grown on it for several years, except rice.

58778. Reference was made to the difficulty of giving a guarantee against loss to the local cultivator who conducts a demonstration. I think every one is agreed that, if possible, there ought to be these local demonstrations, but the giving of a guarantee against loss is objectionable?—Yes, that is the difficulty, but I do not think that it is insuperable, because, if the Agricultural Department have got anything worth pushing, they will fix the minimum outturn, which must necessarily be an enormous increase on the average outturn the man now obtains. If they can give him a minimum guarantee, the difference between the outturn according to the Agricultural Department's methods and the cultivator's own methods of cultivation might be very little, in the case of a small area. As I have pointed out, I do not expect the Agricultural Department to rush blindly into this without being certain of their facts in 95 per cent of the cases, assuming, as the Chairman said, that there is no wilful neglect and damage on the part of the cultivator himself, which I do not think is likely.

58779. Do you think, instead of a guarantee, it would be practicable to buy up the crop?—Yes, quite so. That is a form of guarantee.

* Note referred to on page 20.

58780. You could make it the subject of a definite contract beforehand?—Exactly.

58781. Whereas a guarantee introduces the question of what is a normal crop after the crop ripens?—Yes.

58782. *Mr. Calvert*: On this question of a central research station, we found in Egypt that they have a staff of about twelve men engaged on irrigation problems for a, comparatively, very small Province. What kind of staff would you recommend for a central research station for irrigation for all India?—I do not think the staff need be very much bigger than that, because they would take up general problems, and try and co-ordinate them with the work of the local provincial staffs. I should be inclined to have the provincial staffs rather bigger than twelve. The central staff should be there mainly to co-ordinate and to see that the experiments being done in the Provinces are comprehensive, and though they may not necessarily make an attempt to carry out any of them themselves, they can throw out suggestions as a lead to the Provinces to take action in any particular direction.

58783. Should the central station deal with hydraulic questions only?—I should think both hydraulic and agricultural.

58784. Is there any common meeting ground for irrigation officers of all India?—No; unfortunately, such is not in existence.

58785. Do you think it would be an advantage if you could have a common meeting ground?—I think it would be very valuable. It is now left to the officers to attend the different local Engineering Congresses or not. There is no specific organisation to discuss specific All-India subjects at any time in one place.

58786. We were rather struck in our tour by the lack of acquaintance of one Province with the work in other Provinces?—Exactly.

58787. Do you think it would be a good thing to facilitate the meeting of engineers of Provinces?—It would be highly desirable. In this connection, I regret the disappearance of the Inspector General of Irrigation. He used to tour round and co-ordinate the work of various Provinces, and he used to inform us what the other Provinces were doing. We have no such co-ordinating agency now.

58788. On page 14 of your note, you say that you hope the more enlightened of the big zamindars will lead the way in the rectangulation of existing holdings. Would you make it a condition of irrigation?—We are doing rectangulation; we want to do sub-rectangulation.

58789. Would you make it a condition of giving them water?—We cannot enforce it where they have established rights. Where we have Government waste lands to sell, no land will be allowed to be cultivated except on condition that it is worked in 'squares' or fields of certain sizes. The Revenue Officer will see that no auction is held unless the land is properly divided up. In the Punjab some ninety per cent of the land under new Government schemes is Government waste whereas in Sind we have got twenty-five per cent only Government waste. Therefore, we have to do our improvements by persuasion, not by law.

58790. Could you give us a rough idea of the capital cost per acre irrigated of the Sukkur Barrage scheme?—Thirty rupees per acre. The value of the land will work out at about three times that in ten years.

58791. *Dr. Hyder*: What is the bearing of this custom of *mohag* on fragmentation and rectangulation? What is *mohag*?—*Mohag* is an indefinite right to as much land as the man can grab adjacent to his holding. I should think that is the ordinary way of describing *mohag*. It was a very important factor in the days of the Mirs, because, in those days, the Government did not construct any of the channels. Therefore, a zamindar went into virgin land and started with a canal say three miles from the river. That was very nice for the Mirs, because they could get hold of a part of the produce of that land without effort or liability, and if the zamindar wanted still further to extend the canal, they encouraged them by giving *mohag* rights. As far as one can see, the principle was that the

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zamindar went on extending irrigation and using the adjacent land. That was all right in primitive days, but owing to more settled conditions now, the alleged *mohag* right has become a great nuisance. It tends to limit the quantity and value of Government land for sale.

58792. *Professor Gangulee*: Have you asked Government to get rid of it?—We hope to recognise it as little as possible in giving out the land. The gentleman who will give more evidence on the point is Mr. Dow, the Revenue Officer who is going to be examined.

58793. *Sir Chunilal Mehta*: With reference to the figure which you give on page 13 of your note about fragmentation in the Deccan, have you fixed upon five acres after any examination, or is it just an idea?—It was after examination when I served in those parts. I had prepared a scheme for Government to acquire about 40,000 acres of land near Belapur, and we found there that certain of the land was wanted for sugarcane and the rest was to be given back. I worked out that five acres would be an equitable area to give back to the people after consolidation of the holdings.

58794. That would be on irrigated land?—Yes.

58795. *The Raja of Parlakimedi*: On page 11 you suggest that demonstration should be more concentrated upon than experiment. Do you mean demonstration on the fields of the ryots?—Yes, that is very desirable. I would not do it as an experiment. I would demonstrate after I had experimented on experimental farms.

58796. After seeing the good result of a certain experiment upon a crop you may wish to see it demonstrated—Yes, follow it straight into the fields.

58797. On the land of the cultivator?—Exactly.

58798. Have you any sort of idea as to the staff which you would require to carry on that work?—No, but I should say that if the Agricultural Department is to give it its full value there will probably be required at least one demonstrator in every taluka; that would be sufficient to visit say two or three villages in a taluka centrally situated so that they could spread their knowledge to neighbouring villages to carry out these demonstration experiments.

58799. Would you not have a kind of *maistri* or people trained on the farm to see that this is carried out properly by the ryot?—Exactly, yes, trained field men.

58800. And you would have that demonstration carried out at the expense of the department I suppose?—Yes; as suggested by Sir Thomas Middleton, it would be a very good way for Government to undertake to buy the produce if the owner so desired: that is, to guarantee it.

58801. With reference to what you say on page 13 on fragmentation of holdings, have you made any calculation with a view to suggesting what area will be sufficient for a ryot to maintain himself in Sind?—Yes, we reckon that sixteen acres probably, and twenty-four acres certainly, would be sufficient to keep him in good bodily comfort under perennial irrigation. The Punjab have fixed on twenty-five acres, but Dr. Mann I know in discussing the matter held the view that I was correct in thinking that sixteen acres would be sufficient in Sind.

58802. How much dry land would be required?—In this project we allow here for eighty-one per cent of the holding being irrigated annually; that is with *kharij* and *rabi* crops.

58803. Have you got in mind the problem of preventing the formation of a layer of red stuff which is, I believe, complained of by another witness?—Yes, that is the question of salt efflorescence; it takes various forms: the white, black or red. That is a problem of drainage.

58804. You are guarding against that?—Yes, we hope to; but one of the important points is the question of distribution of water. I hold, though probably agriculturists do not agree with me, that the Irrigation Department should have full powers to deal with the economical distribution of water, because that is the main source from which waterlogging

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arises. You will find in the statement I have made, and I adhere to that statement, that the greater proportion of waterlogging does not come from the main canal but from irrigation. I think that has been proved by most research officers in India. Careless irrigation produces waterlogging, and that is what we have got to get at and try to stop.

58805. To see that proper distribution is effected?—And economical water distribution.

58806. *Professor Gangulee*: Do you consider the area under waterlogging conditions to be increasing?—Not in Sind. Of course, we have no perennial conditions. We have only semi-perennial on the Jamrao Canal and there we have no waterlogging at all.

58807. *The Raja of Parlakimedi*: Have you statistics to go upon as to the requirements of each crop?—That is why we are now experimenting; we have past experience but we are now carrying out experiments at the Sakrand farm of which Dr. Mann was in charge of. I do not know whether it is in charge of anybody now; that is my trouble.

58808. Do you intend to publish that statistical information among the cultivators?—Yes, as soon as we get sufficient information. This year it has been published in a general form for the general public; we have not got sufficient information to take to the village, but from the point of view of the general public Dr. Mann has published a statement, in the last six weeks, of the result of the work up to date; it is most encouraging.

58809. That is a pamphlet, I suppose?—I do not know whether it has got to the pamphlet form yet; it was a press note.

58810. *Sir James MacKenna*: Have you formed any views on the question of what the effect of the Sukkur Barrage will be on irrigation conditions in Lower Sind outside the barrage area?—Yes, in 1921 and 1922, when this question was raised by the Lower Sind zamindars, a very detailed investigation was made by the then Chief Engineer, Mr. Shoubridge, who submitted what I considered to be a very able report. I cannot attempt to remember figures now, but he pointed out in that report that the fear was greatly exaggerated, because we have got to deal not with a question of two or three years but with a question of a large number of years, and the delta formation of the Indus is such that between Sehwan, which is north of Hyderabad on the river and the sea, there is a constant rise in the bed of the river, and we reckon that that rise might be ten inches in twelve years; so that in itself that rise of the bed of the river will compensate for an equivalent of ten inches loss in level of the water. We are not so concerned with the quantity of water; it is the level at which it is delivered in the river which matters. We found it was not anything like as bad as it was thought to be. I undertook to give a certain amount of water from the tail of the Rohri Canal to protect garden crops in the Fuleli Canal area, and Government have undertaken in Council to spend five or six lakhs of rupees for a new head regulator on the Fuleli Canal to get better distribution. That was in addition to some eight or twelve lakhs of rupees on the Fuleli Canal to get a better discharge into the canal. The new regulator does away with most of the preventable loss in head due to afflux.

58811. So that the interests of these people in Lower Sind have not been overlooked?—They have not been overlooked.

58812. *Professor Gangulee*: Could you tell us a little more as to the functions of this central research station that you have in mind?—Each Province will have at least one research station. In the Bombay Presidency I recommend two. Those research stations will deal with what I call the domestic problems of the Province concerned: that is, the crops grown under certain climatic conditions of which they have local experience, the distribution of water, the amount of water required, reclamation of salt infected lands; the central research station could go into what I call higher research.

58813. Fundamental research?—Fundamental; and they would watch to see what was being done by the local research stations and use their

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brains to see if they can initiate anything which has not been started by the local stations.

58814. The central irrigation research station will then have two main divisions: one dealing with agricultural problems in relation to irrigation, and for the other you suggested hydraulics?—Hydraulics and soil physics.

58815. Would you include the problem of lift irrigation?—Yes, experiments can be carried out.

58816. In the administration of such a central research station, would you have a representative from the Provinces?—No, I would not.

58817. Could you give us an idea of the sort of administrative body you would desire?—I would have a totally separate body whose work would be frequently visited by officers from the Provinces; it should be an entirely separate station but functioning in such a way as to bring the local research people into very close touch with all its functions.

58818. But the provincial workers would not have anything to do with the administration?—No, I do not think they should. They would only send their suggestions; otherwise it would tend to become provincial, and be cramped in scope by too much interference by the Provinces.

58819. And the finance for such a station should come from the Central Government?—Yes, it should come from central funds.

58820. Have you any suggestion as regards the situation of this central research station: at Sakrand or any of these places within the Barrage tract?—I have not given thought to the central station; I should certainly have a local one at Sakrand and one at Poona, with the central station at the most convenient centre possible.

58821. You regret very much that Sakrand at the present time is without any chief?—So far as I know there is not one. I hope there will be one soon. If there is one now it has not come to my knowledge yet in the last fortnight or three weeks since Dr. Mann has gone.

58822. With regard to the question of water supply in tracts outside the Barrage, do you think there is any scope for well irrigation?—Not a great deal in Sind because well irrigation is so extraordinarily deep, and if you have shallow well irrigation it means you have supplied the area with water from canals, and you may as well lift straight from the canals.

58823. Then you do not hold out a very great prospect for well irrigation in Sind?—Not on a large scale now.

58824. Smaller canals other than the Barrage canals would perhaps be useful?—Yes, very useful indeed.

58825. Could you tell us something about the Jamrao Canal. It was supposed to be a perennial canal, was it not?—Yes.

58826. But it did not become so?—That was due to having no barrage at Sukkur. They were very sanguine that the old Eastern Nara supply channel, which was originally a bed of the river, would carry sufficient water down to give a perennial supply to the Jamrao Canal. History has proved that to be a mistaken idea; it worked all right for the first few years; the river altered its course and there have been silting troubles and lack of discharge ever since.

58827. So that on the completion of the barrage scheme the Jamrao Canal will be a perennial canal?—Yes.

58828. It is alleged that the clearance of canals has been very much neglected by the Irrigation Department. Could you tell us what is the position?—That is a common allegation, but I would like to point out that we have done our best to explain to the cultivator that it is not a fact. In the old days in Sind scientific irrigation was not known; in fact very little of it is practised now because the canals themselves are totally unscientific. The easiest way, from the engineer's point of view to keep the people quiet, and from the cultivator's point of view, was to put a gang of men in and start digging: what they call "silt clearance". As you no doubt know, a canal has to be designed to a certain gradient,

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and that gradient is fixed with reference to the soil level of the fields. It is no good digging below that level, because you will get nothing but what we call dead water. If you dig at the head of a canal you will get certain dead water and above that you will get the moving water; it is the gradient below which the canal will not work. For years, in Sind, money was spent on silt clearance; it has been considered by the irrigation officers to be an absolute waste of good money. We have always tried to go into the matter from the scientific point of view, and whenever silt clearance is advisable we have never hesitated to advise money being spent thereon.

58829. I understand from your replies that you attach a great deal of importance to lift irrigation?—A great deal, yes.

58830. In what way can the Government encourage lift irrigation?—I suggest the giving of a prize for the encouragement of the development of low lift high duty pumps. I think that is the only way. The Local Government encourage lift irrigation; so far as the Bombay Presidency is concerned, by giving a preferential rate. The lift rate is half the flow rate in Sind and the Bombay Deccan.

58831. On this question of fragmentation of holdings, you say you would like to fix five acres as the minimum area for the purpose of irrigation?—Yes.

58832. We find there are about 66,000 holdings of under five acres in Sind?—Yes.

58833. How would you provide water for those holdings?—That is a difficult problem. We shall have to do it. I personally should not like to supply water to anything under sixteen acres, but these people have got their rights and we shall have to recognise those rights and supply them with water as best we can. It is a totally uneconomic proposition from the irrigation point of view: it is wholly uneconomic to attempt to supply water down a long channel to three or four acres of land; but we have got to face the facts as they are and meet the situation as best we can.

58834. So that, is this idea of having a minimum area which you suggest a very helpful one?—Yes, we can stop that in the future. I am looking to the future; for the past we have got to deal with it as we find it; but I should certainly have a rule by which Government would not, in future, after a certain date, give water to any holding which is under a certain area.

58835. You are referring to the new settlement?—Yes, the old we have to face as it is.

58836. *The Chairman:* Do you distinguish between sub-division and fragmentation?—They are one and the same, if the members of the family happen to be at variance with one another that is the whole trouble; if they work together as a unit it does not matter how much they fragment. I know of one case in the Godavari Canals area where there were twenty-seven tenants on an area of fifteen acres, but the holding was in excellent condition because the head of the family kept the rest of them together. He did all the agriculture and they shared the profits.

58837. Is not sub-division the inevitable division which takes place if the hereditary law which is in operation is followed, whereas fragmentation is that which occurs when each heir insists upon having not merely his fair share of the whole but his fair share of each particle?—Exactly; of course that is hopeless. But the Bombay Government have made an effort and a Bill is being introduced now. Sir Chunilal Mehta will be able to advise you about that. An effort is being made to reduce fragmentation and sub-division.

58838. *Professor Gangulee:* In establishing the Sakrand station you had active co-operation from the Agricultural Department?—Yes, it was their scheme; I think I myself originated it, but all the work is being done by the Agricultural Department. Throughout, Dr. Mann has been in very close co-operation with me; he has seen me on every occasion he has been.

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in Karachi, talked about the varieties of crops he proposed to grow, given me information and asked me if I had any further suggestions to make.

58839. *Mr. Kamat:* You think that the Sakrand station should continue for some time longer under a senior officer of the Agricultural Department?—It is not a question of a senior officer of the Agricultural Department. I should look round. Personally I do not know of an officer available in the Agricultural Department who would carry it on. I should look round for the best possible officer, pay him well and put him there to run the place, even though one got a temporary man from outside. The climate is very bad and I do not think that the ordinary service conditions would induce a good man to come. I attach the greatest importance to the proper conduct of that station.

58840. With regard to fragmentation, on the Deccan canals you at present recognise even half an acre as the minimum area for allowing canal water?—Yes.

58841. Even under existing conditions do you not think that rule could be revised with a view to avoiding excessive fragmentation?—Yes, I have advocated for the last twenty years the fixing of a minimum area that we will recognise as an irrigation unit.

58842. Half an acre you think is rather a small minimum?—Hopelessly small.

58843. And yet the Irrigation Department is continuing to recognise that as the minimum?—That we cannot help; we do not want to do it; we want a much bigger minimum than that.

58844. On page 13 of your note you say: "In the Deccan there is a large number of schemes prepared which can be taken up one by one as soon as the vital problem of how to make the Deccan irrigation pay is solved". I should like to take advantage of this opportunity afforded by your presence here as a witness to ask you a question as to this problem of Deccan irrigation being made to pay. Are you aware of the present situation in the Deccan, that, as the rates for *gur* have gone down, it does not pay the cultivator to grow sugarcane at the present rate of Rs. 45 for the canal water, and also that if that rate is not realised by the Irrigation Department it is felt that the irrigation schemes cannot be made to pay?—I cannot agree as to the rate of Rs. 45, affecting the situation seriously at all, because it is one of the smallest items in the question of sugarcane cultivation. In Java where they prosper and are able to undercut India and send their sugar to India, they pay as much as Rs. 225 per acre for irrigation water supplied by private Dutch companies while we charge Rs. 45. The cost of manure, husbandry and of nearly all the items is bigger than that Rs. 45.

58845. Whatever the conditions in Java may be, you are aware, I suppose, of the conditions in the Deccan where sugarcane growing is being given up by the cultivators and the department is faced with the question of what to do with the water?—Again I must say that I do not think it is because the rate is Rs. 45. The situation is uneconomic, partly through the extravagant methods used in cultivation. I myself have seen it. I started the sugarcane irrigation myself on the Godavari and Pravara canals and I saw the expenditure going from Rs. 150 to as much as Rs. 850 per acre, men vying with each other to get the heavier crop, until it came to this in the end, that the sugarcane became an aquatic plant: instead of being grown on the soil it was being grown on manure and water. With the deeper rooting of the cane and more economic cultivation, I think you will find you will be able to compete with the low price of *gur* in the market.

58846. Whether the use by the cultivator of the canal water or the quantity of manure put in is right or wrong, supposing the growing of sugarcane falls into desuetude—whether rightly or wrongly on the part of the cultivator is an entirely different point, I am not going to discuss that,—have you any other paying crop to suggest for the utilisation of the irrigation water in the Deccan?—I do not see why they should not turn to wheat and the ordinary *khari* crops and, in the black soil tracts, cotton.

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I advocated the establishment of a cotton station at or near Nevasa, but nothing was done. I even suggested getting Messrs. Ralli Brothers to put up the money as they were interested in growing cotton there, but no action was taken on my suggestion. I see no reason why we should not turn to the old staple crops of the Deccan for our salvation.

58847. You think that, even assuming sugarcane does not pay, apart from the present methods being right or wrong there are other crops for which the water could be used?—I would not despair of finding other crops. It is a question of going into the economics of crops, but, speaking off hand, I should say we could turn to other crops. That would make it pay for the people but not for the State.

58848. On the first page of your note you say you are in general agreement with the views which Mr. Inglis has put before the Commission?—Yes.

58849. I think Mr. Inglis has said that it would be desirable that the Irrigation Department and the Agricultural Department should be under the same Minister; do you subscribe to that view also?—Yes, I do; I think that is very sound.

58850. With regard to roads, there are certain roads in the irrigated tracts in the Deccan maintained by the Irrigation Department?—Yes.

58851. Do you think it would be an advantage to continue them under the Irrigation Department or should they be under the local boards?—From the point of view of efficient upkeep I would rather see them under the Irrigation Department, but from the point of view of general policy they should probably be under the local boards because I hold that the irrigation engineer should confine his attention to irrigation: he has plenty to do.

58852. Do you desire to maintain this dual control?—No, not if I could find an efficient way of getting out of it.

58853. If you want to have unitary control, what would you suggest?—I personally should put the roads under the Roads and Buildings Branch of the Public Works Department where they have not been put under the Local Board.

58854. With regard to your proposal for an experimental station you would wish to see an irrigation officer attached to the superintendent of the station who might be an agricultural officer; is that your idea?—Yes. I have not looked into the question of who should be the head of the station, but there should certainly be expert research officers on both the agricultural and irrigation sides.

58855. Assuming the head of the experimental station were an agricultural officer, would you like to have an irrigation officer always attached to the station?—Certainly, the best man should be the head.

58856. To work under the agricultural officer?—Yes, certainly they should be working together. I have no objection to the irrigation officer being nominally under the agricultural officer.

58857. But in any case there must be an irrigation officer attached to an experimental station?—Exactly so.

58858. Speaking about this silt clearance in Sind, in view of the explanation which you have just now given the Commission, you think that the question of spending a certain percentage from the land revenue does not arise; is that what I am to understand?—I think it is a most dangerous principle, to earmark definite sums of money for any particular purpose.

58859. We have been told by another witness in a statement submitted to the Commission that whether the practice of clearing silt is good or bad, there is a history behind it and at one time Government adopted the practice?—I happen to have seen the written evidence to which you refer; I was asked about it yesterday and that is the first time I had ever heard that Government had ever set aside, or proposed to set aside, a definite percentage of their revenue for silt clearance: a policy to which certainly nobody in his senses to-day could subscribe, because you must look to

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the actual needs of each particular situation, and not fix a definite sum of money to be spent, which would lead to gross extravagance, because persons would say: 'if it has to be spent, let us spend it'.

58860. Supposing, however, the fact were proved that Government had in the past given an undertaking to spend a certain percentage of land revenue, would you still maintain that it would be an extravagance to spend that percentage if under modern conditions that much were unnecessary for effective clearance?—Yes, exactly.

58861. *Mr. Jamshed Mehta*: You have just made the statement that the capital cost of the Barrage would be Rs. 30 per acre?—Yes.

58862. Is that based only on new land to be brought under cultivation or on the whole area commanded?—I take the whole area commanded. It is on the total area we propose to irrigate, not command but irrigate, compared with the total cost of the scheme. But the actual protection is of course on the area commanded which, in the case of the Barrage, is very nearly 8,000,000 acres, and the irrigation is just under 6,000,000 acres.

58863. I find that one of the witnesses writes: "In my opinion the detailed distribution should be left to the landholders". Do you agree with that opinion?—No, I have had very bitter experience on that point; I myself tried to encourage that co-operation in the beginning. On a certain distributary on the Godavari right bank canal I got the cultivators together and used my personal influence to try to get them to co-operate. I gave them a fixed discharge in the channel. That was the outcome of accusations of bribery and corruption on the part of my menial staff. At the end of six months the cultivators came and begged me to take it back again; most of them had had their crops damaged, there was a lack of co-operation and several men had had their heads smashed. That is my bitter experience of co-operation in the Deccan. I think it would be still worse in Sind.

58864. You have no hope of finding a *via media*, by which Government officers and landholders could co-operate in Sind?—No. There could perhaps be advisory committees, much the same as are running railways.

58865. You have spoken as to the influence of the Barrage in Lower Sind; on that Mr. Shoubridge has given a report; you say that the Government want to spend five or eight lakhs on Fuleli canal improvements?—Yes.

58866. Do you agree with Mr. Shoubridge's report on that?—Yes, in the main; there are a great many points which are hypothetical, as there always must be in dealing with the future; but as far as I can see he has been very sage in his judgment and moderate in taking figures for both sides of the argument.

58867. But I suppose you know that the fear of the Lower Sind zamindars still exists to a great extent?—Yes.

58868. Do you think that if all these things fail Government will be immediately prepared to take action?—I feel certain Government must protect their interests: that undertaking was given in the Legislative Council in 1923.

58869. I take a statement made by you on page 13: you also feel that beyond the Lloyd barrage scheme other schemes are very necessary; "In Sind there is still scope for very great improvements in the irrigation of the area outside the Barrage Canals zone", and Government will have to take up future developments?—Yes.

58870. Are these schemes before the Government?—One or two are practically before Government, and others have to be worked up. The Marani project is practically complete in its final state and that has to go up to Government.

58871. May I take it as definite that Government has appointed a staff of engineers to work out the scheme?—That has been done in the Karachi canals district but not elsewhere in Sind. Each officer takes up such work as he has time and according to his keenness.

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58872. *Sir Chunilal Mehta* : In connection with this silt clearance problem, there is also a question of reduction of *karia* heads, is there not?—Yes.

58873. Can you throw some light on that question?—Yes, I will put it in as few words as possible. A *karia* is a water channel, that is an expression used in Sind for a water channel leading to a zamindar's field from the main channel. In the days of the Mirs the landholder dug a hole in the canal bank, cut his channel and took his water. When he found he was getting less water, he widened that opening. That process went on; that zamindar, who was probably a small man when he started, through having lashings of water got very powerful, his opening got wider and wider and the man further down got less and less water. As a consequence, we found after a review of the situation that the zamindars at the tail of these old canals starved whereas the zamindars at the head were very prosperous indeed. We find most of them are "representatives" on the Legislative Council; the representatives of the people of Sind are mostly gentlemen who own lands at the heads of canals. I think cause follows effect in that case, but I cannot see how they can represent the true interests of the man at the tail. We have been trying to protect the smaller zamindar at the tail. For that purpose we have introduced what we have called the proportionate module; it is a masonry outlet or opening which will give a proper proportion of the discharge of the water passing in the canal at each point to everybody concerned; that is to say, if a man has so many acres of land, we say he shall have so much of that water which is passing. We make this module and indicate what the depth of water passing in that channel is within certain limits. By the time we get to six inches depth it does not matter who gets it because it is hopelessly inadequate; but within certain limits everybody gets his proper share, within five per cent of accuracy of the water passing through that channel. As a consequence we have had to limit the amount of water taken by very big zamindars at the heads of these channels. They say we are robbing them of water: we say we are taking back some of the excess water that they have enjoyed for years. That is a conflict of opinion that I am afraid must go on between the man who owns the land and the officer who has to distribute the water. That is the controversy as it is at present. It will lose a great deal of its importance in Sind because two-thirds of the irrigation of Sind will come under the Lloyd Barrage. Under that scheme every outlet will be moduled because we propose to have a regular supply of water in all the canals and as a consequence we must see that everybody has his proportionate share of water which will be his full share. It is not necessarily his full share at present but it is his share of, probably, an inadequate supply of water. I think that is as succinct as I can put it.

58874. It has been claimed that an experiment was made in the presence of the Irrigation Member which supported the contention put forward by some of the landholders; is that a correct statement?—I should think it is wholly incorrect; I have seen the written statement but I had not heard of it before.

58875. It has also been claimed, as was pointed out by a member of the Commission, that Government undertook to spend a certain amount of the land revenue on silt clearance. Reading the evidence, it appears that it was not silt clearance but maintenance of canals?—Yes, that is a very different proposition.

58876. Can you give us any idea as to the proportion of land revenue that you spend on the maintenance of canals?—On some canals it is practically the full revenue, a hundred per cent, I am sorry to say; but in other cases I should say thirty or forty per cent is a very common figure: very heavy charges indeed.

58877. Considerably more than the sixteen per cent?—Yes.

58878. You also said, I think, that in the Deccan it is possible to divert the irrigation water from sugarcane to other crops?—I said I hoped it would be possible; it is a line of investigation.

58879. You have not any facts in your experience which would lead you to think it would be not only possible but economical?—I say it may be economi-

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cal from the point of view of the cultivator, but never from the point of view of Government; the canals will never pay if sugarcane is given up, but the cultivator could prosper.

58880. Would it involve a very considerable expenditure in extra canals to give water for crops such as you mentioned?—It would mean a much more detailed distribution, yes.

58881. It is not certain that a cultivator would take that water: he would prefer to take his chance with the rain?—Exactly; that was my difficulty when we started irrigation in those tracts: they gambled on the rain, and then when it failed they came in their thousands to ask for water, all on the same day.

58882. Cotton does not require very much water in the Deccan, does it?—No.

58883. So that the chances are that cultivators may refuse to take the water at all?—Certainly; but Government might consider putting on an insurance cess on every acre whether they take the water or not, and that would make them take the water at the proper time and get a better crop than if they gambled on rain.

58884. Would you force them to pay the insurance cess?—Certainly; we all have to insure our lives, why not insure our crops?

58885. Could you say in how many years the cotton crop fails?—Sometimes for four or five years continuously it has failed. I knew of three years of either scarcity or famine in the eight years and three months I was at Kopar-gaon in the Pravara Canals division. The country was absolutely black in its bareness; oil seeds were grown but not cotton.

58886. That was in the Ahmednagar district?—Yes.

58887. *The Raja of Parlakimedi*: When fixing those division dams you have just mentioned, if there are estates that do not possess survey records, how do you fix your area for irrigation?—We find out the area that is established on that channel from the revenue survey records.

58888. There are estates where a survey is not held?—We should have to hold it ourselves, but that is very exceptional, probably only in *jagir* lands. In *kabuli* lands it is known to the Revenue and the Irrigation departments exactly what crops have been irrigated and the exact extent of them.

58889. To get the revenue upon those?—Exactly.

58890. *Mr. Calvert*: We have been told that the Indus is at a higher level than the land eastwards?—Yes, and westwards.

58891. How do you intend to dispose of your drainage water? It cannot flow back into the Indus. Will you pump it back?—It can flow back into the Indus.

58892. How can it flow up?—We take it at a flatter gradient; one of our main drains takes off near a place called Mehrabpur and we let it back into the river above Hyderabad. We give a flatter bed slope to our drains than that of the river.

58893. You will not need to use pumps?—No; there may be one or two local places round the Mirpurkhas area where we may have to use pumps.

58894. *Mr. Kamat*: To revert to this question of sugarcane in the Deccan: if sugarcane is given up, that means a set back to the extension of irrigation in the Deccan?—Yes, it will, unless it is run on philanthropic lines.

58895. Do you think it would be an economic proposition for the cultivator to pay Rs. 45 and yet to grow sugarcane at a profit?—Not under present conditions. I say that from my experience. A lot of alterations have been made in the last nine years since I left that area, but nine years ago they were getting very big incomes from their crops and they did not mind what they spend on producing the crops; Rs. 800 and Rs. 900 was a very common expenditure and they were getting Rs. 1,200 and Rs. 1,300 per acre for the crop.

58896. Is it a method of wasting the manure?—I think it is wasteful in all directions; that is why I want to see greater research made into the question of sugarcane cultivation.

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58897. As to the allegation that they waste water over the sugarcane, is it also true, as has been alleged in some quarters, that they over-flood their sugarcane because they are not sure of getting their turn of water from the department at regular intervals?—I should think that is highly improbable as a cause, because the canal is run as a perennial one. I never had a case like that. I put it down mostly to gross carelessness. In Sind when the water is non-perennial, excessive watering is the practice: a bird in the hand is worth two in the bush but in Sind we shall have the bush birds in the hand in the future.

58898. In Sind the distribution is less complicated than in the Deccan?—Yes, because holdings are bigger.

58899. Not because of the module system or anything of that sort?—No.

58900. Is it not possible to increase the efficiency of the Irrigation Department with regard to the regularity of the intervals of supplying water for sugarcane? Is there no possibility of any further improvement in that direction?—Yes, if it is proved by the experts to be necessary you could make your intervals anything you like. You might have to make your canals bigger. If it is proved to be necessary to have an interval of seven or eight days, the Irrigation Department will have to give water every seven or eight days.

58901. If you could ensure absolute regularity of the distribution every ten days, or whatever it may be, there is the chance that the cultivator may not use the present amount of water?—Yes, but of course the chances are remote with a greedy man. If you or I have ten rupees in our pocket and we think there is a likelihood of getting a further ten rupees later, we soon spend that money. That is improvident, but I am afraid we can never get over that in the Deccan; I have seen too much of it.

58902. *The Chairman*: You mentioned, a few moments ago, the post of Inspector General of Irrigation: you said that in your view that officer did do certain things which were very useful. Amongst other things, he kept Province in touch with Province. Under present conditions and under the existing circumstances, can you conceive of an officer being able to carry out that work and to perform those functions in the position of Inspector General of Irrigation?—I certainly think so. I have been surprised all along that it has ever been abolished. I have never seen any reason for its being abolished. There has been a certain amount of inter-provincial jealousy over the appointment, but, if it is looked at impartially, an Inspector General is worth untold wealth to the country; any little thing he might tell us might save lakhs of rupees in design or matters of policy.

58903. In post-Reform conditions he would, of course, have no authority in a Province?—No, he would be advisory.

58904. Do you think that he would be welcome?—Yes, I think he would be highly welcome.

58905. Would he be in a position of sufficient authority in the Province to carry out the inspections without which it is difficult to see how he could carry on his work?—It would be an extraordinary policy for any Local Government to attempt to prevent his coming round and inspecting their different areas. He would have no executive authority, but the fact of his visiting us in the Provinces would, I think, be valuable; I have felt the lack of it very much since the post has been abolished.

58906. Speaking from your own experience of the agricultural research station, so far as the work of that station touches upon your subject, have you formed any view as to whether Sakrand, and any other stations which may be set up, can well be conducted by an officer resident at Poona, or do you think that there should be a separation of responsibility and an officer in charge in Sind?—I should think it must be entirely separate; the conditions are so totally different that any idea got from research in Poona would probably be of little use to Sind and *vice versa*.

58907. Are you satisfied with the circumstances of the research station and with the work of the Agricultural Department so far as you have seen it and from your own point of view?—At Sakrand?

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58908. Yes, and in the Province generally?—Yes, I think I am, on the whole. I have made a point in my note which I do not know whether you have noticed, and that is as to the question of the personality of officers.

58909. Yes, I noticed that?—To that I attach the greatest importance. I have known officers who have been most erudite in research and keen on their profession who have been no use at all in going out and instilling these ideas into the minds of the people. I have in mind one officer who used to be Director of Agriculture in the Bombay Presidency who was a born agriculturist, a farmer by profession and a farmer by birth; that officer used to get into the closest touch with the cultivators, which I do not think is the case when we attach too much importance to the academic side of an officer's qualifications.

58910. Do you think that full use is being made of the silt in the Indus from the agricultural point of view?—Yes; but so far as the old bad canals are concerned a great deal of it has been dropped on the way.

58911. Will your canals carry it straight on to the fields?—Yes, we want nothing to drop in the canals other than silt in the berms; after that, everything is to go on the land, and we have to calculate our velocity of water to give that effect; the silt must go on the land.

58912. That should be a very valuable contribution to the fertility of the Province?—Yes, extremely.

(The witness withdrew.)

APPENDIX I.

Statement showing the average working rates of the dragline Excavator machines working in the Lloyd Barrage.

Serial No.	Type of Machine.	Maximum reach and capacity of corresponding bucket.		Minimum reach and capacity of corresponding bucket.		Working average rate per 1,000 cubic feet.	Average depreciation per 1,000 cubic feet.	Total all inclusive rate per 1,000 cubic feet.	REMARKS.
		Reach in feet.	Bucket in cubic yards.	Reach in feet.	Bucket in cubic yards.				
1	2	3	4	5	6	7	8	9	10
						Rs.	Rs.	Rs.	
1	Class 320 Bucyrus Steam Machine .	155	5	120	8	7.13	3.75	10.88	
2	" 300 Ruston " " "	155	5	100	10	8.40	3.30	11.70	
3	" 135 " " " "	70	4	70	4	5.37	3.00	8.37	
4	" 20 Bucyrus " " "	70	3	70	3	8.74	3.48	12.22	
5*	" 50 " Diesel " "	55	1	45	1½	6.62	2.17	8.79	* Caterpillar mounted. All types can, however, now be mounted on caterpillars. All machines are self-propelled.
6*	" 30 " " " "	45	¾	40	1	4.78	1.63	6.41	

NOTE :—(1) Separate rates have been given for each type of machine as the rates of depreciation differ in each case.
 (2) The rate of depreciation depends on the assumed life of the machine. These machines were all purchased for construction work which fixes a definite period during which their full value is written off. Machines purchased for maintenance work would be given a much longer life and depreciation charges would therefore be on a lower scale than that shown in column 8.

APPENDIX II.

Details regarding types of carts.

Description.	Diameter of wheels.	Width of tyre.	Load carried.	Gauge.	Life.	REMARKS.
(a) Ordinary bullock cart as used in Sind.	2' 6"—2' 9"	4" (bevelled on edges so as to reduce the width of tyre to 2'—2½").	12½ Maunds	4'	6 years	An iron tyre 2" wide is fitted on the wheel on the carts that have to travel mostly over metalled roads.
(b) Bullock carts used in Sukkur for carrying bricks.	3' 8"	4"	250 bricks as against 120 bricks carried by ordinary bullock carts.	5'	8-10 years	As these carts are used on metalled roads in Sind, iron tyres 4" wide are fixed to their wheels.
(c) Bullock carts as used in the Punjab.	4' 4"	5"	40-45 mds. on metalled roads. 25-30 mds. on earth roads. 20 mds. on sandy tracks.	4'	The main body lasts from 15 to 20 years, but wheels require renewal every 3rd or 4th year.	An iron tyre 2" wide is fitted on the wheels when the carts have to travel mostly over metalled roads.

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Replies to the Questionnaire.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(b) and (c) (1) Demonstrations have little effect on the cultivator unless he is convinced that they are carried out under the same conditions that apply to his own land. Model farms where the Agricultural Department have separate water-courses and a special water supply, expensive machinery and unlimited labour, do not make much appeal to him, for he is generally quite convinced that he could, without any special knowledge, get just as good results as the Agricultural Department if he were given the same conditions.

(2) The best demonstrations are those that take place on a cultivator's own land. The Agricultural Department should demonstrate their improved methods side by side with fields worked by the cultivator himself, under an agreement to hand over to the latter any additional gain due to their superior methods, and undertaking to make good any loss. The cultivator will not be slow to adopt simple improvements when he is sure there is money in them.

(3) Officers who are really interested in agriculture and rural economics do very useful work by stimulating the interest of others in the course of their tours.

(4) In Sind, further propaganda work seems to be necessary. One frequently comes across important zamindars who deny, with obvious sincerity, all knowledge of what the Agricultural Department in Sind is doing. The taluka development associations are capable of doing good work but need more funds, and it will probably be necessary to keep them from falling into the hands of tuft-hunters and *veranda-wallas* who are themselves bad zamindars.

(d) *Successes.*—(1) Introduction of improved ploughs into the Jamrao area.

(2) Establishment of small fruit and vegetable gardens throughout the same area, largely owing to the personal influence of various colonisation officers and engineers.

Failure.—The case with which I was most familiar was the Daulatpur Reclamation, in which it was attempted to reclaim a large area of *kallar* land in Mirpurkhas taluka. The main methods were copious washings and rotations of crops and the land was finally declared to have been reclaimed (about 1915-16). The local zamindars and cultivators maintained that the land which was fairly good at first had been improved owing to the copious waterings and croppings, and were quite convinced that with the same supply they could, and would, have improved it in the same way and to a greater extent, whereas the worst of the land was never cropped and remained quite unfit for cultivation. This enterprise of the department was, I believe, meant to be experimental and not by way of demonstration, but it actually brought the methods of the department into considerable local disrepute because the department maintained that the land had been reclaimed when it was common knowledge that little improvement had in fact been made.

QUESTION 4.—ADMINISTRATION.—(a) Provinces tend to become watertight compartments, and the officers of one Province know very little of what is going on in the next. The result is that in one Province there is much waste of time in discussion and experiment over problems, without the knowledge that there is on record, in other Provinces, the experience which renders such discussion and experiment unnecessary. Most revenue and irrigation officials in Sind know no more about the revenue and irrigational problems of the Punjab than they do of those of Timbuctoo. Government should encourage officers to visit other Provinces unofficially for short periods to make themselves familiar with what has been and is being done there. The cost to Government in travelling expenses is negli-

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gible in comparison with the benefit which any officer with a flair for his subject derives from such an extension of his horizon.

(c) (1) The Veterinary Service is so small that its effect on the agricultural life in Sind is hardly discernible.

(2) More feeder railways will be urgently necessary in Sind for the development of the Lloyd Barrage area. These are now under consideration.

(3) The improvement of roads, and more particularly of culverts, is necessary. The load that a bullock cart can carry over a given length of road is conditioned by the worst crossings that have to be negotiated. The improvement of roads would, in my opinion, justify greater recourse to the re-imposition of tolls, in spite of their objectionable features.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—

(a) (i) *Causes.*—

1. Extravagant social customs.
2. Capriciousness of the inundation season.
3. Ignorance. The cultivator cannot properly distinguish between capital and income.
4. Priest-craft.
5. Poverty and prosperity. This is not a paradox, for both, in alliance with ignorance, lead to uneconomic borrowing.

(ii) *Sources of Credit.*—

1. The land.
2. Character. My experience has been that an honest cultivator, even with his land on restricted tenure, can borrow the limited sums which he needs for cultivation at rates as favourable as others who hold on full tenure.

(iii) The same as under (i).

(b) and (c) The further development of co-operation seems the most promising method of decreasing uneconomic borrowing. Legislation on the lines of the Punjab Alienation Act would have a salutary effect in restricting the credit of the more extravagant.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(a) The fragmentation of holdings is not very serious in Sind, because the land is usually enjoyed in undivided shares. But holdings are often scattered, and are of uneconomic shape. It is hoped to remedy this to some extent in the Barrage area by the introduction of the rectangular survey.

(b) The chief difficulties are conservatism and suspicion. The possibilities of tackling the question along the lines followed by the consolidation of holdings co-operative societies in the Punjab is now being investigated.

(c) Not at present.

QUESTION 8.—IRRIGATION.—In my opinion, insufficient attention has been devoted in Sind to the problem of lift irrigation by means of pumping schemes. There are many places in Sind where a perennial supply is available from large *dhands*, such as the Manchar, from *dhoras* and from the river itself, and only requires to be pumped a few feet to irrigate large areas of land. I do not think it has ever been satisfactorily demonstrated that this cannot profitably be done on a large scale, and the experience of the Punjab seems to indicate that it can. There are some zamindars who have installed small pumping plants in their own lift lands, and find themselves amply remunerated by getting, as their share, *batai*, or one-half the crop (as for flow land) instead of the third share which they would get for ordinary lift land. In these circumstances I find it very difficult to believe that pumping cannot be profitably carried out by Government on a large scale.

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The matter is of great importance from the point of view of the Barrage, as there are large unoccupied areas of good lift land commanded in some parts. These will have very little sale value for many years unless they can be turned into flow (so far as the zamindar is concerned) by a pumping scheme. It is also important because of the number of cattle which would be set free for field work as, during the early years of development of the Barrage area, there may be some shortage of cattle.

QUESTION 10.—FERTILISERS.—(a) Artificial manures are too expensive for the cultivator, and he is fully alive to the value of ordinary animal manure. Much however of the latter is wasted, because it is not properly collected and stored. Animals are driven into the jungle for grazing during the day and no attempt made to collect their dung, and they are herded together at night within village enclosures and their urine almost entirely wasted. Zamindars ought to pay graziers to fold goats, sheep and cattle in their fields. In certain districts of the Punjab, zamindars are willing to pay one rupee per night for every hundred goats folded on their land.

It is sometimes too readily assumed that in any case only a small minority of the lands can be manured by animal manure. It has been estimated that two thousand goats are sufficient to manure one acre of land in a single night. There are in Sind over a million goats and over half a million sheep whose manure is equally valuable, i.e., enough to manure annually 270,000 acres of land. A very much larger area still could be manured from the more bountiful excrement of horned cattle, of which there are nearly two millions in the Province. In other words, a very large proportion of the three-and-a-half million acres which are now annually cultivated in Sind can be satisfactorily manured from the agricultural stock of the Province.

(d) It is my impression that throughout Sind the value of manuring is much more generally recognised than it was fifteen years ago, and the difference in value of different manures is well understood. The richer nitrogenous and phosphoric content of goats' dung and sheep dung is recognised by its greater use for the more expensive crops such as vegetables and sugarcane, and night soil and poudrette which is available in limited quantities near large towns is also used for garden crops. Dried blood from slaughter houses, and dried fish where available, are used mainly for fruit trees. Kallar earth and earth collected from old abandoned village sites are frequently used as a top dressing for cotton, *juari* and wheat, and ordinary cattle manure is freely used for all crops.

(f) I do not think anything can be done to discourage the practice and it is not practicable to forbid it. The value of cowdung as manure is fully realised, but it is also valued as fuel for its slow burning and facility of storage. The extent of its use as fuel or manure depends on demand in any particular area.

QUESTION 11.—CROPS.—(c) American cotton. Hitherto, owing to the unstable conditions of water supply, the introduction of long-stapled varieties of cotton has been rather an up-hill fight, and the Agricultural Department has in consequence had to divide its energies between the improvement of Sind *deshi* cotton and the introduction, or production by hybridisation, of long stapled varieties suitable to the Province. I incline to think that with the near prospect of a perennial supply in the Barrage area, the department might now leave Sindhi cotton to look after itself, and concentrate on the long stapled varieties. I would even go further, and suggest concentration on one type, 4F, which is the most satisfactory of the Punjab Americans and has been proved to be capable of giving good results in Sind.

Perhaps more might be done to interest co-operative credit societies in the distribution of good seed, particularly wheat and cotton.

QUESTION 18.—AGRICULTURAL LABOUR.—(a) No measures are necessary, I think. There are very few zamindars who do not find it possible to expand their cultivation considerably during a really good inundation season. Labour easily gravitates to where it is wanted most, particularly in Sind where the *hari* has no permanent interest in his land.

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(b) Some doubts have been expressed as to the possibility of the existing population of Sind being sufficient, or being likely to expand rapidly enough, aided by moderate immigration, to bring the new Barrage lands under cultivation within a reasonable period of years. I do not share these doubts. Those who express them make, I think, insufficient allowance for the large area that will be turned from lift into flow, thus requiring fewer cultivators; for the long periods of idleness which the present uncertain and restricted season enforces on cultivators; for improved methods and organisation, and especially for the stimulative effect on population of a period of agricultural prosperity and development. The population of the Lyallpur district had decreased from 40,000 to 30,000 in the decade before the opening of the Lower Chenab Canal. It has now a population of over 1,100,000, of whom about half were born in the colony; and the most prolific families are those of the old Jhangli inhabitants who were a dwindling race before the canal brought them prosperity.

QUESTION 22.—CO-OPERATION.—(b) (v) I hope that it will be found possible to tackle the question, in Sind, of fitting the present irregular holdings into the rectangulation survey with the aid of co-operative credit societies formed on the model of the consolidation of holdings societies in the Punjab. Two officers have just been deputed to make a careful study, in the light of Sind conditions, of the work being done in the Punjab.

(vi) Joint-farming societies would, in my opinion, be entirely premature in Sind, and likely to bring discredit upon the co-operative movement generally. There would be little hope of them being run honestly, or disinterestedly. The history of the few landholding co-operative societies in the Punjab is not encouraging.

(c) Yes. I should certainly be in favour of legislation to compel a recalcitrant minority to join in any such co-operative scheme. There are differences of at least a thousand years between the general outlook and development of different individuals in a Sind village, and there always will be a minority (where there is not a majority) against any co-operative scheme of improvement.

(d) I only had detailed personal knowledge of one society, some dozen years ago, when the co-operative movement in Sind was in its infancy. The leading men of the society certainly achieved their object, which was that of borrowing the whole funds of the society and not repaying them.

QUESTION 23.—GENERAL EDUCATION.—(b) I have no experience of the matter but I feel that schools with an agriculture bias, if properly run by trained teachers, should be capable of doing much good, both to the boys and indirectly to their parents.

I think the ordinary readers in use in elementary schools might be more descriptive of the things which boys see, without really attending to, every day. Nothing holds a boy's attention so much in a book as a description of some thing which he thinks he knows all about already. Many of the simple facts of agriculture could be rubbed in in this manner. I am told that the Sindhi readers, although frequently revised, still contain nothing whatever about the Lloyd Barrage scheme, which is now in process of revolutionising the lives of half the agricultural population of Sind.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(b) Government really cannot afford to undertake this work, though the results of such economic surveys would be most valuable. They are of no use unless they are really the work of a well-educated, trained and conscientious observer, and they take a great deal of time to do properly. In a more developed country such work is done by large numbers of private individuals, out of personal interest or devotion, and is produced in such masses that the principal defect, prejudice, can be readily discounted. In India the usual fault of such work is political bias, but there is improvement in such work owing, perhaps, to the fact that politics in India is no longer the simple business of opposition to Government that it was a few years ago. There is very great scope for such surveys in Sind, where it is hardly too

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much to say that at least half of the agricultural statistics are little but guess work.

QUESTION 26.—STATISTICS.—(ii) The figures of yield, as given in the Agricultural Statistics for Sind, are generally admitted to be unreliable. Some of the figures for the Karachi district were till recently (I am not sure whether they have now been revised) fixed on the authority of a casual demi-official letter from a Collector of early Victorian days who got them by questioning a local zamindar. I think they require to be brought up to date by extensive crop experiments. The difficulties of obtaining the figures indirectly, from estimates of consumption, carry-over, export and import, are very great. I had much experience of this matter during the War, as Assistant to the Commissioner in Sind for Civil Supplies, and my opinion is that there are so many unknown factors which have to be estimated, and the margins of error are so wide, that the indirect method is quite unreliable, especially in the case of food grains.

(iii) The figures for Sind are, I suspect, quite unreliable. Concentration of effort over a limited area would probably give more reliable results.

Oral Evidence.

58913. *The Chairman:* Mr. Dow, you are Revenue Officer, Lloyd Barrage and Canals?—Yes.

58914. Your headquarters are at Karachi?—Yes.

58915. What length of time have you held this post?—I have only held this post from the 1st of January this year. Before that I was for a year Financial Adviser to the scheme; out of 17 years of service I have spent about 11 years in Sind as revenue officer and on other miscellaneous work; I first came to Sind in 1910, and I have always been in and out of Sind since then; my longest period out of Sind was three-and-a-half years in the Finance Department.

58916. What exactly is your own responsibility at this moment? Are you formulating schemes for the colonisation of those areas which are to be newly irrigated?—Yes; I am in charge of everything except the actual building and construction of the Barrage and Canals, with which I have nothing to do; except that I am acquiring the land which is wanted for the digging of the canals; I am to be responsible for the land sales, and generally, I suppose, for securing the financial success of the scheme, so far as it depends on the receipts.

58917. We have not seen the Government scheme of colonisation of the areas; is it in existence?—No; there is no definite scheme in existence. It is rather too early to formulate a scheme of any definite nature.

58918. When do you expect the water to be flowing down the canals?—I understand the engineers hope that the water will be flowing by March 1931.

58919. How soon do you anticipate that the sale of the lands will be begun?—As regards lands which it is proposed to sell by auction or to sell in any other way at full rates, it does not seem to be of much use to attempt sales until we are in a position definitely to assure the purchasers that water will be ready on a certain date. At present there are good hopes that it will be ready by March 1931, but I do not think even the most sanguine of engineers would like to make a very definite statement that that date will not be delayed, and I do not think that you can hope to get anything like the full price until two years before the water is ready.

58920. On the other hand, you have to wait longer for your money?—Yes; it is a matter of arithmetic to work out whether we are likely to lose more by selling in advance than we would have in interest charges. We are paying interest on borrowed money, and by getting in our money in advance we should borrow less and so pay less by way of interest.

58921. I suppose the area to be irrigated is actually divided into two classes, that which is already owned and occupied, and that which is virgin land which will be cultivated for the first time as a consequence of irrigation?—Not altogether virgin land; some of the land which is still Government land has been cultivated on temporary leases; *eksali* and *panchsali* (let for one or five years), and in many cases these temporary leases have been extended from year to year, up to as much as fifteen years sometimes.

58922. Do they present obstacles to sale as freehold?—Some concession will have to be made undoubtedly in respect of some of them. In some cases virtual promises of permanent grants have been given; in other cases they are purely temporary. For example, this year in consequence of the floods a large amount of land has been given purely for temporary cultivation. I think all these cases will have to be gone into individually. But they do not amount to a great deal; they amount in the whole area to a little over a lakh of acres.

58923. Where the land is with Government, is it the policy to encourage ryotwari colonisation or zamindari?—I do not quite follow the distinction you draw between them; is it merely a difference in the size of the holding or in the nature of the tenure?

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58924. In the size of the holding?—I imagine that Government will, as far as possible, want to encourage the smaller holder; I am certainly very much in favour of doing that as far as possible, and I think it is possible. Sind is already very largely a country of small holders. The number of holdings in Sind of over 500 acres is less than 2,000, and 75 per cent. of the holdings are under 25 acres; 36 acres is the average size of a holding for the whole of Sind.

58925. Would you call that a very small holding?—Under present conditions it is small.

58926. But not under conditions of perennial irrigation?—Under perennial irrigation that is still not a very large holding, but it is well above the minimum economic holding.

58927. Holdings over a hundred acres constitute about seven per cent of the total; is that approximately correct?—Yes, about seven per cent. In some districts the average holding is already very small; in the Sukkur district it is about fifteen acres.

58928. Is it proposed to sell the land at auction or at fixed prices?—No definite decision has been taken by Government.

58929. What is your personal view?—My personal view is that both systems may go on side by side; there are advantages in each. I should certainly prefer to sell the very best of the lands in the largest blocks by auction. But a system of selling by fixed prices has many advantages; it would enable the work of land distribution to be carried on more evenly throughout the year, which is an advantage where staff is limited. They have tried both systems in Bikaner side by side, and each has its advantages.

58930. Do you contemplate any scheme for the financing of purchases by small men?—I certainly contemplate that purchase will be made by instalments, probably up to eight or ten instalments, and I think co-operative societies might do useful work in aiding purchasers.

58931. There is no proposal to provide any *ad hoc* machinery of credit other than what is supplied at present under the existing acts?—No, no proposal has been made.

58932. Has any suggestion been made that a certain number of large blocks of land might be leased for a certain number of years to corporations or individuals in order, amongst other things, to demonstrate the advantages of improved cultivation to the neighbourhood as a whole?—I have not had such suggestions made to me.

58933. What is your own opinion on that point?—I think that certain areas of land should be leased for periods when we are not prepared to sell outright. That, I believe, is commonly done at present in the Punjab; land which is not considered ripe for sale is leased out for periods of varying lengths; sometimes bad land is leased with a view to getting it improved.

58934. I was thinking rather of the leasing of a sufficiently large block of land for a sufficient number of years to attract capital, either Indian or European, so that all the advantages which come from progressive methods might be tried out and advertised in the district. That has taken place to some extent in the Punjab, and the balance of advantage may be in having a certain number of such blocks?—I am getting a certain number of applications, at any rate nibbles, from people who want large estates for particular purposes, fruit-growing, cattle-breeding or something of that kind, with a view to bring various advantages to the State and incidentally to benefit the individual making the proposal. But I understand that in the Punjab, Government have now come definitely to the conclusion, in connection with their latest irrigation projects, that such applications ought to be discouraged.

58935. No final decision has been taken; is that so?—No final decision has been taken here.

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58936. Has any suggestion been made to put upon the purchaser or the cultivator of land to be irrigated under the Barrage scheme any restrictions as to the methods of tillage, the adoption of improved varieties approved by the Agricultural Department, and so on?—You mean on the conditions of his tenure?

58937. Yes?—No such proposal has been made.

58938. Do you consider it advisable?—I should think not.

58939. For what reason?—Generally because of the impossibility of enforcing such conditions applying to a large number of people in a large area with practically no establishment which you can rely on. I have had some experience of that; I was for three years on the Jamrao Canal which was largely colonised by small holders from the Punjab and from Sind, and various conditions regarding building of *pucca* residential houses were supposed to be imposed. They were very irregularly enforced; provided the tenant kept on the right side of the local officials, he was fairly safe, but if he fell out with them then he was fairly sure of being reported for these things. I moved in the matter when I was there, and I think those conditions have now been abolished. Even as regards the Jamrao they were very difficult to enforce consistently.

58940. There are certain attractions in providing such a scheme; you get a large block of one improved variety of this or that crop; the difficulty of preserving the purity of the strain is done away with, because of the absence of the risk of cross-fertilisation and also you get a sufficient volume of produce of improved quality to ensure a premium in the market?—There are certain advantages if you can enforce those conditions; but there is no advantage in making rules which you do not enforce. In that particular matter of seed, I think the cultivator in Sind is beginning to realise the value of having good seed, and I think that is one of the most promising ways in which the Co-operative Department and the Agricultural Department in combination can help the cultivator.

58941. What about the need for arranging, in the beginning of things, for irrigated plantations to provide firewood; have you any views on that?—The Forest Department will doubtless want certain land and possibly give up others; but are you referring to small scattered plots in the actual villages?

58942. I want to know whether you have any ideas, big or small, about it?—The fuel problem is not so acute in Sind as it is in many parts of the Presidency.

58943. Do you not expect an enormous increase in population as a result of the Barrage?—No, not a large immediate increase. I think our scheme in Sind is rather different from any of the Punjab schemes. In the Punjab, when they have undertaken a scheme, they have always concentrated on large blocks of vacant land. But the Sind scheme is designed mainly in the interest of existing zamindars. Almost in every part we have a nucleus, sometimes too big a nucleus, of people, and the land we are going to give out consists for the most part of small plots dotted here and there amongst existing holdings, so that the whole area is very largely already provided with villages, plantations, roads and so on, which require development rather than organisation *ab initio*. So it is really only a question, in the matter of plantations, of developing existing arrangements. There is already in Sind a system by which anybody wishing to grow a *babul* plantation gets a certain number of years free of charge and then gets light rates of assessment. *Babul* groves are frequently grown for about ten years or so with a view to replenishing the soil when the soil is exhausted, and are then cut down.

58944. Surely, in colonising Government land, where you have probably no vested interests to speak of, if it were in thirty years' time found that there is a shortage of firewood, it would greatly be regretted then that early provision had not been made for growing a certain amount of firewood at the early stages?—Yes; but what I mean to say is that we

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have got that system in force, and that it is only a question of encouraging a system which is indigenous.

58945. Not merely on land in the hands of the zamindars, but also on large blocks of Government land?—Any land which is given out as new land can be allotted subject to some similar conditions; low rates can be fixed for growing fodder and timber.

58946. What is the actual relief in rate for fodder growing?—It varies in different areas according to the other rates. But natural grass can always be grown with the aid of canal water for a rate of twelve annas per acre.

58947. Speaking about the existing customs, would you tell the Commission anything about the system of *mohag*?—The word '*mohag*' merely means frontage. Now, the zamindar's ideal of his *mohag* (to take an extreme case) is all the Government land which with the aid of a powerful telescope he can see by standing on the highest portion of his own land; and the extent to which it has always been recognised by Government is this: any land in the frontage of one zamindar which cannot be granted to another zamindar without injuring the former's rights of user or access to his existing holdings.

58948. Must the land claimed be contiguous to the man's own holding without the intervention of any other lands?—Yes; it must be contiguous. I should have explained that *mohag* is not in any sense a legal right; it has never been recognised as such, nor has it, I think, been claimed to be a legal right. Between those two interpretations there is room for a great deal of give and take. It depended in the past a great deal upon the conditions of irrigation and the personality of the officer in charge and so on. When the land was not particularly valuable and the zamindar would be involved in a good deal of expense in bringing it under cultivation, naturally his right of *mohag* was recognised to a much greater extent; in fact there have been very often no other claimants.

58949. Is *mohag* not founded on the conditions attaching to inundation irrigation?—Yes; I think it is entirely so.

58950. In normal years a man could only get a certain amount of water, but in a season of high floods, if he wished he could take full advantage of the water and extend his cultivation over all the unoccupied land contiguous to his holding?—Exactly. Of course if a zamindar had to take a canal from the river to water his holding, he would take, in the first case, the best land that could be easily irrigated, but might, in order to reach that best land go through a good deal of perhaps indifferent land. In exceptional years, he would be able to cultivate that indifferent land. Obviously if another zamindar were allowed to settle between his holdings, he might be expected to give a good deal of trouble and stop a good deal of the water, and therefore it was recognised that this land should not be given to any one else if the original zamindar had any objection to it.

58951. This is a system which it would be difficult to fit into the conditions of perennial irrigation; is it not?—I do not think there is any question of fitting it in; the real question is the extent to which one is going to recognise these claims. I believe, in the Punjab when they have perennial irrigation, if a particular piece of land is in a zamindar's *mohag*, that is regarded as an excellent reason why he should be able to pay a bigger price than anybody else. We shall undoubtedly approach that condition of things in Sind, but for various reasons it is necessary to recognise these claims to some extent. As I have already said, the vacant land which we have is very fragmented; and it is not a practicable proposition to get an outside zamindar to go in for a little piece of land in the middle of the holdings of another zamindar; and even where it is practicable one cannot expect to get a reasonable price. So, it is advisable from more than one point of view to give it to the local zamindar at a fairly low rate.

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58952. Do you propose to create in the Barrage area any rights of *mohaj* where none now exist?—Certainly not.

58953. Are you satisfied with the provision made in the Barrage area for drainage?—That is a matter in which I am not a technical expert, and I am bound to accept the opinion of engineers. But so far as I am able to understand, I think the provision is adequate, and some think it excessive. Our drainage problem is certainly different from that of the Punjab.

58954. You mention on page 36, in answer to Question No. 3 (b) (2), your views about the demonstrations carried on in the cultivators' own holdings. Have you had any experience of such demonstrations?—No; I have had no experience. I am of course very well acquainted with the criticisms made by the ordinary cultivators of the existing system.

58955. It appears to be your view that the Agricultural Department is hardly getting down to the cultivator?—Yes; I think so. That is certainly the case in Sind.

58956. Is that due to the insufficiency of the numbers or the quality of the staff?—I think it is probably due to both in Sind.

58957. With reference to the Sakrand station for research, do you agree with the proposal according to which, apparently, responsibility for the work is to be held by a gentleman who will be resident in Poona?—No; I certainly do not. I think that it does certainly require a man, a man of considerable calibre, to be in Sind the whole time, and the importance of the work is sufficient to justify that. I think it is quite wrong to try to run a thing like that from Poona, however capable the man is. It is not merely a matter of capacity; one cannot deal with the thing on paper; a great deal of the officer's work will consist not only in giving advice, but actually seeing and satisfying himself that his advice is carried out.

58958. Who is to be the agent of the Director of Agriculture on the spot here?—I am afraid I am not altogether familiar with what is now proposed, whether it is proposed that the Deputy Director of Agriculture in Sind should in any way be responsible for the work of the sub-station at Sakrand, or whether the work at Sakrand is proposed to be carried out under the immediate and direct supervision of the Director of Agriculture in Poona. I do not know what is proposed.

58959. Have you formed any view as to whether the one station at Sakrand is sufficient?—I think it is probably sufficient for general purposes, but we do require more demonstration stations in other parts. For the particular purpose for which it was formed, I think, it is probably sufficient; it is not so much a demonstration station as a research station.

58960. Is any study being made at Sakrand, of the problem of soil deterioration as a consequence of irrigation?—I understand that they are studying it; but of course the thing is in its infancy yet; it was only started a little over a year ago. When I saw it last (I saw it in January) the work was not very far advanced.

58961. Do you regard it as important that this work in connection with research on irrigation should be taken seriously and undertaken at as early a date as possible?—I think it is of very great importance, and that it should be taken very seriously, and the results made available to the public as widely as possible.

58962. It is very little use waiting until the damage is half done?—Of course, in certain respects the experiment is already somewhat belated. They are studying the question of the "duties" for various crops, and here we are already constructing our scheme and providing for certain "duties" for the land. It is really work which ought to have been done ten years ago.

58963. So far as that affects the size of the canals?—Yes. It is very little use having a station and getting results to show that the present duties are wholly inadequate, by the time you have already constructed your Barrage and made your canals.

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58964. On page 36, you deal with the taluka development associations. Have you any personal experience of taluka development associations?—Only from meeting occasionally members of these associations, on tour, and making general enquiries about them. They are only two or three years old. They were not in existence when I was in Sind before, and they are one of the new features that I come back to find. Where they can get good men, who are really interested in agriculture and have a certain amount of drive, they are capable of doing good work.

58965. Do you think there is any danger that such associations will fall into indifferent hands?—There is always the danger, when officials try to help forward any movement in this country, that certain people who have not the movement at heart will come into it, solely with the view of pleasing the officials, prominent men in talukas, who have their finger in every pie, whether they know anything about it or not, and whether they have any real interest in it or not.

58966. On page 36, you are giving a list of the successes and failures. Is it not the case that a good deal has been done to introduce some of the Pusa wheats in Sind?—I believe that is so, but my answer refers to things of which I had personal experience. Those Pusa wheats, for the most part, were introduced into Upper Sind, in places where I had not served.

58967. How about winter ploughing? Have you witnessed the introduction of that particular method?—No, I have not.

58968. On page 37, you are dealing with the construction of feeder railways. You say "More feeder railways will be urgently necessary in Sind for the development of the Lloyd Barrage area. These are now under consideration." What is the gauge proposed?—Ordinary broad gauge for the most part.

58969. Are they likely to be constructed at an early date?—I hope so. I believe the Railway Board were prepared to start the construction during the coming cold weather on the left bank. There was a question of a guarantee from Government. That was sent to me for opinion. I strongly recommended that it should be accepted. I do not know what the decision of Government on the matter has been. My opinion is that they ought to be pushed on as rapidly as possible.

58970. You are dealing with the matter of roads. Have you a Road Board in Sind?—It is just appointed; it has not yet met. I am a member of the board.

58971. Is a calculated attempt being made to lay out these roads with due regard to the proposed feeder railways?—That will have to be done, and also of course with the canals. The Public Works Department have just appointed a special officer to make a preliminary survey, and it means very complicated negotiations with local boards and so on, who have to be brought into the scheme.

58972. But that attempt at co-ordination has not yet been made?—It has not yet been made. The necessity of it is realised.

58973. On page 37, in answer to Questions 6 (b) and (c), you suggest that legislation on the lines of the Punjab Alienation Act would have a salutary effect in restricting the credit of the more extravagant?—Yes, but it should not be interpreted that we necessarily recommend legislation on the lines of the Punjab Alienation Act. Such legislation would also have very important political reverberations which have to be considered. I do not wish my answer to be interpreted as my having plumped for legislation on the lines of the Punjab Alienation Act.

58974. Page 37, Question 7 (a): How exactly is the carrying on of a rectangular survey going to affect fragmentation of holdings? I do not quite see the connection?—The reason is this, that the rectangular survey is being done, in the first instance, in vacant lands, and then it has to be done, very largely by persuasion, in lands which are already occupied. There will very often be a village containing, say, 2,000 acres, at present divided up into survey numbers of all shapes and sizes. Out of the 2,000 acres, perhaps there will be 1,600 acres which is occupied land, held in holdings of various sizes, some large and some small, and the remaining 400 acres may be

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Government land, also in scattered little pieces. I have just deputed two officers to the Punjab to study their methods there. I hope that it will be possible to get the people in such a village to form a co-operative society for gathering their holdings together, and work into the survey square the whole land of the village. I should stipulate that instead of 400 acres of vacant land scattered about, I would get 300 acres given to me, but all in one holding. 300 acres all in one holding is more valuable to me than 400 acres in scattered pieces. That gives the landholders 100 acres which they can play about with, and with that inducement I hope they would consent to have their lands squared and would possibly amicably arrange to gather their holdings together.

58975. Is the Revenue Department doing this work?—It is not being done at all yet. It is an idea of my own which struck me after visiting the Punjab and touring about there and learning about the work of their consolidation societies. The two officers I sent to the Punjab have just returned, but they have not submitted their report yet.

58976. Which department would you suggest for this work?—The Revenue Department. It would probably have to be done under my own supervision. but I am not at present prepared to say that the work would be successful. I think it offers some promise.

58977. Do you think it is the unstable conditions of water supply that have checked the spread of American cotton?—I think probably that is the main reason. American cotton wants its water fairly early, and if the river is late in rising, the people are afraid to sow American cotton.

58978. Do you think the indifferent marketing conditions and the failure on the part of the cultivator to get a fair share of the higher value of such cotton may have its bearing on his disinclination to sow it?—It certainly had a bearing on it in the earlier years. I was better acquainted with these experiments ten years ago, when I was Assistant Collector in Mirpurkhas division, where practically all this American cotton was grown, and then it certainly was an important factor. Whether it has been so in the last two or three years I am not able to say.

58979. Have you got much land under F. 4 Punjab?—I could not say the quantity, I am afraid I have not got the figures.

58980. It seems to be your view that it will be possible to provide the increased population required as a consequence of the Lloyd Barrage being constructed, without any important volume of immigration from outside the Province?—Yes. I think the difficulties of the population question are generally somewhat exaggerated. At present, in the whole of Sind, we have about one acre of cultivation per head of population. Now, a more developed area such as the Jamrao has a limited amount of water available in the *rabi* season, and in the Jamrao you have an acreage of more than one-and-a-half acres per head of population, even under existing conditions. The population of the Sukkur Barrage tract is already well over two millions, and we only expect to work up to our full cultivation in thirty years, with, say, an increase of something like forty per cent. in the first fifteen years, and I do not think that is at all out of the way, when you consider what has happened in the Punjab. Take the Lyallpur colony. I believe the population in what is now the Lyallpur district was about 40,000 in the census of 1881; it had gone down to about 30,000 in 1891, and the population of the tract now is over a million.

58981. You do not suggest that there will not be a certain amount of migration into the Province?—I think there will be migration into the Province.

58982. On page 39, in answer to Question 22 (b) (v), you say: "Two officers have just been deputed to make a careful study in the light of Sind conditions of the work being done in the Punjab." Who are those officers?—One is Khan Bahadur Azimkhan, the Assistant Registrar of Co-operative Societies, whom you are going to examine to-morrow or the next day, and the other is Mr. Bulchand, my survey officer. He is very well acquainted with all matters affecting survey and size of holdings.

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58983. Has co-operation made much progress in Sind, since you have known it?—A great deal.

58984. Do you think it is promising well?—I think so. I have myself not been in very close touch with it. I have referred to one society which I did know, which was not a very good one. I should say that was almost the first society in Sind; it is probably one of the first half dozen. I was in touch with it ten years ago.

58985. Have you seen co-operative work carried on by credit societies?—I have seen very little of the working of these societies first hand.

58986. Have you any definite system of collecting crop statistics in Sind? Is there available accurate information?—There is plenty of system, possibly not so much accuracy. We have very elaborate taluka forms, which have to be kept by the village accountant. He is a man who is not very well paid, and has a great deal to do, and I have very little doubt that some of the forms which he regards as unimportant he probably fills up at the end of the year by sitting in his office and putting down what he thinks to be reasonable figures. But many of the forms have to be kept accurately. The most important, those that deal with acreage and land revenue, are probably more accurate than such figures are elsewhere, because revenue depends on the amount of cultivation. Every field has to be inspected every year for getting that essential information. But when you come to things like census of cattle, and the number of animals killed by wolves and so on, I think the *tapedar* probably sits in his office at the end of the year, says "I think four is a good round number" and puts down four.

58987. *Dr. Hyder*: Are the figures of yield of crops accurate?—The figures of yield are not very reliable.

58988. *The Chairman*: Are tests carried out?—Tests are carried out by the various Sub-divisional Officers from time to time, but I am not aware that the Director of Agriculture ever accepts those figures as a basis for altering his figures of average yield. There is very little co-ordination in the matter.

58989. How about the attitude of the population towards the Lloyd Barrage? Do they welcome the development?—Very much indeed. I think perhaps the best illustration of that which I can give you is the popular name which the department has earned for itself.

58990. Which department?—The Barrage Department. It is known as the "Sind Sudhar," the department for the improvement of Sind.

58991. How about the application of scientific agriculture to the district? Is that a popular idea?—I do not think that this is a matter which has soaked down to them yet. I think the probable way in which that will be brought home to them is when they find that they have to pay considerably higher rates of revenue.

58992. They will have to get the best out of the land?—There will certainly be a greater inducement to them than there is at present. They are very conservative, and a very large number of people are not in the least interested if you tell them that they can double the yield of their fields. They say "We have enough; why worry? Why get more?" For example, on the Jamrao, I have frequently ridden down a ten foot road, separating cotton grown by some of the best Punjabi immigrants, peasant colonists, on one side of the road, from a most awfully tangled cotton crop on the other side of the road. The conditions of irrigation are exactly the same, the water is from the same source; the difference is in the quality of the cultivator. I would say to the Punjabi "How much seed do you put in your field?" He would say "Five *seers*." I would turn to the Sindhi zamindar and ask him "How much do you put in," and he would say "Thirty *seers*." I would suggest to him that he might, by way of experiment, try to put in five *seers* like the Punjabi, and I would get the reply "He is a Punjabi, I am a Sindhi." I have had that reply given to me over and over again. It is considered a conclusive argument. I am speaking of ten years ago, and I do believe that attitude is breaking down to some extent, but the way

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in which those people live side by side and deliberately learn nothing from each other is astonishing. It is not only the Sindhi; the Punjabi in other ways is just as conservative. The Punjabi would frequently come to me and want a ten foot road constructed, usually through somebody else's land, in order that he might remove his produce by bullock cart. The country would be full of camels, and everybody would take his produce by camels. You suggest to the Punjabi that he might make use of camels for transport, and his reply is "I am a Punjabi." That is the attitude of mind which one has to wrestle with.

58993. *The Raja of Parlakimedi*: In the Province of Sind, are the rights of zamindars over irrigation sources well defined?—Yes, I think so, so far as I understand your question.

58994. Suppose a river runs through a zamindari, are the rights over the river bed and the water fully defined?—They are well enough defined, and I think the present custom is rather an unjust one; at any rate, it is very unequal in its working. The river changes its bed and goes clean through a man's land, and wipes out his whole holding. He loses his holding, and the land which is exposed owing to the change of the river is not given to him in exchange. It adheres to the holding of the man on the other side, to whose land it is an accretion; it belongs to him. Subsequently, the river may go back, but the man who had lost his holding does not get the land back; it adheres to the land of the man who has a holding on the other side.

58995. Under such circumstances, how is he compensated?—He is not compensated.

58996. Has he still to pay the same revenue?—He pays nothing. In Sind no one pays revenue on land unless it is cultivated; you cannot cultivate it when it is at the bottom of the river.

58997. Suppose the Government settled a certain rate for irrigation, under the river, and the man is not benefited by it, does the Government write off that charge?—He never pays any kind of rate. We have a consolidated rate for land revenue and irrigation, which is not paid at all where the land is not cultivated. The zamindar who does not cultivate the land pays absolutely nothing in any way for it; so that the zamindar losing his land pays nothing. When I say he is not compensated, I do not mean to say that extraordinary cases like that would not be regarded with a great deal of sympathy by Government, and Government, if it were possible to do so, would give him land elsewhere, rather than that he should be ruined altogether, but he has no kind of legal claim.

58998. Suppose the zamindar wishes to effect any improvement for irrigating more area of his estate, is it left to him to settle his rate of revenue with the cultivators, and come to an understanding with the cultivator instead of going to a court to have it confirmed; is such an undertaking binding on either parties?—The zamindar in Sind gives out his land to a cultivator, and the cultivator gets a share of the produce. So that, any improvement which the zamindar introduces which increases the outturn, is naturally shared between him and the cultivator.

58999. The zamindar cannot expect to increase his share of the revenue from the holding, after introducing that improvement?—His share of the revenue is entirely a matter of arrangement between him and the cultivator. There are very strong customs. For example, generally speaking, for flow land, the zamindar takes half of the crop, and the *hari*, the cultivator takes the other half. In the case of lift land, the usual arrangement is that the zamindar takes one-third and the cultivator two-thirds. But there is no reason why, if the zamindar and the cultivator are able to agree on another rate, they should not do so. The cultivator has no rights in the soil. If he is not willing to accept the zamindar's terms, the zamindar can turn him out and get some one else.

59000. The cultivator has no rights upon the holding?—No. If the zamindar wants to get cultivators, of course he must pay certain attention to established

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custom; otherwise, he would not be able to get the cultivators. But provided the cultivators are willing to come to him, there is no reason why he should not impose any terms. If he can get a cultivator to accept less, say one-tenth instead of one-half, there is nothing to prevent him doing so.

59001. There is nothing in the Act?—Nothing at all.

59002. For instance, in other parts of India, the ryots come to a zamindar with a promise that they will pay enhanced rates of rent, if an improvement is effected, and the zamindar carries it out on a sort of moral understanding, and after that, because the Act says that such an agreement is invalid unless it is confirmed by a court, there is every chance of the ryot going back upon his promise. I suppose there is nothing of that sort here?—I suppose, if an agreement of that kind is reduced to writing, it is a matter of legal interpretation for the courts, but the Irrigation Department, for example, has nothing to do with it.

59003. As regards agricultural bias education, which you wish to be spread in the country, how would you distribute the number of schools?—My idea was that all schools in rural areas should be given a sort of agricultural bias, rather than that there should be a few agricultural bias schools here and there. I think probably one could make their school readers more practical, one could instruct the boys in simple biology, and let them know what was going on in the fields around them, enlightened object lessons, and so on. I do not intend to imply any further addition to the curriculum. I mean that it must always be present to the mind of the schoolmaster that a great number of the boys he teaches are going to be cultivators and he should try to train them for the life they are going to lead.

59004. Have you observed which part of the population takes to education?—Generally speaking, of course Hindus more than Mussalmans. The Mussalman is fully alive to the value of education, but generally speaking he is rather poorer and his boys are wanted for work in the fields rather more than the boys of shopkeepers who always let their boys go to school during certain hours of the day and use them in the shop when they are free.

59005. I mean the cultivating class; are they fairly well represented in the schools? Do they take to education?—That is very largely a matter of local need, the zamindar of the village and so on. But the main thing which prevents it is, I think, the economic factor, that boys are more useful and do a great deal of useful work in cultivation at a very early age and particularly during certain periods, such as the various reaping times of the year. If you are going to interrupt the boy's schooling every now and then, for two to three months, he might almost as well stay away altogether.

59006. Would you conduct these agricultural bias schools as night schools?—Certainly not. I do not see any reason why the boys should be sent to the night schools. It is a horrible idea to send children to work in the fields during the day and to learn at school during the night.

59007. Would you be able to attract a greater number of pupils from the cultivating class if you conducted the teaching in the vernacular?—They are taught in the vernacular; they must be taught in the vernacular. I am thinking of boys under the age of fourteen; I am not thinking of adult classes at all.

59008. *Sir James MacKenna*: Are you familiar with the experiment in Mirpurkhas with Egyptian cotton?—No; it was conducted before I went there. I think it was written down as a failure, mainly because of defective marketing. I am not quite sure, but I think the seed deteriorated in Sind. It had been definitely set aside by the Agricultural Department as a failure. But the experiment was conducted before I went to Mirpurkhas; I was in Mirpurkhas from 1913-16.

59009. Was it in the time of Mr. Henderson?—Yes.

59010. What about this Sakrand farm and the agricultural operations there? Have you seen it?—I was there towards the end of January or February.

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59011. Can you give us any idea of the agricultural experiments carried out there? Is it primarily experiments for irrigation, for example, water distribution, etcetera? Was there any indication of what they were trying to do?—There was very little indication to me, but the idea was to conduct experiments under Barrage conditions. I understood that they were going to experiment on *kallar*.

59012. Do you not think that they should devote attention to the varieties of cotton, wheat, and rice that can be grown in the Barrage area; in other words, that as much emphasis should be given to the agricultural side as to the soil problem?—I am rather of the opinion that we have already reached the stage when we know that certain varieties of wheat, cotton and rice are much better than others which are generally grown, and in my opinion, we should do better now by concentrating on the best we have and getting them fairly well established. Once you have got rid of the inferior varieties and established the good ones in their place, then all your propaganda work is bound to succeed and everybody will be willing to introduce still better varieties. We have already got to the stage when what is wanted is propaganda for extending the best of what we have.

59013. *Professor Gangulee*: You attach a great deal of importance to the research work at Sakrand station; do you consider that Government have adequately supported the research scheme financially?—I do not think the thing has been held up for lack of money in any way. No complaint of that kind has been made to me.

59014. I understand that at the present time the sum of four lakhs is the recurring expenditure; is that adequate for the work?—I think if it were not found adequate and a reasoned statement of the case was put up, then Government would have every sympathy and every interest in giving what was necessary.

59015. The station has been at work two or three years?—Actually at work rather under two years.

59016. We are told that the Lloyd Barrage water will be available by 1931. Do you think the station will then be in a position to give definite advice to the cultivator on the cultivation of land within the Barrage tract?—I think they are already in a position to give a great deal of advice with regard to the crops to the cultivator. Even the worst equipped member of the Agricultural Department is a great deal ahead of the average cultivator.

59017. I know that is so; but I mean with regard to certain special problems arising out of perennial irrigation; say definite instructions with regard to crops, use of water, preventive measures with regard to the rise of alkali, etcetera?—At present they are in a position to give a great deal of useful advice.

59018. I was not referring to the ordinary information which demonstrators have at their disposal. I was really referring to definite results of the experiments at Sakrand?—When you talk of these experiments, it must be obvious that until the experiments are over you are not in a position to give definite advice.

59019. You are not in touch with the nature of the experiments there?—I am not of course in close touch with them.

59020. The results obtained from Sakrand will not be applicable to the right bank area; would you require another station for that tract?—I think, except on the Central Rice Canal, they would apply to the right bank. The soil of Sind is on the whole fairly homogeneous. When I say that, I do not mean that there is not a tremendous amount of variation in limited areas; but generally speaking there is no marked difference between the kind of soil you have on the right bank and what you have on the left bank. It is largely a question of levels. The Central Rice Canal has of course its own problems.

59021. The *hari* is your actual cultivator?—Yes.

59022. Under the present system of farming he has no permanent interest in the land?—None at all, except in a few places where he is definitely

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attached to the soil (but this is special to certain places); but generally speaking the *hari* has no interest in any particular land.

59023. Do you think such a state of affairs offers any inducement to agricultural improvement?—I think there might be more inducement offered than now. But there is this point, the relation between the *hari* and the zamindar is always on the basis of *batai* (sharing of the actual crop) so that any encouragement given by the zamindar which results in increasing the crop increases both his own share and the *hari's* share. Therefore, you would expect that there would be a certain community of interest between both to get the best out of the land.

59024. You have referred to *mohag* rights; is it not a fact that a great deal of land will remain unsold by virtue of this *mohag* right?—It is not sold at full rates; a great deal of land will be given to zamindars in satisfaction of all rights, *mohag*, frontage, and fallow forfeited land. Fallow forfeited land is land forfeited under the fallow rules and is naturally included in the zamindar's existing *mohag*. Generally speaking, the zamindar's fallow forfeited land is the land which he was not able to cultivate; it is land which is with difficulty reached by water; it is generally situated in the extremity of his holding. Naturally, the right for the land which was once in his possession is somewhat stronger than the ordinary claim of *mohag* over other land. To meet all these claims based on frontage, including fallow forfeited land and so on, Government have proposed to set aside some three-and-a-half lakhs of acres; that represents about roughly 25 per cent of the total Government land available.

59025. Referring to taluka development associations you suggest that funds would be required to facilitate their work. Have you any suggestion to make as to how funds could be raised; or do you suggest that subsidies should come from Government?—I am afraid I cannot suggest anything except grants from Government or from local boards. I think it will take a long time to persuade local boards to make grants to taluka development associations.

59026. But if they realise that good work is done do you not think that local boards can be persuaded to support these institutions?—I should like to think so; but I have some experience of trying to persuade the local boards to do things, and they rather look to Government for funds.

59027. You have explained to us what you really mean by the reference to the Punjab Alienation Act. Do you find any tendency in Sind of land passing into the hands of non-agriculturists?—Yes; there is a certain tendency. It is very difficult to get accurate figures. The Bombay Government have placed an officer on special duty and I understand he has collected these figures. The report is not yet available, and I have not seen it. But there is a great deal of complaint about it in certain local areas, and I do know of certain instances in which comparatively poor Hindu shop-keepers have within a short time erected themselves into the position of very large zamindars. I have no doubt that personal capacity had a great deal to do with it; but there is a great deal of feeling about the matter.

59028. You say that insufficient attention has been paid to the problem of lift irrigation, irrigation by means of pumping. What do you definitely suggest to the Government of Bombay?—I think that they should support such schemes. I believe there is a great deal of information available elsewhere as to the cost of lifting water in large volume; we have very little experience of it here; and my impression is that the question has not been seriously tackled either by the Engineering Department or by the Agricultural Department. There is no obvious reason why, if it is possible in the Punjab to raise water by pumps, the same thing should not be done in Sind.

59029. In answer to Question 22 (c), you say you are in favour of legislation to compel a recalcitrant minority to join any co-operative scheme. Would you apply this argument in other spheres of social or economic legislation?—I am not prepared to put that forward as a general proposition; I should like to know what the particular scheme was. I am certainly not definitely against interference in such cases, because, as I have said, the difference in outlook between people even in the smallest villages is enormous (more than what you get in Europe); you never get everybody to agree.

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59030. You refer to a scheme of education and you suggest that some sort of agricultural bias should be given to education. You suggest that an elementary course of biology should be taught. You want to proceed one step further than the previous witness who wanted only diffusion of literacy. Would you increase the dose of education a little more than he was prepared to prescribe?—I would rather give a different drug. It is not a question of increasing the dose; but it is a question of giving a different medicine. I would like to see the village people taught about the things going on all around them.

59031. In addition to the ordinary three R's?—Yes; I am not suggesting this as a substitute for reading, writing and arithmetic.

59032. You would not confine yourself to the three R's?—Certainly I would not.

59033. *Mr. Kamat*: About the sale of lands and colonisation, I gather that you said that no definite proposals have yet been framed by Government. When these proposals come to be formulated, would you consider it desirable that they should be published for public criticism?—I cannot say that I ever considered that, but I really do not see any objection to it. In any case the land which we have to give out will be given out over a period of twenty years at least, and there is no reason why mistakes that are made in the beginning should not be rectified as we go along. Nobody is proposing to give out the one-and-a-half million acres of land all at once; it cannot be done; it must be absorbed gradually; and undoubtedly we shall get a great deal of advice and criticism from the public, which we shall value. At present, when these schemes have not yet been formulated, I should value such criticism; but what usually happens is that people ask me what my scheme is; they find it very much easier, as we all do, to get a scheme and to criticise it than to start from the beginning and make suggestions of their own and I am able to reply at present: "Well I have no scheme, but let me have your ideas." That closes correspondence.

59034. Although the land will not be sold all at once, yet once Government formulate their rules, and decide to bring them into force, it is rather too late for the public to get them amended?—I do not think that is so. Obviously if you gave out land on certain conditions, you could not amend those conditions with respect to that land already given out but there is no reason, if you find the conditions working badly, why you should not amend the conditions with reference to the land you are going to give out for the next few years.

59035. You know that it is generally difficult to get a policy changed in any way?—I agree that that is sometimes the case, but there is as much difficulty caused by policies being changed a great deal too often as by their not being changed often enough. It is sometimes difficult to get Government to stick to a policy for more than ten minutes.

59036. Is the percentage of Punjabi cultivators in Sind large or small?—Reckoned in percentage I think it is very small; but there is undoubtedly, I think, a growing influx of Punjabis into Sind. We have colonies of them, on the Jamrao, which was largely colonised from the Punjab; whole villages are colonised by them. Land was given to *abadgars*, and those people have made money out of Sind. They know what the Sind lands are like, some of them are now zamindars and are going about Sind and buying land elsewhere. They have also certainly got connections with the Punjab, and owing to their propaganda other Punjabis have bought land here and there all over Sind. Naturally this tendency is growing, because the Punjabi realises more clearly than the Sindhi the immense value of land under perennial irrigation; the Punjabi is familiar with canals, the Sindhi has never really seen a first class canal and he is still rather sceptical about the high profits which we tell him he can get from these lands.

59037. If you sell these lands for colonisation by auction, which you said you proposed to do, . . . ?—I said I would propose to sell some by auction.

59038. Do you not apprehend that there would be a great Punjabi invasion, because the Punjabi has so to say tasted blood so far as colonisation schemes are concerned?—I certainly do not see why we should exclude the Punjabis

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from Sind, if that is what you suggest. We want the superior knowledge and energy of the Punjabi merely as an example to our own people; they are very slow to learn by example, but they will be slower still if they have no example at all.

59039. You have visited the Punjab; did you notice that at the Lyallpur Agricultural College they do not keep an open door to the Sindhi students?—I do not remember that being brought to my notice; I rather went to see the actual things they were doing than to represent the interests of Sind in any respect.

59040. For the capital involved in the Barrage scheme, has the Punjabi contributed a large share?—The capital has been borrowed from the Government of India. It may be said that the Punjabi has contributed as much as the Sindhi. The people of Sind as such have made no direct contribution to the cost. We are at present working merely on borrowed capital.

59041. What I want to ascertain is, amongst the investors, so far as it can be ascertained, are the Punjabis preponderant?—Amongst the investors in the Government of India loans, it is probable that the Punjabi, being comparatively more affluent, has put in more money than the Sindhi on an average.

59042. Speaking about the feeder railways to which you have made reference, what are the actual projects under construction?—On the left bank there are three short lines proposed to go, as far as I remember, from Tando Adam, a station which is north of Hyderabad, going between the river and the existing line up as far as, I think, Mehrabpur. Generally speaking they will serve a fairly wide belt of country between the Indus and the existing line from a little north of Hyderabad to a little south of Sukkur.

59043. Do they involve a guarantee of interest on the part of Government?—I think the last time I dealt with the project officially the position was that the Government of India had asked us to give a guarantee of at least four lakhs for the first five years, and, I think, two lakhs for the next five years, I am not absolutely certain of the figures, but it was four lakhs for the first five years.

59044. So that Government are pursuing a policy of extension, even when they have to guarantee the interest, wherever it may be necessary?—I do not know what decision the Bombay Government have come to. I certainly recommended that we should.

Sir Chunilal Mehta: We have accepted it.

59045. *Mr. Kamat:* Coming to your remarks about the Punjab Land Alienation Act, do you recognise in this Province of Sind any such distinction between the agriculturists as hereditary agriculturists and non-hereditary agriculturists; that is to say, do you classify an agriculturist as such because his grandfather or great-grandfather was an agriculturist?—We have no such official classification. Generally speaking, it is probably true that agriculture goes down from father to son like almost any profession in this country; undoubtedly it will be easy to give exceptions. I do not follow the object of the question. Are you suggesting that we should have considerable difficulty in classifying agriculturists and non-agriculturists?

59046. In the Punjab they make such classification. I wanted to know whether you are in favour of such artificial classification?—I am afraid I do not follow what the question is, and in view of its importance I would rather have the question quite clear before I give an answer.

59047. In the Punjab they do classify (I do not know on what basis) some people as agricultural tribes and others as non-agricultural tribes. Now, if you are in favour of the application of the Punjab Land Alienation Act to Sind (you say it has had a salutary effect), I want to know whether you would have the power to make the same classification in this province of Sind?—You would certainly have to have some classification; but I do not see why you should have the same classification as they have in the Punjab. I am prepared to say that in our classification you might possibly have various Hindu castes classed as agriculturists, if they express a general desire. I have not discovered a large body of Hindu opinion favouring the application of any such legislation to them.

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59048. I am not speaking of Hindu and non-Hindu. Supposing a particular man wanted to cultivate land, would you exclude him under the Act, because his grandfather was not an agriculturist?—If you can get a classification which would include him, I should not object. The real point is that, generally speaking, such a man would not want to be included.

59049. The real point is not that. Whether a man is Hindu or Mussalman, agriculturist by heredity or not, if he wishes to buy land and develop it, would you prevent land being alienated to him?—I should not refuse to include him among those to whom land can be alienated. I do not think anybody has ever suggested that people who are not agriculturists should be definitely excluded from purchase of land. For sales of land under the Barrage I should certainly not wish to exclude them.

59050. As regards the total acreage which will be commanded by the Barrage when it comes under full operation, you said that a large portion of the land might not be saleable immediately; that is to say, there would be no demand for it at once?—It is saleable tomorrow at a price; but you could not expect to put one-and-a-half million acres of land into the market at once and get a reasonable price for it. If I were willing to sell it for two or three rupees per acre, I should have no difficulty in getting a zamindar to buy up the whole land immediately.

59051. That is not what I meant. You have referred to the interest charges which are accumulating, and you have said that to save those interest charges you may clear off a certain portion of land?—What I mean is this: if we sell land in advance and get a reasonable price, we can keep down the total capital charges on the project to a much smaller figure. Obviously, the longer you allow the thing to go on before you begin to get in any income, the larger your total capital charge becomes.

59052. Taking that into consideration, which would be the better policy, a waiting policy or the policy of quicker sale?—On the whole, I should think the waiting policy would be better, because this is not the only question involved. If you give out land too rapidly and at a low price, it gets into the hands of people who have no capital and no ability to develop it. This scheme is going to bring in money not merely by capital receipts; that is important, but that is not really so important as the revenue we will get. I am for getting steady revenue, rather than getting a large amount of money at once by sales of land and then indefinitely holding up the development of the land. If you gave all the land under the Barrage scheme at once to the Sind zamindar, you would have very little additional cultivation done when the water was available and things would go on just as usual, except that the zamindars would probably want to extend rice cultivation.

59053. From your observation of joint farming societies in the Punjab, do you think that co-operative societies for joint farming are not very encouraging?—I should like to explain: I did not see any of these societies in the Punjab. I had a talk with the Registrar, Mr. Strickland, at the time and by his courtesy I was enabled to go through the files relating to, I think, three out of five societies. There were only five societies. It was a very dismal record, and it was generally recognised in the Punjab that these land-holding societies were a failure. I think the difficulties in Sind would be still greater, and I think there is no hope of starting such societies at present with any chance of success.

59054. *Mr. Jamshed Mehta*: Can you give the Commission a list of the areas of virgin land which belongs to Government in the Lloyd Barrage area, the area which is cultivated belonging to Government, and also the area of the virgin land which belongs to private landholders?—I can give you rough figures. Do you mean for the whole area or for particular districts?

59055. Could you give the figures for the whole area? I am not particular about districts?—Roughly, the amount of Government land available is about one-and-a-half million acres in the whole area, belonging to Government. That is practically all virgin land, except a small area which has been given out for *eksali* cultivation to various zamindars; it is about a little over a lakh of acres.

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59056. What is the area of the land, including that belonging to private holders now, which has got the advantage from the Lloyd Barrage?—Speaking from memory and very roughly, about eight million acres, I understand, is the total under command in the Barrage area.

59057. What will be the total cost of the scheme?—The rough cost is eighteen crores of rupees, and I think Mr. Harrison spoke of six million acres as being the amount likely to be actually cultivated in any particular year. Personally, I do not see why he takes that figure to work out the cost, rather than the total of eight million acres under command. If you take six million acres as the whole area commanded and eighteen crores as the cost, you get thirty rupees an acre.

59058. You just now told us that Government would encourage small holders. Is that your opinion about it?—I hope so. I am certainly very strongly in favour of developing small holdings as much as possible.

59059. How would you practise it? Supposing I am a small holder, how will I get the advantage of getting land? They would auction it and any rich capitalist would come in and buy it?—I do not think that follows at all. I paid a visit to Bikaner last year, and Bikaner had then sold about three-fifths of the land that was being commanded by the scheme. They had sold this land either at fixed prices, or in auctions, and eighty per cent of the sales had been made to peasant holders, who bought at full rates, and on exactly the same footing as other zamindars. On the day that I was at Bikaner, actually one of the cultivators from the Jamrao in Sind came up there to buy land at full rates. The man, in my opinion, who is unwilling to pay good rates for his land in Sind is not the small holder; it is the big holder. The big zamindar is all out for cheap land, and I think that Government will have no difficulty in getting a fair price out of the small holder. Of course, he must be given the benefit of instalments, very liberal instalments, and he will pay the instalments with his revenue from the produce of his land.

59060. Would you prefer Government to take interest only on the capital, at the market rate of interest or at the rate at which Government raised the loan, instead of taking the capital from the buyer? Would you advocate that to the Government?—I am afraid I do not follow.

59061. Supposing there are 40 acres of land, and the price is Rs. 100' an acre, the total cost will come to Rs. 4,000. Would you recommend to the Government that instead of taking Rs. 4,000 in cash from the buyer of the land, they should only take interest at five per cent?—In other words, you say that we should lend him the money to buy his land, and never get it back, but merely get interest on it.

59062. Yes. Would you recommend such a course?—I do not think there is any reason for it. I do not think Government could afford to do it.

59063. *Mr. Calvert*: Take *malkano* only?—*Malkano* in Sind has a different meaning from what you are accustomed to in the Punjab. *Malkano* in Sind is used to denote the whole of the purchase price. If that is not understood, we shall be at cross purposes. *Malkano* in the Punjab is an annual payment made by a tenant who has not acquired proprietary rights.

59064. *Mr. Jamshed Mehta*: He would go on paying interest. Government will not lose, because they will get the interest?—I have not studied that in detail, but having had it put forward to me now, I do not think there is any sufficient justification for such terms. I think the cultivator would be willing to pay more.

59065. You just now said something about leasing for twenty years. Do you recommend to the Government to allow a buyer only twenty years to purchase the land? In one of the answers to one of my colleagues, I think you said that?—What I said was, I think, that I expected the sales would be spread over twenty years. I did not mean to say that I would allow the man twenty years to pay for his land.

You said leases of twenty years. What did you mean by that?

59066. *Mr. Calvert*: You mentioned the case of land not quite ready?—I do not know whether I said twenty years. I think probably ten years' will be the ordinary maximum, and in some cases only two or three years. That

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depends on the state of the land and on various local considerations. In places there are large areas of extraordinarily good land covered with thick jungle. That is the kind of land which might be leased to a zamindar for three or four years, on condition that he clears it. He would get light lease terms during that period.

59067. *Mr. Jamshed Mehta:* You made a statement that because the relationship between the *hari* and the zamindar is one of partnership, it is to the interest of the zamindar to encourage the *hari*. What is your practical experience in Sind? Do you think the zamindar does encourage the *hari*?—I am afraid my practical experience is rather different. There are of course a few enlightened zamindars, but generally speaking the zamindar is inclined to leave it all to the *hari*. He does not take a great deal of interest in inducing the *hari* to adopt improved methods, and he is not himself sufficiently educated to give him advice that is any good. The *hari* often knows more about it than the zamindar.

59068. Would you not, from that point of view, in the interest of the *haris*, recommend to the Government to put forward some system by which we can help the *haris* to become proprietors of the land and become small holders in a period of years?—Are you suggesting that legislation should be introduced which would enable the *hari* to become a sharer or a full owner of land which at present belongs to some one else?

59069. I am talking of the Government virgin land?—Then he would not be a *hari*. A *hari* is a man who cultivates the land for a zamindar.

59070. What I wanted to suggest was, free the *hari* from his bondage, and then make him a small holder, by some facilities which the Government should give him?—That practically means, am I prepared to take *haris* and establish them as small holders? Certainly. The intelligent *hari* is just the man. If the question is "would you take him and put him in as a small holder, and let him cultivate for his own benefit instead of for the benefit of the zamindar?" The answer is "yes." But one could not do that sort of thing on a large scale, without reference to a large number of local considerations. The zamindars, for example, complain of the lack of *haris*. They say that they are already considerably handicapped in recent years by the lack of *haris*. It would not be equitable to make a dead set at a zamindar and take away all his *haris* and settle them in a village. But there is scope for a considerable amount of personal selection.

59071. Supposing a progressive syndicate of big merchants, or cotton growers or some such people came forward to buy land, in order to evolve a progressive scheme, would you recommend to Government to sell the land to them?—I should want to examine the scheme before I recommended it. I would certainly be prepared to consider it. In the Sudan, at present, they have a very large scheme of that kind, with which you, Sir, are probably familiar. There the land is taken over by a company of this sort. The company pay something like thirty or forty per cent of the produce, to the actual cultivator and the rest is shared between Government and the shareholders of the company in a certain fixed proportion. That is a scheme not of peasant proprietorship but of peasant tenantry, and it is an interesting experiment. I should like to know more about it, or even to go there and see it if possible while on leave. I am certainly prepared to consider any scheme of that kind and to make recommendations to Government. I naturally cannot commit myself to anything further than an examination of it at present.

59072. Is it your experience in Sind that the agricultural class, the zamindars, even now object to the non-agriculturists coming into the Sukkur Barrage land? Have you heard that they object to it?—No. I do not think I could say that has been brought to my notice. I think that at any rate all classes in Sind will have to be left free to purchase lands in Sind.

59073. You make a statement on page 39 against joint farming, because it has failed in the Punjab. But supposing joint farming were taken up by educated young men who are not able to earn their living in other ways and have necessarily to go into agriculture, would you still feel that it would be unsuccessful?—I should think if such a land holding society were formed,

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composed entirely of educated young men who had no practical experience of agriculture, it would be more likely to crash rapidly than any other kind of society that I can conceive of.

59074. Supposing you give them experts with agricultural knowledge, or agricultural students, if you give them such an opportunity, do you think it would be hopeless to expect that the educated man would go back to agriculture?—Not in the least. I think there has already been a considerable advance in the attitude of the educated young men towards other than purely clerical occupations. When I first came to Sind in 1910, I found very few of these young men would take up any kind of trade, but now you will find Karachi is absolutely full of shops run by these people. But they have not as yet turned to actual work on the land with their own hands. I do not think it is hopeless to think that they would, and if we can induce them to do so, I think it is a very fine ideal and a thing that we should encourage in every way. If we can get classes who are at present too numerous for their ordinary avocations and are averse to agriculture, if we can get such people to supplement the numbers of the agricultural classes, so much the better. What I am against is simply setting them up as a rent receiving class from the very beginning. Most of the suggestions hitherto made on their behalf, I believe, have been devoted to starting these young men off with fairly large holdings, anything from 80 to 250 acres, which is very much more than an economic holding under the Barrage. If they get holdings of that kind, they would certainly immediately go to some of the towns or big villages and proceed to give their land to *haris*, and live on the rent of the land. This is going to do no good at all, and it is absolutely of no use. If the educated young man who is at present without land, or capital, or knowledge, wants to take up land as a peasant proprietor, I should like to encourage him in every way, and I think he can show an earnest of his sincerity now by going to work as a *hari* with the zamindar. He can make a living by working as a *hari* with the zamindar. After all, men of the British middle classes are going out to the colonies without capital or knowledge, and they are gaining capital and knowledge by working simply as farm servants in the roughest sort of way. I see no reason why the Indian educated young man who is really keen on it should not do the same. If he will do that, I believe Government will do all they can to encourage him; start him off with a small holding of 16 acres or so, which is enough for a living, and if men like him made good, every encouragement would be given to them to take up further land, so that they could do very well indeed. But I do think that the initiative lies with these persons, and they can show their sincerity by getting training by actual work on a farm during the next three or four years.

59075. On page 39, you suggest that minorities should be compelled. Have you heard of any such legislation in India?—Of course, there is a lot of legislation which does compel minorities to do various things. In fact, in a way, most legislation is devoted to compelling minorities either to do or not to do certain things. A particular example is the Bill which has just been introduced in the Bombay Legislative Council relating to the consolidation of holdings. There are certain clauses of that bill which do propose to compel minorities to come in. In the Punjab, I believe, in the matter of consolidation of holdings they have had their work tremendously held up in some cases by recalcitrant minorities, sometimes very small. They get two or three people in the village who simply will not come in. In one instance there was merely one man who held out, and would not come into a scheme. But they decided to go on with consolidation in spite of him. They left out his land and consolidated everybody else's. Now of course that village is the greatest advertisement they have, because they can take people round and show, by way of example, the man who would not come in. He cannot now come in; he is left with little pieces of land all over the place; other people's holdings have been consolidated. The work in the Punjab has been handicapped by very small minorities of people, who will not come in willingly and cannot be compelled.

59076. On page 37, you say something about pumping schemes for low lying land. Do you think we can have co-operative societies formed specially

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for that purpose?—If they can engage the necessary technical knowledge, I do not see why not.

59077. Do you know of Government making any scheme for roads in Sind? Everybody accepts the importance of roads in Sind but are you aware of any regular scheme being made?—No. The Communications Board has only just been formed, and of course the whole state of communications in Sind at present is necessarily in rather a state of flux, owing to the Barrage. We are having new canals; enormous bridges have to be made over these canals. We have a certain number of existing roads; some will have to be scrapped, some can be kept, and it is a thing which cannot be done in a hurry. There are, I understand, various schemes for improving the main trunk roads, and so on, in Sind, but naturally I am not very closely in touch with the details of those. I am not in a position to say at what stage they have arrived.

59078. On page 40, you refer to your experiences as Assistant to the Commissioner in Sind for Civil Supplies. Would you recommend to the Government to make their purchases for the Military Department through co-operative sale societies?—I am afraid I do not know enough about that to express any opinion whatever.

59079. You say that Government have reserved three-and-a-half lakhs of acres for *mohag* at present in the Sukkur Barrage area. Is it a settled scheme passed by Government, or is it merely a tentative one?—I would not describe it as a scheme. You will remember, when the Lloyd Barrage was first passed by the Legislative Council, Sir Chimanlal Setalvad, who was then the Member for Irrigation, made a statement in Council that this area would be reserved for meeting local claims. There was considerable apprehension at the time that Government might sell away the land to non-Sindhi outsiders, and that the interests of the local zamindars would be entirely neglected. This assurance was given to them then and, as far as I know, Government have every intention of regarding that as a promise.

59080. *Sir Chunilal Mehta*: Was it only for *mohag*?—For meeting all concessionary grants. The figure was regarded at the time as a maximum, sufficient to meet all claims of existing zamindars over Government lands in the area.

59081. *Mr. Jamshed Mehta*: Do you know that Government have lately brought out a scheme for agricultural bias education for Bombay Presidency?—I have not seen it.

59082. *Sir Thomas Middleton*: You informed us that the ordinary assessment for grass land in Sind would be twelve annas. Could you give us, for comparison, what the rate would be, for similar land, for cotton, rice, etcetera?—The ordinary rice rate in Sind at present ranges from about Rs. 3-8-0 to about Rs. 7-8-0, the average being about Rs. 5 per acre; cotton Rs. 2-8-0 to Rs. 5; other *kharif* rates for millet, *bajri*, *juari* and so on would be about Rs. 2 to Rs. 3-8-0. The rates depend a great deal on the position of the land, whether it is lift or flow, and the character of the water supply.

59083. Sugarcane land?—Sugarcane is very little grown in Sind. I am not familiar with it, but I imagine it would be usually about the rice rate or a little less. On the left bank of the Indus and in Eastern Nara tract it is assessed at rates from Rs. 1-12-0 to Rs. 4, but the water supply for this crop is not sufficient, and it is very little grown.

59084. You have suggested that too much reliance should not be placed on the livestock census in Sind. I think the practice in Sind is to collect figures once in five years?—Yes.

59085. Is there a special date or time for making the returns?—No; I do not think there is a uniform date for the whole area. In the course of his work the *tapedar* makes enquiries in various villages; there is no special staff or enumerators appointed to do the work.

59086. The village accountant collects the figures, and these figures find their way to the Department of Agriculture?—Yes; they are consolidated at various stages. The village accountant sends in his return to the taluka

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headquarters; they are consolidated for talukas; then they go to the sub-divisional offices and the district offices, and eventually reach the central office.

59087. Does any one check the figures at any stage; does any one in the taluka office examine the village accountant's figures to see that they are not a repetition of those of the last census?—That depends upon the individual officer; one exercises such control as one can; one has a great deal of work to do and it is not possible to check every figure by any means; but if one gets a return which seems to be palpably absurd, one will examine how it was arrived at. But the figures have a certain value. When one is collecting figures relating to goats, buffaloes and other horned cattle, there is no reason why the percentage of error should be greater in the one case than in the case of the other, and the figures have at any rate a relative value.

59088. There is no reason why the village accountant should seek to increase or decrease the figures; he gives proportions?—Undoubtedly if the returns were taken now in certain areas of Sind, where there have been recently calamitous floods, every village accountant would take great care to see that there is a great decrease in number.

59089. One gets fair approximations?—I cannot say that you get approximations to the total number, but the relative proportion that one district bears to another is constant.

59090. Taking India as a whole, up to about 1913-14 the livestock figures varied very much. Obviously, no great reliance could be placed upon them. But since that time there has been considerable constancy. The returns could only be constant on the assumption that total numbers in fact remained constant and that errors in detail cancelled out or that the village accountant kept a note of the last returns and copied the same figures?—I should think both those methods are adopted to some extent. Undoubtedly, a great many people look up their last returns and bring forward a figure by the use of which they think they may escape criticism. If a certain figure satisfied the officer five years before, and this did not vary materially from it, probably this would not call for an examination.

59091. Is the accountant supposed to count the livestock?—That is what he is supposed to do in the course of his enquiries.

59092. That should not give much extra trouble; he can make the count when he is making other enquiries?—There is no reason why he should not do it.

59093. I am trying to find out the chances of error that might arise in enumeration?—The staff is very ill-paid in comparison with the importance of the duties which they have to do, and they are pretty heavily worked, so that any piece of work which they regard as an extra is rather liable to be scamped.

59094. I have seen the large number of forms a village accountant must keep, but in this particular case it seemed to me that when travelling in an area it would be a simple thing for village officers to get the required information, and most of them would be likely to get the figures fairly correctly?—It would be simple if they always found the people on the land when they inspected it, but they might do the inspection of a whole area, a large number of the fields, and never come across a cultivator who has a knowledge of the facts there.

59095. So far as actual working bullocks are concerned, I should think the village accountant knew pretty well what each man in the village had?—I do not think that is so. He has a fairly large area; a village accountant might have seven or eight villages, an average of about 2,000 acres in extent; that is a fairly large tract of country. In Sind it is not the custom of the people, as it is in most parts of the Presidency, to live in very big villages; in Sind they live in small villages, hamlets, scattered about their fields.

59096. *Mr. Calvert*: Do you find that the rise in the price of land for the last fifteen years has led to much increase in borrowings?—Certainly, that is so.

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59097. Then, with this new Barrage scheme and the enormous rise in the value of land which may be anticipated, would indebtedness increase?—I should think it would; I see no reason why it should not.

59098. Could you suggest any measure for fighting that evil?—I am not sure that it is necessarily an evil.

59099. I am assuming that most of the borrowing is unproductive?—Well, there are various things which would tend to reduce uneconomic borrowing. One of them of course is legislation on the lines of the Punjab Land Alienation Act. The principal thing to be said in favour of it (I am speaking merely from the economic standpoint and expressing no opinion on the political aspect of the case) is that it would tend to prevent uneconomic borrowing by the more unthrifty of the Mahommedan zamindars.

59100. In the rights to be given to your cultivators, is it suggested that there should be no restriction on the right of mortgage?—I think there would be at any rate some kind of restriction on alienation, and probably on mortgage, in the case of those lands which are to be given out at concession rates. It is obviously quite impossible for us to give very large areas of land to zamindars at a rate of fifteen rupees or less if the zamindars are going to be immediately free to put that land on the market and get two hundred rupees an acre for it. But it has not been suggested that in the case of lands sold under ordinary auctions there should be any restriction on alienation.

59101. There would be free auction?—I imagine that would be so.

59102. Is the cost of clearing the land to be brought under cultivation heavy?—It varies with the soil. I do not think it would be very heavy. There are lands covered with timber, but the value of that timber would represent more than the cost of clearance. A great part of the land is fairly level. But there are places which are overgrown with jungle which is not of very great value, and that is the land that might be dealt with in the first instance by being leased for a certain number of years on condition that it was prepared and cleared.

59103. The cost of clearing for irrigation will not by itself be a powerful cause of indebtedness?—I should think not; not the actual clearing of land.

59104. *Dr. Hyder*: I have the map of your Presidency before me, and I find the easiest way to get to the seat of Government from Sind is by sea?—Otherwise you have to make a detour. In the monsoon one travels by train. It takes forty-eight hours by train and thirty-six hours by sea.

59105. Are you well served by the Bombay Government as regards agricultural administration when it takes two days for a man to get here?—I do not quite see what the Government of Bombay have to do with it, unless you say that they ought to have pressed for more rapid railway communication.

59106. The administrative head might be seated at Poona, and it might be very difficult for him to know about the Upper Sind Frontier district?—I am afraid I do not really follow the question. It seems to me that one might know a great deal about country which is more than two days' distance away although it would undoubtedly be more convenient, if one wanted to inspect the Upper Sind Frontier district, if one could cover the distance in two hours instead of in two days.

59107. You mention priest-craft as one of the sources of agricultural indebtedness. Do these men descend upon the cultivators, like a swarm of locusts, eat up their substance and depart leaving behind only the odour of their sanctity?—I would not put it so strongly. There is a very large class of Mahommedan *fakirs* and Hindu *bawas* who, not being a productive class, take a certain share of the produce to which they contribute very little. More or less cognate to this question is, of course, the general retardation of agricultural improvement owing to the religious customs of the country; the Hindu veneration of the cow prevents that animal being fully exploited for agricultural purposes; the Mahommedan refusal to take interest is also a thing which retards progress, and the refusal of both to have anything to do with that useful gentleman, the pig, is another. It is not exactly priest-

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craft; what I have in mind is, that the influence of organised religion does not do anything to help agriculture.

59108. What is the nature of the rights of *haris* in the land?—They have no right in the land.

59109. They are tenants at will?—Yes, pure and simple.

59110. The majority of the people of Sind belong to this category of *haris*; most of the cultivators are *haris*; they have no particular interest in the land, and their relationship with the zamindar is purely personal?—No doubt a large number of *haris* do always, for many years, cultivate the same piece of land, but they have no actual right in the land.

59111. You said, in answer to a question, that your ideal was to set up small holders on the Government waste lands when they are commanded by the Lloyd Barrage scheme?—I do not wish to imply that all land should be given to small holders. But I do think there is considerable scope for the encouragement of small holders, and the small holder is likely to give very good results from the point of view of Government revenue and also the general development of the tract; the *hari* may be expected to work better when he is working to serve his own interests than when he is working for a zamindar.

59112. Would you have the area dominated by the small man?—The small man is already predominant. There are large areas in Sind which are run by small zamindars. As I have pointed out, thirty-six acres is the average size of a holding; seventy-five per cent of the holdings are under twenty-five acres.

59113. As regards the influx of the Punjabis, you say that the Punjabi is a very valuable gentleman and a very good cultivator. I dare say you will agree that the Chinaman is a much more capable and agreeable man. But would you agree to import the Chinese into Sind?—I should not be prepared to recommend the importation of the Chinese. I do not think the question is likely to arise.

59114. Your responsibilities as an administrator are mainly to the people of Sind. Would you like to see the Punjabis swamping Sind?—I do not see any possibility or any likelihood of that.

59115. As regards sale of land by auction, would you like to limit the quantity of land to be bought at the auction by one individual?—That is a matter in which I have an open mind. I can quite conceive that in some particular cases it might be to the advantage of Government and the people generally to have a large block of land in the hand of a particular man; but generally speaking, that question will not arise because there are very few places where it would be possible to give a very large block of land to one man. The land is fragmented, and the number of places in which, there is more than 500 acres in one block is very small indeed.

59116. You say the fuel problem is not acute in Sind?—There is a great deal of scrub jungle, and there are forests mainly near the banks of the river.

59117. *Sir Chunilal Mehta*: You were on special duty to visit the Punjab; how long did your visit last?—For about six weeks, about the beginning of 1926, and I went to Bikaner on my way from the Punjab.

59118. And you studied all the conditions in the Punjab that may bear upon the Lloyd Barrage?—That was my object in going there.

59119. You are aware that the cost of the Sakrand farm is now being met out of current revenues, and that the Government of Bombay were not allowed to put it on to the Lloyd Barrage scheme so that the necessary money might be spent from loan funds?—Yes.

59120. There is a limitation to multiplying the number of such farms if the expenses are to be met from current revenues in the present financial state of the Bombay Government?—That is certainly so.

59121. These farms do not bring in any revenue, for many years at least; they are research farms and they are not supposed to yield revenue?—Yes.

59122. I agree with your remarks regarding co-operative farming; but supposing a co-operative society were formed in order to supply facilities for educated young men to take to farming; supposing that the society contained

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certain well known gentlemen who raised funds in the first instance for buying the land and that they chose to send say twenty-five to thirty young men, who were keen on farming and who were known to the members of the society, to the Poona Agricultural College for the short course of six months or a year to get acquainted with agricultural methods, and they were then perhaps put in charge of an expert, somebody who knew how to deal with agricultural problems in Sind, could plots of land be given to such societies?—Are you suggesting that the society should be formed now, that they should first of all get the land and then send the men for training? If so, what will happen to the land in the meanwhile?

59123. Form the society now, give the young men the training, also select somebody to be in charge of their operations and to teach them, and also make the condition that they should work on the land and not get into the habit of working as zamindars or being rent-receivers, would the scheme work?—I would not say that the scheme would not work, and I would be prepared to encourage such a society and try to make it work. One has no experience whether these people would work on the land; they have shown very little promise that they would do so. But certainly if a scheme of that kind were brought forward it would deserve very great encouragement.

59124. I was thinking of that as a sort of alternative scheme to your suggestion that the young fellows, perhaps having the letters "B.A." after their names should work as *haris*. Perhaps they would then learn more than the ordinary agriculturists, but I do not see any prospect of their working as *haris* yet. In these circumstances would a scheme of this character be likely to get consideration as regards the supply of land, especially at market rates?—One thing which I think is necessary to insist on is that he should not become, and he should not be encouraged to become, a mere rent-receiver living on other people's labour. If he could be taught to work with his own hand and by his own labour to erect himself into the position of a zamindar, I think it would be an excellent thing to give all the encouragement that one can. The thing is happening all over Sind; small men in the Jamrao (there are large numbers of them) who started as *abadgars* have, by working with their own hands, saved money and bought land in Sind and erected themselves into zamindars. They are now going all over Sind and buying land. There is no reason why an educated young man should not work with his own hand, save money and prosper. I do not suggest that he should be tied to the land for the rest of his life, but if you can teach him to work, with his brains and superior character he ought to be able to get on.

59125. I agree with you that the greatest possible discouragement should be placed on any inclination to become rent-receivers. My scheme is something on the lines of co-operative housing societies. If I become a member of a housing society I am prevented from selling the house which they provide for me to somebody else without the permission of the society. The object is not to enable me to make an immediate profit?—The difficulty I had apprehended is this: you say that the society would pay full rates; presumably they would want to pay in instalments?

59126. Yes?—If the members of the society are turned out for various reasons, then who is to be responsible for the payment of the remaining instalments?

59127. The society would consist of people whom the Revenue Officer would approve. After all, the land is worth something, and it would be security?—It would be rather difficult if the land were granted to a society and some of the members defalcated. I think a way could be found over this matter; I would certainly be prepared to consider such a scheme very sympathetically and do what I could to make it a success.

59128. I was thinking further that if there were societies of this character, they might be able to buy and hire out implements like tractors, which an individual holding 25 acres might not be able to buy?—That is probably a question on which the Assistant Registrar of Co-operative Societies, whom you are going to examine, would be able to speak.

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59129. There would be no objection from the Revenue Officer's point of view to sell lands to such societies?—None at all.

59130. On page 39, you say that you hope that it will be found possible to tackle the question of consolidation in Sind on the lines of the Punjab, but you think that legislation would be necessary, at least most helpful, to bring in recalcitrant members to join any co-operative scheme?—So far as I remember, the question was a somewhat hypothetical one, whether under certain conditions I would approve of compulsion. In the present circumstances of Sind, I do not think Sind is ripe for legislation of this character, and it has, in fact, been excluded from the Bill which is at present before the Legislative Council of Bombay (Small Holdings Bill). There are very good reasons for the exclusion; in the first place, land in Sind, even when it is held by a very large number of co-sharers, is not divided on the ground: it is cultivated jointly and the produce is shared; that is generally the case. But it is true that in the last twenty years there has been a distinct movement towards actual sub-division on the land; it seems to have caught on in one or two areas, particularly; in Ratodero there is a good deal of it, and in Kandiaro. In one village I have discovered survey numbers divided into as many as fourteen pieces; but that tendency is not at present very marked, and I think all that is wanted at present is, first of all, to prevent civil courts recognising or ordering partitions below a certain figure; secondly, Government should refuse to enter in any official record of rights sub-divisions below a certain figure; thirdly, more important than any perhaps, the Irrigation Department should refuse to recognise a holding below a certain area as a unit for irrigation purposes: that is, that they should refuse to make separate arrangements for irrigation of a holding below a certain figure.

59131. What is *hakabo*?—*Hakabo* is a water rate which is charged to *jagirdars* who do not pay land revenue but pay a certain light water rate; it is intended to represent the cost of irrigation; any considerable improvement in irrigation is accompanied by a rise in the *hakabo*. But in olden days it was certainly loosely used as meaning any kind of water rate; nowadays as a technical term its use is confined to *jagirdar* lands.

59132. Was there any obligation, so far as you are aware, to spend whatever was received in the shape of *hakabo* on silt clearance?—No, I am not aware that any definite obligation was ever undertaken. I think that somewhere about the seventies an additional rate was levied from certain lands which was afterwards consolidated with land revenue, and it was said that this should be spent on the maintenance of canals, which included silt clearance. In those days, probably much greater importance was attached to silt clearance and silt clearance alone by engineers, because it was the infancy of the department and silt clearance was the most obvious thing to keep the canals in order. Now, of course, a great deal is done other than silt clearance, and it is a matter of some controversy as to the extent to which silt clearance is necessary. A great many old fashioned zamindars still think that the more they clear a canal the better their water supply is bound to be. That is not a view which is accepted by the engineers generally.

(The witness withdrew.)

Khan Bahadur SHAH NAWAZ KHAN BHUTTO, C.I.E., O.B.E.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(i) I am afraid this is too large a question for me to shed enough light upon, in my answer, without making it appear unwieldy. Our trouble in the Province of Sind is not want of improvement schemes, researches, analysing results, want of propaganda, publicity or demonstrations, but to make agriculture more paying, which, on account of having come to be known as not in the least a paying industry has gone on losing labourers instead of attracting them, so much so that we are at present working our land with hardly one-fourth the number of men that otherwise would be required if we are to adopt improved methods of cultivation. Researches into indigenous methods, (our present ones are very old) are necessary but I really cannot understand how they could be made to produce profitable results to suit different places. India, as a whole, does not follow the same methods of cultivation; they are different in different places according to the climatic conditions. Even in Sind the methods are not exactly uniform. In the *Lar* portion with so much water-logging and damp climate responsible for keeping people indolent and idle, we cannot expect much improvement. It will be sheer waste of energy to attempt to find improved methods for them. In Upper Sind districts the climate is very hot and the time for doing work is very short; there the methods of milder places will not suit. I do not know whether researches for so many different places could be undertaken, because so much money would be required that India would find itself unable to afford it.

(ii) *Veterinary research.*—My remarks apply equally to research in the veterinary branch. The animals—bulls, cows etcetera, may not be equally useful for all places, e.g., the same milch cows giving so much milk in one place may be found suddenly to turn dry in other places. In the same manner, fat bullocks doing excellent work in cooler countries, may be found useless in hot places where alone strong bone and skin and not flesh would keep them working. I do not know; you may undertake researches but the results may not be commensurate with the amount of money spent on them. Try, but every step in this direction requires to be taken with the utmost care, because after doing such expensive work, you find that you are no better and all your money is wasted on so many research institutions. I am not one of those pessimistic people who despair of good in research institutes, but my experience and knowledge of how these researches have worked show the necessity of caution.

(b) In Sind, in different parts, many researches have been instituted and the majority of them have not been I am sure, attended with success. This I take to be due, not to want of skilled workers or of field or laboratory facilities, but to causes to which the climate and the inadequacy of water supply facilities largely contribute.

(c) Siltless water turns very rich soils into *kallar* ones; the land adjoining the banks of canals carrying water above their levels are at once turned into *kalar* and eventually become unfit for producing crops. These points require investigation. No way of escape has yet been found from the scourge of pests like locusts, crickets, etcetera, which in every year do so much damage to the crops. Ringing of bells or sounds produced by striking metals against each other to frighten away locusts, have not succeeded as they are too deaf to heed them. Rats sometimes do incalculable damage to crops. No device has yet succeeded in extirpating this pestilence. I do not know whether this Commission is going to recommend any research in this direction in the interests of agriculture but the pest question certainly requires investigation, if not in preference to other problems, at least along with them. I do not know if, in any other country, these pests do so much harm as in Sind and continue doing it with impunity.

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QUESTION 2.—AGRICULTURAL EDUCATION.—In Sind, as yet, progress in the direction of starting agricultural institutions has not been marked. It has only begun. In a few places, classes have been attached, and that too only very recently, to primary schools but they have not yet shown any indication of success.

(i) Does not arise.

(ii) Throughout Sind. In my opinion, classes should be attached to all schools and education in agriculture should be compulsorily imparted to students, and, if possible, from ten to twenty acres of good land commanding free flow should be provided as adjuncts to schools for practical knowledge. Agricultural schools to train up the present rural school master in practical agriculture should be opened in all the district towns of Sind, and then it will be possible to give adequate attention to agriculture in rural schools. It must be done in Sind, which is an essentially agricultural Province.

(iii) Agricultural class teachers and, if possible, the head masters should be drawn from the agricultural classes.

(iv) I have already stated that we have, in Sind, no school where agriculture is taught in a practical manner.

(v) I would suggest that Government should make a rule that any student showing a bent towards agriculture should be awarded at the end of his school career, ten acres of good land free of *malkana*, to give him an opportunity to put into practice the theoretical knowledge which he has acquired in school and thus to make him stick to his father's profession with advantage.

(vi) Does not arise because there is no agricultural school. We have one at Poona, started by Government for the whole Presidency; but unfortunately it is impossible for us to attract to it students belonging to the agricultural classes from our Province who, on account of poverty, cannot even claim their souls to be their own. It is therefore full at present of students drawn from different classes, not agricultural only, and the result is that after finishing their students' career, these students, with the exception of a few, take to Government service, finding it more paying to follow other pursuits in life than agriculture, which is not in the least a paying industry in our Province.

(vii) As there is no agricultural school in Sind, this question cannot be answered on behalf of Sind.

(viii) I have already stated that each rural school should be attached to a farm where agriculture in all its bearings should be taught practically.

(ix) They have at present very disappointing careers because it has not been possible for most of them to take up an agricultural career after finishing with their studies.

(x) Not until some methods are found to make agriculture more paying, approaching, in its return, to yields from other industries.

(xi) Absolutely none, which is the most modest expression that I can use. Huge humbug is so much resorted to, but with absolutely no result.

(xii) I have already said, by grant of awards of land to the most deserving of the students taught in the classes that I wish to see attached to all schools.

(xiii) All these classes should be under the control of district local boards, among whom I hope, as time progresses, there will be improvement in membership.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(a) Demonstration and propaganda work depends for its success very much upon the kind of agency employed in administrative work. In Sind of late we have, under Dr. Mann, two lieutenants, K. B. Gulmahomed and K. B. Azimkhan who both appear to be well-placed in their jobs for their different duties—one doing research and the other demonstration and propaganda. They are doing good work to begin with, and require to be encouraged to continue their good work.

(b) Increase the activities of the department, increase its establishment, increase the demonstration of implements and tools, including ploughs, introduce good bulls, introduce tractors and threshing machines three or four of

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which should be available in each district headquarters if possible. I would go still further and say that each taluka should be given one tractor and one threshing machine, to be given out on hire and worked by the agency of the department, so that we should see the results that are claimed for them; and the rate of hire should be fixed in consideration of those results.

(c) I do not know, but if experts were able to convince people of the claims that they make, there would be no difficulty in inducing cultivators to adopt their advice.

(d) The methods employed in Sind are yet in their infancy and I do not know whether any striking instance of a failure or a great success has yet occurred which may be cited.

QUESTION 4.—ADMINISTRATION.—(a) I am always against centralisation. There is much to gain by entrusting the work to one Government rather than make it wait for advice or instruction in the conduct of that work.

(b) I do not want the Government of India to come in between our improvements and Local Governments. The latter should be trusted; much better if they are left unhampered by interference from any other higher authorities.

(c) (i) The Agricultural and Veterinary services do not appear to be thoroughly efficient but they cannot be better with the funds at present available.

(ii) I hope that if the present rate of progress is maintained, railways and steamers ought, in course of time, to be equal to the demands of agriculture.

(iii) Our chief lack, in Sind, is roads. No roads worth mentioning are kept up by Government, and this indifferent provision of roads has resulted in an enormous set-back to progress in agriculture. I have known of instances where produce was harvested, cleared, kept ready, but was allowed to lie and go to waste and be eaten up by birds and beasts on account of lack of facilities for transport. These things ought to improve if Government were brought to attach to them the importance they deserve.

(iv) A Meteorological Department does exist, but I do not know if it is of any good to agriculturists who do not know that it exists. Publication of the results of their observations about forecasts in the Government Gazette in English does not reach agriculturists. Accordingly, this department is looked upon as another white elephant kept up by the Government.

(v) and (vi) They are all right according to the present requirements. I would rather suggest, as all things cannot be done at the same time, that progress in all these lines should be maintained.

QUESTION 5.—FINANCE.—(a) and (b) According to my view none of the means employed hitherto to finance agriculture have succeeded; this is not due to any fault on the part of agriculture; it is because, as yet, no effective means has been found to make agriculture in our Province a paying industry. Consequently, the result is that agricultural indebtedness has become chronic, and repayment of loans and advances is not as easy as it ought to be.

I have very little to say in favour of, but much against, the system by which *taccavi* is advanced by Government. In the first place, the interest charged requires to be pitched as low as possible. Over six per cent interest, the present rate, is too much for an agriculturist to pay. I really do not understand why Government should not make it as low as what the Imperial Bank pays on deposits.

As much as fifteen per cent of a *taccavi* loan filters away from the time the *taccavi* leaves the Government office till it reaches the agriculturist; and the Damocles' sword of Government that hangs over the head of the borrower until he makes repayment of instalments on exact dates, depending, as he does, for repayment on the realisation of his uncertain crops, dependent upon the vagaries of the most notorious Indus—these may be mentioned as reasons that have hitherto struck at the root of the popularity of *taccavi*

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and have compelled people to borrow from money-lenders at double and triple rates of interest, rather than take Government *taccavi*.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(c) All such measures—the application of the Usurious Loans Act, restricting or contracting the credit of cultivators, or limiting the right of mortgage or sale, or making the redemption of mortgage easier,—these are all merely temporary remedies which only lessen the credit of cultivators. These, however, do not exhaust the possibilities by which their conditions could be improved because, according to my view, impoverishment is not due to their lavishness but to their failure to get a living wage from their work on the land. These remedies have hitherto not succeeded in reaching the root cause, which is the incapability of the land hitherto to supply a living wage for the workers on it. These measures may be employed where necessary, but, first of all, steps should be taken to make agriculture a paying concern which at present it is not, as compared with profits from other industries or labour pursuits. At present, in Sind, it means complete distress and disaster if there are two successive bad years.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—This is a very important question, especially as applicable to the Province of Sind, where agriculture is mostly in the hands of the Mahommedan population with a rigid law of inheritance. This law is very ruinous and many generations of wise heads have not been able to improve it to any extent. For instance, if a Mahommedan with a seven-*jerabes* holding dies leaving seven sons, according to Mahommedan law, each must receive an equal share; not only so but out of those seven *jerabes*, sisters, daughters, mother must receive a share. What this involves in sub-division everybody knows, and so much land must come under boundary lines. I am not exaggerating when I say that in an instance of seven *jerabes* divided as indicated above, nearly one-quarter of the land would go, or rather be wasted, under boundary lines. This fragmentation has caused much loss and, in some cases, the almost total extinction of families as traditional zamindars. I do not know whether Government could interfere in this but I hope that, in the present civilisation, even the bluntest Mahommedan ought to consider it very necessary to consent to the revision of our law of inheritance. Fragmentation beyond a certain limit should be totally restricted by some legal enactment. This seems to be necessary and Government should do it, if not in our interest, then in the interest of its own land revenue collection; because, one of these days, it will find itself in a most difficult position as regards making recoveries from the too numerous petty small-holders.

QUESTION 8.—IRRIGATION.—In our Province, notwithstanding the number of irrigation systems that have been provided, we do not find ourselves immune from distress or sometimes disaster, from droughts and deluges and we have places where as yet no effective means exist to save our crops from being eroded and washed away by floods. No arrangements exist in any place to drain off the excessive flooding caused by rivers over-flowing or by breaches in *bunds* or by downpours of rain. In Sind, we depend for our irrigation supplies on the Indus—the most capricious river known in the world. Of late, owing to so many schemes maturing in the Punjab and in its upper reaches, which are responsible for much reduction in it, we have ceased to get water in the proper season and sufficient for inundation over-flooding. This river is now in course of being husbanded and brought under control at a cost of some twenty crores of rupees. People have many misgivings about the success of this huge project but I have had to consent to its being undertaken after a very great struggle in my mind. The fact that our Province of Sind receives a most inadequate water supply is evident in the large tracts of excellent cultivable lands lying waste and unoccupied. Our Province is essentially an agricultural one and yet, on account of want of adequate means of carrying water to all its parts, is known as the Desert Province. I have seen most of the Indian Provinces and my conclusion, after a study of the irrigation conditions as they exist in several of them, is that our Province is a most neglected one, in which improvements have proceeded, very slowly.

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Our Barrage is intended to provide a perennial supply of water. If it cannot do that I am afraid all our money on it will be ill-spent. This Barrage affects only what is known in our Province as Upper Sind and does not affect an equally large, if not larger, part of it, Lower Sind. There will remain other parts where we must provide canals which will give people, if not a perennial supply, at least sufficient inundation season supply, which at present they get. It is feared that after the Barrage has been constructed this will be considerably contracted. I am going to mention our Begari Canal on which I possess most of my land. It is a canal of sufficiently big size but it miserably fails to meet the calls for water of the land commanded by it. The details of the land situated about this canal shows that much of it is allowed to lie uncultivated and unoccupied. The Begari country if provided with proper sources of water, ought to support at least thrice the number of its present population, most of whom now, on account of having to live on the starvation line, resort to the commission of thefts and depredations, making the lives of the few prosperous people insecure. Consider the question of the country below the reaches of the Barrage. That country, I mean about and below Kotri, ought to be provided with another barrage on the river to give people water at a higher level, otherwise I am afraid the Lloyd Barrage will leave them in a much worse position than they are in at present.

(ii) and (iii) About tanks, ponds and wells, of which we have very few in Sind on which we can depend solely for agriculture, I think enough is being done towards providing new ones or keeping the existing ones efficient, and I think the local Government may be trusted to do all that is necessary.

There are no natural obstacles but of course there are artificial ones. Lack of money, and lack of interest on account of our Province being so far away from the seat of Government, are the only reasons that account for the lack of that extension of cultivation which is so necessary for providing the population with a living wage.

(b) I am not. In most places detailed distribution is left to landholders who break each others' heads, and in some places where distribution is done by Government officials it is a source of annoyance and mischief and leaves so much authority in the hands of subordinate officials whom nobody can expect to exercise it honestly. In my opinion, the detailed distribution should be left to the landholders. Government should concern itself only with providing water for private distribution in proportion to areas depending on their distributaries. Government canals should be so well arranged, for example, by putting in regulators, falls, and undertaking clearances, that they will provide supplies at the mouths of all the distributaries. At present it is not so. The canals are worked so badly that we find that, in most cases, lands situated in the upper reaches leave very little water for the tail lands. No system yet tried has succeeded in making distribution even over the whole length of the canal.

QUESTION 9.—SOILS.—(a) (i) According to my view, to spend money in improving soils by Government is out of the question. Soils get very much improved by Nature's ways, which provides silt water for flushing *kallar* lands. Leave this work to the holders. You cannot be equal to all the demands called for in this direction.

(ii) I am not prepared to recommend any Government money being spent on reclamation of alkali or uncultivable land. All that ought to be done is to provide sufficient water to flush and drain off such lands, and any land which cannot be improved by this method is better left alone. It is not likely to be improved and it is a waste of money to try.

(iii) With our mad river it is needless to spend money to prevent erosion.

(b) I know of no such instances and I can give none but I have many instances to give where money has been spent to no purpose.

(c) Give them *gratis* to the cultivators, if possible to small men of the peasant class, providing of course ample water for irrigation.

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QUESTION 10.—FERTILISERS.—(d) I do not know of any place where an increase in the use of manures has come about. We can only find manure for very small patches of land, not for whole areas. Will it not be prohibitively expensive to attempt to manure every soil at places where manure is not available?

(e) Not to my knowledge.

(f) It is impossible to effect any change in this direction. People who use cowdung for fuel must continue to do so, because they have no other fuel to fall back upon. They know that cowdung smoke is injurious to their eyes but they cannot help it.

QUESTION 11.—CROPS.—(i) In our Province where labour is so scarce, the present crops must continue because they require least labour. Of course land that is cultivated with rice, as long as it continues to yield, as at present, a return equal to what is obtained from other crops, costs least labour. We cannot replace it by other crops to save water because we shall not have the cultivators nor the manure necessary to succeed with other crops. My own idea is that unless Government is prepared to employ steamers to import large numbers of *haris* from other countries, nothing should be done to discourage rice cultivation in which alone we have been able to succeed in spite of labour difficulties.

(ii) Rice cultivation supplies so much fodder that I, having most of my holding under rice cultivation, have never found myself in difficulty for want of fodder, but have such an abundant supply that I am able to sell the excess.

(iii) I think the present distribution is all right. It should be left entirely to the zamindars whose methods are good and will improve in the ordinary course and become more economic. I have noticed improvements already being effected in this direction; for example, during the last ten years, in some places the quantity of seed used has decreased by nearly half.

(iv) I think the local authorities are doing what is necessary in this direction by granting licenses to people living in neighbourhoods infested by wild animals.

(b) I have already stated that, as far as possible, in our Province the cultivation of rice may be encouraged to the exclusion of all other crops, the rotation of other crops such as wheat, cotton, *juar*, grain and oil seeds being left to those who, owing to lack of the large quantities of water required for rice, find it profitable to cultivate these crops for export.

(c) The substitution of paddy for other crops has proved most profitable and has been the means of bringing much land under cultivation in spite of the scarcity of labour.

QUESTION 12.—CULTIVATION.—(i) and (ii). In the selection and rotation of crops, the cultivators are doing what is best, growing wheat and gram in rotation. Any interference would be inadvisable.

QUESTION 13.—CROP PROTECTION, INTERNAL AND EXTERNAL.—(i) The small amount of work that has been done in this direction has so far failed to produce good results. It has not been found possible to deal effectively with the rat pest and now, in my neighbourhood, the cricket has come to harass the cultivator. It has been found to be impossible to deal with locusts, the destruction of a few eggs here and there being merely a waste of money.

QUESTION 14.—IMPLEMENTS.—(a) Some improvement is taking place, but greater and steadier progress is necessary. All that is required is that Government should allot more funds for the purchase of improved implements which, if possible, should be distributed free among the cultivators. A sufficient number of officers should be employed to go round merely to see whether these implements are being worked properly or require correction and to make arrangements for repair. Otherwise what happens is that such implements, when they become damaged or out of order, are thrown aside as useless for want of mechanics to repair them.

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(c) The only difficulty is that prices are too high. Prices of implements should be brought down to the capacity of the cultivator to pay through a system of Government bounties.

QUESTION 15.—VETERINARY.—(a) I think it should be under the Director of Agriculture because he alone can see what improvements ought to take place to make it equal to the demands of agriculture.

(b) (i) The present dispensaries are under district local boards. But officers appointed in their charge do not consider themselves wholly subordinate to local boards which fact sometimes turns their heads and makes them offensive and irresponsible.

(ii) Extension is needed and is being attended to.

(iii) Nô. It can only be done at the cost of their popularity which they as yet have not attained.

(c) (i) Agriculturists mostly resort to the indigenous methods of treating their sick animals, finding it so difficult to go to dispensaries which are not at present situated within easy reach of every one. At present we have not even one dispensary to a taluka.

(ii) In our district, doctors go about the villages and attend to cases brought to their notice but owing to the shortness of their stay in the village are compelled to leave their patients before recovery.

(d) Legislation is very necessary to prevent the spread of contagious disease by contact.

(e) I am not prepared to say because I do not know much about it.

(f) We have never given a trial to preventive inoculation, and I am unable to say anything for or against its efficiency.

(g) I think every Province must have at least one such research institute.

QUESTION 16.—ANIMAL HUSBANDRY.—(a) (i) I have no special suggestion to make. I only wish that the efforts that are being made shall not be allowed to relax. Improvement in this direction cannot be secured merely by spending money but will be secured by continuing the gradual and steady work which is at present being done by the Local Government to whom this work should be left.

(ii) The dairy industry is not known in our Province. I have heard of a dairy being started at Malir or Landhi near Karachi but I do not know if it has yet been made to pay. I know of one started at Ruk which on account of its having proved to be not paying has had to be abandoned.

(b) (i) I have never heard of any overstocking of pastures resulting in any injury to animals.

(ii) We have no enclosed pastures, to speak of, in our Province. All our livestock depends on grass that we provide for them at home. We usually send them for grazing and exercise to our own pastures or grazing grounds outside the district.

(iii) We have not experienced it in ordinary good years because the river, on which we depend, always carries enough water to give us sufficient fodder crops in some part of the Province.

(iv) Our animals are so brought up that they do not depend on green fodder but can live on dry fodder. Green fodder, where procurable, is too costly to be within the reach of everybody.

(c) I have already stated that we do not experience that scarcity of fodder which the question suggests. In my whole life I remember only two such occasions and then we were able to tide over by importing grass from neighbouring Provinces.

(d) It is not necessary in our Province.

(e) The interest which they are taking at present is sufficient.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(a) He toils throughout the year. During the intervals of one or two months in every season he is

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engaged in clearing jungle, improving his land, ploughing, clearing silt in the canals, etc.

(b) Subsidiary industries have almost died out owing to their failure in competition with imported articles of better quality and finish put upon the market at lower prices. Mr. Gandhi is endeavouring to revive one home industry and his effort should be encouraged.

(c) Our agriculture at present requires whole time labour not only from the males but from the females also. This constitutes an obstacle to the expansion of subsidiary industries.

(d) Government may please themselves. People have already commenced to do these things for themselves. The only way in which Government can encourage them is by grants-in-aid and protection.

(e) The cultivators have no time to devote to subsidiary industries.

(f) I think Government may do that.

(g) No other means. Additional rural employment is not needed in our Province of which the present population is already insufficient to meet the demands of agriculture.

(h) District local boards and Government should be entrusted with this work and should steadily follow the methods they have adopted.

QUESTION 18.—AGRICULTURAL LABOUR.—(a) (i) Give them grants of land free and you will find swarms of labourers immigrating from places where there is a surplus, because otherwise they will starve in their homes. I am speaking of Sindhis, the emigration of whom out of Sind is unknown.

(ii) Provide water and grant land. In Sind there is no cultivable land remaining uncultivated.

(b) There is a deficiency of labour in our Province due to the unattractiveness of the agricultural industry which has proved to be the least paying industry and which does not give the *haris* a quarter of what they can get in wages as labourers in other industries.

(c) As I have already stated, the only way to get over this difficulty is by making agriculture more attractive by reducing the burdens and pressure on it.

QUESTION 19.—FORESTS.—(a) At present, as far as I can see, the forests in our Province are administered not to help agriculture but to supply fuel for towns and cities. People granted access to them have to pay more than they would otherwise spend on supplies of grass for their animals, in addition to the trouble and the difficulties put in their way by ingenious subordinates who sometimes prove a great nuisance.

(b) Twenty or thirty acres of land free of *malkana* and on nominal rent should be granted to every village to grow grass and firewood. I also propose that the existing forests should be handed over to the charge of district local boards.

(c) I do not know any instance.

(d) I am not yet convinced that afforestation can have any influence on rainfall or increase of moisture.

(e) No. In our Province our villages are congested and we have no space where afforestation may be promoted.

(f) The Forestry Department is so keen on maintaining the forests that it will not permit adequate grazing.

QUESTION 20.—MARKETING.—They are satisfactory in our Province; but the roads should be improved to facilitate transport of produce and railways should give priority to agricultural produce.

(b) I have nothing to complain of in this matter.

(c) Please do not interfere with the people who are doing all that is needed in the matter; you cannot improve upon their methods without spending money in ways which may be considered to be unproductive.

(d) I think this is most necessary but the co-operative societies should be utilised and not Government officers. The latter, on the excuse of being

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already over-worked, may throw away your handbills, leaflets, and advertisements containing information which would be of great benefit if properly distributed.

QUESTION 22.—CO-OPERATION.—(a) The co-operative movement as at present instituted can only be encouraged and co-operated with, especially by Government officials whose interests at present appear in some instances to clash with those of the co-operative movement.

(b) Only this, that co-operative credit societies require advances of money at much easier rates of interest; otherwise not only is their popularity at stake but failure is almost certain. Advances are made to societies at rates of interest up to eight per cent though the societies can hardly realise six per cent on their most fortunate agricultural investments. How then can these co-operative societies be expected to succeed? Arrangements should be made to provide societies with money at lower rates of interest. I do not know whether I am asking too much when I suggest that the money may be lent at rates not higher than those which banks pay to their depositors.

(c) No such legislation is needed. Co-operation should succeed by its popularity. In Sind, so far, no such society exists or has been attempted.

(d) I have under me something like 200 societies and I think they are doing fairly well.

QUESTION 23.—GENERAL EDUCATION.—(a) In this Province we have no schools that have been started for the benefit of agriculturists as a class and in which only agriculture is taught. It would be very difficult to convert all primary schools into agricultural schools. We have very recently commenced agricultural classes in a few schools in some important places but have not yet provided the necessary facilities for agriculture to be taught in all its bearings. Let us hope we succeed. It all depends on money and co-operation of Government in providing agricultural farms commanding the best supply of water.

(b) (i) I have not yet been able to discover a way by which the agriculturist may retain agriculture as his profession in life and yet go through other courses of primary education.

(ii) We are just introducing compulsory education, but I am afraid scarcity of labour and want of appreciation will prove insurmountable difficulties which time alone will enable us to overcome.

(iii) The explanation is very simple: when boys become of an age when they can be employed in the fields they leave schools. In the Province of Sind, in some cases, the parents want to employ the improving intelligence of their sons in acquiring religious education by studying the *Kuran*; in other cases they put them into pursuits of life paying much better than agriculture which is the least paying.

QUESTION 24.—ATTRACTING CAPITAL.—(a) Make agriculture more paying by reducing the burden and pressure on the land. By burden, I mean the assessments and perquisites that the zamindar must pay to remain firm in his position as a zamindar. Pressure could be removed by opening new tracts and providing greater facilities for water, bearing in mind that in our Province of Sind owing to the scarcity of labour, only flow irrigated crops can succeed.

(b) The failure to secure adequate returns to the people working in agriculture. That is the main cause to be contended with, the only remedy being to reduce the burdens.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(a) In our Province, this subject has been transferred to the district local boards who may be trusted to provide all that is necessary to promote hygiene and welfare. All that is necessary is that Government should consider this matter to be as important as the subjects of their reserved departments. In the Government's Budget only a few thousand rupees is provided for this subject; in fact it is a subject for which my experience as a legislator has taught me Government allots least money.

(b) It will not help much now. Time alone will help.

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(c) I have conducted no enquiry nor seen the results of any enquiry conducted in places which I have visited in other parts of India.

QUESTION 26.—STATISTICS.—(a) The steps taken at present by the Local Government to collect statistics are sufficient.

(b) I have no suggestion to make except that care should be taken to collect only accurate information. Persons employed to collect information very often, owing to pressure of work, invent it.

Oral Evidence.

59133. *The Chairman:* Khan Bahadur Shah Nawaz Khan Bhutto, I think you are a large zamindar in the Larkana district?—Yes, I have lands in Larkana.

59134. Would you be good enough to tell the Commission the extent of your holding of land?—About 10,000 acres.

59135. How is that cultivated: by your tenants?—Yes, by tenants: whom we term *haris*.

59136. What are the arrangements between yourself and your tenants?—Half-and-half.

59137. On the *batai* system?—Yes.

59138. That is universal over the whole of your estate?—Yes, except our lift lands.

59139. How about the lift lands?—The *hari* takes three parts and the zamindar two parts out of five parts.

59140. Do you attach importance to the prosecution of agricultural research in Sind, and particularly in connection with the irrigation to come from the new barrage?—I would welcome it very much. The first difficulty we find so far as this Province is concerned is the poverty of agriculturists; even if research and useful suggestions are made, I do not think they will be able to carry them out unless the state of the people is improved. The root difficulty is the poverty of the agriculturists.

59141. In connection with that, I see you make the suggestion at one part of your note that agriculture in Sind does not pay?—It is the least paying industry.

59142. Do you mean that, from a zamindar's point of view, it is the least paying industry?—I think from the zamindar's point of view as well as from the point of view of the *hari*. The average area that a *hari* can cultivate under the circumstances at present existing in this Province is, at the most, about six acres of rice land; he cannot expect to get more than about Rs. 20 per acre. With four members of his family: his wife looking after his house, preparing the food and carrying the food to the fields, his boy looking after his cattle and with a daughter to help him, with all that help, he cannot make more than about Rs. 20 per acre, say Rs. 120 for his income all the year round, with four people dependent on him.

59143. Naturally, if he could obtain the land at a lower rent, by that amount he would be better off. Does the half-and-half system, as between zamindar and *hari*, appeal to you as a fair arrangement?—It is very fair, when we consider that the income of the *khatedar* possessing about fifty acres of the best land would be about Rs. 1,000. He must support his own family and keep open door to guests; he may have to feed many other persons and there are all sorts of expenses; he has to maintain a horse to go about.

59144. Do you grow firewood on your estates?—No.

59145. Have you any plantations of trees?—We have had, but not many.

59146. Were they an advantage to you?—Not very much.

59147. Is there a shortage of firewood in your district?—We have forests round about.

59148. And that provides you with all you want?—And we have lands near the Indus, where firewood is available.

59149. Again, you suggest that the agriculturist in Sind is in fact fully occupied throughout the year; there is no period during which he is unable to employ his time fully on his land; is that so?—He has got some little time left to him; Mr. Gandhi has suggested the hand-loom and spinning; I think that might be encouraged because that will provide him with his own cloth.

59150. Have you examined the economics of hand spinning?—I do not know how it compares with other industries.

59151. You have not gone into that very closely?—It will not pay, but in the little time that is left at the *haris'* disposal they may be able to turn out sufficient cloth for themselves.

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59152. But is there land on your own estates on which one crop only is raised?—Mostly two crops if we have a good season.

59153. On the one-crop land, I suppose a cultivator does have a great deal of spare time in a year, does he not?—Yes, but then during winter he will have to go about plying bullock carts on hire and doing clearance of *karias* and canals and that keeps him engaged for three or four months.

59154. How do you suggest that agriculture might be made more paying? Reading your answer to our Question 1, it would rather appear that you are not in favour of further expenditure on agricultural research but that, on the other hand, you are in favour of improving the quality of agriculture and so of making it a more paying proposition. Have you any plans in your mind?—I am not against research, but I say that first agriculture should be made paying and then research will be quite useful: they will then be able to carry out suggestions for improved methods.

59155. I think, if I may say so, in saying that, you are inclining to put the cart before the camel; surely if you want agriculture to pay, it is the research, if it works out as we hope it may, that will make it pay?—For instance, we are told that as compared with Sind, Punjab agriculture is more paying; that I attribute mostly to the inadequacy of water in Sind and perhaps to the fact that there is, here, so much burden on the land. If the latter could be removed and people devoted more time, perhaps it might be more paying.

59156. On page 66 of your note you suggest that throughout Sind, in your opinion, "classes should be attached to all schools where education in agriculture should be compulsorily imparted to students." Are you thinking there of the primary schools as well?—Yes, we have got primary schools.

59157. Do you think it a good plan to try and teach small boys how to farm? Do not you think they are better employed acquiring literacy at that age?—I think if they are expected to stick to their own profession they ought to be taught something about it.

59158. You are not much concerned with the importance of literacy; is that the point?—No, I suggest the classes should be attached to primary schools.

59159. But you agree that the prime purpose of a primary school is to make the children, who go to it, able to read and write?—Yes, of course.

59160. In answer to Question 2 (xi) "Are three recent movements for improving the technical knowledge of students who have studied agriculture?" You say: "Absolutely none, which is the most modest expression that I can use. Huge humbug is so much resorted to, but with absolutely no result." What exactly is the huge humbug?—There are no movements at all; but I do not think this latter remark of mine is justified.

59161. In answer to Question 3 (b): "Can you make suggestions for increasing the effectiveness of field demonstrations?", you ask the authorities to increase the activities of the department?—Yes.

59162. What exactly do you mean by that?—If they are provided with more funds they will be able to have more shows and machines.

59163. "Improved crops, better crops:" do you mean better varieties of crops as well?—All the measures that are suggested.

59164. "Better implements and tools:" do you not think that, before that is possible, research is very often necessary?—You may have research by all means but most of the implements have already been found useful.

59165. Then a little later on, on page 67 of your note, in answer to Question 3 (d), you say you do not know whether any striking instance of a failure or a great success has yet occurred. How about the introduction of the Egyptian plough and Pusa wheats; do you know anything about the Pusa wheats?—The implements have already been found useful to a very great extent.

59166. So that has been a success? There is nothing like encouraging people a little, you know, when they have done their best, provided they deserve it! I want to ask you one or two questions about co-operation in this Province. I think you are Chairman of the Central Bank?—I am Chairman of the Larkana District Co-operative Bank.

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59167. Are you satisfied with the progress of co-operation in this Province?
—Yes, it is doing fairly well.

59168. Do you keep in touch with individual credit societies at all?—Yes, almost all.

59169. Would you say that most of the credit societies are sound and soundly administered?—I would say that most of them are sound.

59170. Do you ever attend the meetings of the credit societies?—Yes.

59171. Are they well conducted?—I attend the Bank Directors' meeting, and when I go round in the district I do go and meet co-operators.

59172. According to your practice in these parts, who decides whether a particular applicant is or is not to receive a loan?—The directors of the bank, and we have to depend much upon the local director of the area from which the applicant comes.

59173. Do you mean the local bank directors?—We have about ten or eleven directors.

59174. And they are spread about geographically all over the area?—Yes.

59175. To what extent do the members of the primary society itself decide whether one of their number is deserving of a loan? Your primary credit societies are managed by committees, are they not?—Yes, they have got their own society.

59176. When a member of such a primary credit society desires a loan, to whom does he apply?—He applies to his own society.

59177. Who decides whether he is to have a loan or not?—That society has to decide; we do not deal with them individually.

59178. Do you advance money to societies?—We do.

59179. Then who are the borrowers whose applications are examined and decided upon by the directors of your Central Bank?—We decide only about a society as a whole; we do not consider the case of their individual members; that is for the society to do if we find that a society is quite sound and working very satisfactorily.

59180. Do you ever make advances to individuals from the Central Bank?—No, not the Co-operative Bank; they have the Zamindari Bank; we do not.

59181. Do you ever lend money from the Central Bank to any person or group of persons who are not co-operators?—No, we do not.

59182. Is there a demand for long-term money in Sind?—Yes, there is, but not very much yet.

59183. Would you expect that to come with the development of irrigation?—Yes, people would take to it, but we have to be very cautious before we advance it.

59184. What are you thinking of as long-term credit? Where do you think short-term money ends and long-term begins? How many years maximum do you regard as a short-term loan?—A short-term loan at present is what we give only for twelve months or two years, but we extend it for a year or two more if the crops are bad.

59185. What is the usual arrangement as regards long-term money?—About ten years.

59186. And there is a steady but small demand for that; is that the position?—Yes; a limit of Rs. 10,000 or Rs. 15,000 or Rs. 20,000 would be the maximum that I would recommend in each case.

59187. There is a certain demand for long-term money?—Yes, according to the needs of the society; the certain demands come only from those who seek to redeem mortgaged property.

59188. In answer to Question 22 (b) you say: "Co-operative credit societies require advances of money at much easier rates of interest, otherwise not only is their popularity at stake but failure is almost certain. Advances are made to societies at rates of interest up to eight per cent though the societies can hardly realise six per cent on their most fortunate agricultural investments." I suppose the primary societies can hardly be expected to lend money at

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cheaper rates than they can obtain it at from the Central Bank?—They can afford to do so only with the help of Government.

59189. What you are asking for is a Government subsidy; is that the point?—The Government's own funds are deposited with the Imperial Bank; if they were transferred to the co-operative bank they could charge the same interest.

59190. Are you asking the Government to subsidise the co-operative movement out of the general revenues of the Presidency?—Not exactly, but as Government already deposits its huge surplus funds with the Imperial Bank, if some arrangement could be made with the Imperial Bank to transfer money at the same rate that they pay to Government, that will help to some extent to ease the situation.

59191. What do your district local boards propose to do to improve the sanitary and hygienic conditions in the villages?—We are proposing to introduce our own health officers; Government have just agreed to contribute two-thirds of the expenses.

59192. Do you think action is likely to follow this consideration?—Yes, immediately, so far as our district is concerned, it will not take long.

59193. How do the zamindars, as a whole, view the prospect of improved irrigation under the Lloyd Barrage scheme? Is it a popular scheme?—It should be popular under the circumstances. From our experience for the last two or three years, there is no other hope for the Province of Sind except the Barrage. They are anxiously awaiting its completion.

59194. For perennial irrigation?—Yes.

59195. *Sir Thomas Middleton*: The custom in your district is that the landowner takes half the produce?—Yes.

59196. What does the landowner do for that half? He pays the assessment. Does he provide anything in the way of bullocks, or implements, or other capital?—He makes advances to the *haris*; he pays the interest; he does the clearance of the *karias*, and he pays the assessment.

59197. Does the zamindar make advances to the *hari* without interest?—A Mahommadan zamindar does not take interest.

59198. The zamindar furnishes the capital for cultivation?—He borrows on interest mostly, and advances to the *haris*.

59199. You attributed poverty to the burdens on the land. Apart from the assessment, what burdens are there on the land? Are your local cesses heavy?—It is not only the local cesses; there are other expenses also which the land is expected to bear.

59200. What are these other things, apart from assessment and local cesses?—For instance, *rasai*.

59201. What is *rasai*?—When officials go about, we have to provide for all their requirements.

59202. Bullock carts?—Yes. But not only that, there is also *lapo*; the official who makes revenue collections from the zamindars receives one to two annas per *jireb* (half an acre). Then there is so much corruption. All these burdens are to be borne by the land.

59203. Can you give us an estimate of these in money? What do they amount to? What is the assessment on your land?—It is about Rs. 6-10-0.

59204. How much do these additional burdens add to your expenditure?—They cost a good bit.

59205. Will they add a rupee or eight annas per acre?—Much more than that.

59206. What are the cattle in your district? What is their condition? Are they of a big strong breed, or are they weak?—They are a bit weak.

59207. Have you any bulls supplied by the Government?—The local board does that. Government also bears half of the cost.

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59208. Is there more than one bull stationed on your estate?—So far, we have got only three for the whole of the district.

59209. What is the breed of the bull that is sent to you?—I think it is the *Nadi* bull; that is a most popular breed in this part of the country. It can stand the climate.

59210. Do the local board make any stipulation as to the number of cows that have to be served by the bull?—Yes, they do keep registers. The man who is provided with a bull is expected to keep a regular register.

59211. Does the man who keeps a bull get a grant from the local board?—He gets four rupees a month, and after three years the bull belongs to him.

59212. You were rather severe on the Meteorological Office in your evidence. I do not think that Sind gives much opportunity for forecasts?—Whatever it is, that is the fact. If you provide information to all the local papers, perhaps your object will be served. Very few can read the Government Gazette or the English papers here.

59213. The only item in the forecast that would interest you would be the rainfall?—Yes.

59214. There is not much to forecast in Sind?—But then we are interested in the rainfall in the Punjab and the Himalaya side.

59215. You want to know how much water is coming into the Indus?—Yes.

59216. You informed the Chairman that, on the whole, you regarded this new scheme, the Lloyd Barrage, as likely to be of great benefit to Sind. But in your evidence you say that people have many misgivings about the success of this huge project. You say "I have had to consent to its being undertaken after a very great struggle in my mind." What are your doubts?—We have no doubts so far as the Barrage itself is concerned, but we had some doubts so far as the details were concerned. I refer to the excavation of canals and such other questions.

59217. The alignment of the canal?—Perhaps; the public was of opinion that instead of having all these huge canals and acquiring land and paying heavy compensation, if a feeder was taken to feed the existing canals on the right bank, that would help a great deal and save the expenses. But the experts were of opinion that it was of no use. So, we had to give way to the opinion of experts.

59218. They have made careful surveys. Are they not likely to know better than those who have not examined the question at all?—They being experts, we had to accept their decision.

59219. *Sir Chunilal Mehta*: In your remarks about research and the answers you gave to the Chairman, I suppose you mean that research ought to be conducted with a view to local conditions. You mean it should be done in a manner which would bring out schemes which the cultivator can afford?—What I mean is that there may be risks, but at the same time you should find out how to improve the prosperity of the agriculturist, so that he may be able to effect those improvements or carry out your suggestions. Otherwise, it will be of no use.

59220. You have perhaps had some instances where methods were recommended which were beyond the means of the ordinary cultivator?—Yes.

59221. That has rather made you sceptical about certain improvements?—Yes.

59222. On page 68, you speak about the ill effects of sub-division, especially according to Mahommedan law. Of course, it is very gratifying to hear that you recommend that some legal steps should be taken and that Government should take them?—I for one would welcome it, but it is a very difficult question. Unless the community itself comes forward, I do not see how Government can interfere.

59223. I quite agree with you that Government cannot interfere with the law of inheritance, whether it is Mahommedan or Hindu law. But you go on to say that fragmentation beyond a certain limit should be totally restricted by some legal enactment?—Yes.

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59224. This would be necessary, and Government should do it?—Yes, even in Government's own interest. To that statement of course I stand. I am not talking now of the law of inheritance. I see that it is causing a good deal of harm and this is one way of dealing with it.

59225. I am not clear about your answer to Question 22 (c). Are you referring there to schemes of consolidation?—We have not had any experience except of agricultural societies at present.

59226. Quite so. The question was whether minorities should be coerced. That is to say, supposing there were 100 men in a village and 75 or 66 per cent of them desire to have a redistribution and consolidation scheme and the rest simply stood out, some of them through pure obstinacy, would you in such a case recommend that there should be legislation to compel the minority to come in?—Yes; on principle it is very necessary, but you ought to have the consent of a large majority, at least 75 per cent or 80 per cent.

59227. *The Raja of Parlakimedi*: You were talking about the *haris*. Have they no sort of occupancy right over the land which they cultivate?—There is only one class called the permanent *haris* who have got the right, not the rest of the *haris* who are tenants-at-will.

59228. Suppose a landlord engages them for a couple of years, for that period do they not have any occupancy right?—It is very seldom that landlords turn them out. They continue there for years and years. Some have been on the land for generations, but they have not got any legal right.

59229. While engaging them, what is the understanding between the zamindar and the *hari*?—The zamindar will have to make advances to the *hari*, provide him with loans and seedlings, have the *karias* cleared, and the *hari* will do the cultivation. The zamindar will have to provide him with all the facilities. The produce is shared in the proportion of half and half; the labour will be the *hari's*.

59230. Is fifty per cent collection effected on all crops grown?—It is done in all the districts except lift land.

59231. Irrespective of the labour which each crop entails?—Yes. So far as I know, it is done positively in three districts. I do not know whether it is the same in other districts, but I think it is fifty per cent all over, except for lift land which involves more labour.

59232. How often do you have settlements?—Every twenty years.

59233. If the zamindar applies for a resettlement, the land should be surveyed first?—All the land is already surveyed. The settlement is done by Government of their own accord, as soon as the time expires.

59234. Is there any provision in the Act to enhance the zamindar's rent periodically, say once in twenty years, when the resettlement takes place, in consideration of the rise of prices?—Yes, they do revise. In most of the cases, the assessment is enhanced, and in a very few cases it is reduced.

59235. What are the factors generally taken into consideration when an enhancement is sanctioned?—That ought to be known to a Settlement Officer. Their anxiety always appears to be to enhance the assessment. What factors they really take into consideration, I do not know.

59236. In your parts you get your share of the produce in kind, not in cash?—Nothing in cash.

59237. In the waterlogged areas that you mention on page 65 of your note, is it not possible to grow even paddy?—They sometimes have rice cultivation where waterlogging has not completed its ruin; in the 'lar' portion they do not do transplantation, but broadcast the seed. They try transplantation at some places and broadcast in others but the crops do not come up so well.

59238. Do you possess any of that kind of land?—No.

59239. Why has there not been any attempt to drain that sort of land up to now? Is it not possible to drain it?—Possibly; the Deputy Director of Agriculture will be able to answer that question.

59240. You have no knowledge of it?—I do not know. There is no system of drainage or anything of the kind so far.

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59241. You do not approve of research work on veterinary diseases?—Perhaps I have not expressed myself properly; I do not oppose it.

59242. Do you not have any animal diseases in epidemic form in your parts?—There are, and they are attended to. In my own district, there are three or four veterinary dispensaries.

59243. Unless they carry on research work on these epidemics, how can you give effective treatment?—It is absolutely necessary.

59244. What are the most prevalent diseases among cattle in Sind?—I cannot say.

59245. You have no knowledge of them?—I know some, but I think you will have an expert to reply to that question.

59246. *Mr. Kamat*: As a zamindar, will you tell me from your experience how much income a man can get per acre from rice in Sind?—It depends on the kind of land and the facilities for water.

59247. What will it be roughly?—The average for a small area can safely be taken at about forty rupees per acre, twenty rupees to the zamindar and twenty to the *hari*. That is for an area of about fifty acres.

59248. Similarly, what would be the income for cotton?—I cannot give you the figure for cotton.

59249. What are your other crops?—*Juar*, gram and wheat.

59250. How much can you get from *juar*?—At the most, one can get about twenty rupees.

59251. Is it twenty rupees as a half share, or on the whole?—On the whole; sometimes it is even less.

59252. Out of this, the zamindar pays land revenue assessment?—Yes.

59253. In answer to very many of our questions the burden of your reply has been, rather than do various things such as applying the Usurious Loans Act, restricting or contracting the credit of cultivators or limiting the right of mortgage or sale, etc., the burdens on the land should be reduced, and by burdens" you have explained that you mean assessments and perquisites?—Yes.

59254. Have you any idea of the pitch of assessment per acre of rice land in your part of the country?—I have stated that it is Rs. 6-10.

59255. Now, if Rs. 6-10 per acre is the assessment and if Rs. 40 is the income you derive, do you think all the ills to which the agriculturists are subject could be done away with by merely reducing this burden?—The zamindar has to pay about Rs. 6-10 as assessment. Then it costs about Rs. 2 per acre for clearance.

59256. Even assuming that this amount of Rs. 6-10 were remitted by Government and the land were given to you free of assessment; do you think all the indebtedness in Sind would be removed?—I blame the system of administration. What I feel is that since the Collector's administration has become weak our expenses have increased, and so have the burdens on the land.

59257. Do you mean that there are other burdens?—There are other burdens. Formerly the Collector was considered the head of the district and the Police, the Public Works Department, the Forest Department, were under his control, and things were not so bad for the agriculturists as they are now.

59258. On page 5 of the Government memorandum dealing with Sind, we are told that the average assessment per acre in Sind is Re. 1-8 per acre?—Because most of the land is lift land, and on lift land the assessment is low. That is why they have worked out such a low average.

59259. Would this apply to the class of land from which you derive an income of forty rupees per acre?—No; that is the best land.

59260. About *rasai* and *lapo*, I think there was a committee appointed some years ago?—Yes. And there have been circulars and Government orders from time to time.

59261. Do you mean that the nuisance has not been removed?—It has not been removed. It continues as fresh as ever.

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59262. Did you serve on that committee?—No.

59263. But it was a people's committee?—It was a committee of officials and non-officials.

59264. You have stated that the district local boards are at fault with reference to the state of the roads?—I blame the Government, not the district local boards. There are very few provincial roads in this Province.

59265. On page 67 of your note, you say "Our chief lack, in Sind, is roads." By "our" whom do you mean?—There are no roads worth mentioning which are kept up by Government. If you will read the whole of my paragraph, you will find that I have thrown enough light on it.

59266. Yes, I am just going to ask you some questions about it, but I should first like to get some light on the word "our." What exactly had you in mind?—Not the district local boards as much as the Government.

59267. You know, of course, the value of good roads to the agriculturist as they secure better prices for his produce. I suppose you agree with that?—Yes.

59268. Have the representatives of the cultivators, either on the district local boards or in the Council, ever met the cultivators face to face and explained to them that if they had good roads they would get so much per cart or per acre more for their produce? Have they explained the position to the cultivators?—The necessity is acknowledged there.

59269. Have they asked their opinion or their mandate, as the representatives of the cultivators either on the district local boards or the Council, whether they should support a road cess or a road tax for the benefit of the cultivators? Have you taken that trouble?—We have actually introduced toll taxes.

59270. But a toll tax does not cover the purpose of road improvement?—We are doing our part.

59271. Have you explained the position to them and obtained their consent?—There is no universal consent; there would be some opposition as well. The majority of them realise the necessity, and they are prepared to bear the burden.

59272. You have not fortified yourself by ascertaining their express desire in this matter, whether they would agree to a tax or whether they would oppose it?—I have noticed that I have to face all the agitation so far as my district is concerned.

59273. In favour or against?—Both in favour and against.

59274. You have in this case fortified yourself by obtaining their opinion and their consent?—Yes. As president of the district local board, I first introduced it in my district.

59275. What prevents you from further explaining the policy, and getting the road tax enhanced through the district local boards?—It will not be possible for district local boards, unless Government come forward to take up some of the important roads and provincialise them.

59276. Have you voiced the feeling that provincial revenues should come to the aid of the district local boards?—Yes.

59277. And, besides that, you are for an additional road cess?—Of course.

59278. In answer to Question 20 (c), relating to steps to be taken to improve the quality, purity, grading, etc. of agricultural produce, you say: "Please do not interfere with the people who are doing all that is needed in the matter." Can you explain what is being done by the people for improving the quality and purity of agricultural produce?—They have done much; at least they are very anxious to secure the best seeds wherever they can be got and improve the quality as much as possible.

59279. You say that the cultivators have no time to take to subsidiary industries. Why?—Because much of the agricultural labour has been drawn to the neighbouring factories and mills, and there is scarcity of labour for agriculture.

59280. Then, Sind requires no subsidiary industries?—We do.

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59281. *Mr. Jamshe Mehta*: Supposing *rasai* and *lapo* are refused what will be the consequence?—At present only the zamindar who gives *rasai* and *lapo* is considered useful, and the criterion of usefulness is not based on improvement of cultivation or increase of holdings by thrift. I think *rasai* and *lapo* should be discouraged to a very great extent. If a zamindar who is found to mortgage his property or to sell his land or get into debt, is not encouraged by the officials, perhaps he will know where he stands and he will not incur unnecessary expenditure.

59282. Half of the produce is given to the *hari* and half to the zamindar; out of whose share comes the *rasai* and the *lapo*?—From the zamindar's.

59283. Therefore, the *hari* is not affected by *rasai*?—Except that he has to contribute to the labour.

59284. One of the witnesses said that it is the recognised hospitality of the zamindar. Is that willing or forced?—I would admit that the zamindar is known for his hospitality. Of course you can accept hospitality from a well-to-do man. You ought to consider twice before you accept hospitality from a man who has gone under the Encumbered Estate Act and who has mortgaged his property. Only hospitality from well-to-do people ought to be accepted.

59285. One of the methods you have suggested for lessening the burden of debt is that co-operative societies should be able to lend money to members at a lower rate of interest, and you also suggest that Government should deposit money with the co-operative central banks just as they do with the Imperial Bank of India. Do you mean that then the central banks would be able to lend money to the co-operative societies at a lower rate of interest?—Yes.

59286. It has been suggested that pumps may be erected to lift water for irrigation. Do you think it could be done by co-operative societies?—Who will bear the cost?

59287. Supposing money is lent to them by the central banks, and half the cost is met by share capital of the societies, do you think that co-operation can be made use of in that way?—Yes, if they get money at a lower rate of interest and permission to pay back the loan by instalments.

59288. Government are at present purchasing grass for the Military Department from contractors. Do you think they could purchase such grass from co-operative societies? The societies might then be able to pocket the profit?—Yes; they could make money.

59289. You speak about the poverty of Sind, and you say that agriculture does not pay. Is that because of the relationship between the zamindar and the *hari* or between the zamindar and the Government? What party is particularly to blame?—Deficiency of water is the first cause. Even where we get water, the duty is too low. The duty is fixed at 35 to 40 acres per cusec, when 25 acres only can be irrigated by that amount. Then I have pointed out the other burdens and expenses.

59290. You say that it would be better to transfer the forests to the local boards. Is that because you think that there is some disadvantage in Government managing them, or is it because you want the district local boards to make money?—Not because I want the district local boards to make money, but because the district local boards would give more facilities to the public for grazing, etc.

59291. You make a statement that the Sind zamindar is generally in debt and he would welcome long-term loans either from co-operative societies or from Government. What is the period for which such loans should be given?—Ten years. In ten years they do not get more than four good seasons.

59292. Is it your opinion that such a thing is desirable? One of the witnesses made a statement that money is borrowed for lavish marriage expenses and other extravagances. Supposing you place at their disposal long-term loans either through the co-operative societies or direct from Government, would it not be misused? What is your opinion?—It is the officials who say that people are extravagant and spend lavishly; the facts are to the contrary.

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59293. You say that there is no scarcity of fodder in Sind; are you talking of your own district, or of Sind generally?—I understand that in some parts there is little fodder grown, but they can be supplied by the other places. Owing to the river Indus we have got grass in one part or other of every district, except Thar Parkar, a desert division which is out of the reach of the Indus and depends on rain.

59294. In your district, you feel that the labour difficulty will be felt after the Barrage is completed. Mr. Dow seems to think otherwise. What is your considered opinion?—At present, as I have said, we are losing labour because agriculture is not paying owing to inadequate water supply, and labourers going to other industries. Perhaps when water is given under the Barrage scheme, all the labour may return to the land.

59295. In your statement you have expressed your apprehension about Lower Sind after the Barrage is completed. Mr. Harrison told us this morning that there was a report of Mr. Shoubridge and according to that report five lakhs or eight lakhs have been provided for the improvement of the Fuleli. Have you studied that report, and do you think that the amount provided is sufficient?—At the time the Barrage question was before the Council I had not read it. But I had a discussion with Mr. Shoubridge; we had a conference of the Lower Sind zamindars, and we had to convince the officials of our apprehensions. The Public Works Department may say what they like, but I feel that our apprehensions are real. Even now we see the effect of the Barrage system; since the Sutlej project has affected our supplies in the Indus in Sind, how cannot the Barrage at Sukkur affect supplies in Lower Sind.

59296. On page 69 of your statement you say: "In most places detailed distribution is left to landholders who break each other's heads and in some places where distribution is done by Government officials it is a source of annoyance and mischief and leaves so much authority in the hands of subordinate officials whom nobody can expect to exercise it honestly. In my opinion the detailed distribution should be left to the landholders." Will you explain this statement? In one place you are afraid of landholders breaking on another's heads, but in another place you say detailed distribution should be left to the landholders?—In the interest of fair distribution, we should have a committee presided over by the Collector, and consisting of members drawn from the local zamindars, chosen from the head, middle and tail portions of the canals and also the Executive Engineer as a member. A committee will be able to ensure fair distribution if adequate water is provided in the canal.

59297. You complain, at the same page, that you are far from the seat of Government. May I take it that you want Sind to have its own Government?—I do.

59298. Would you like to have the Fragmented Holdings Bill extended to Sind?—I have not opposed it in the Council.

59299. At page 67 you say that fifteen per cent of the *taccavi* filters away; could you tell us how it filters away?—I think it is an open secret and known to almost everybody; even Government officials will not contradict it.

59300. You speak of the "Damocles' sword of Government" hanging over the head of the borrower. Can you explain that?—Yes; at the time of repayment, if he fails to repay on account of crop failure, all sorts of hardships are imposed on him.

59301. At the same page you say that tractors and threshing machines should be lent on hire by Government. Would you advise the formation of co-operative societies to rent them out to zamindars?—I would advise that method. The Agricultural Department have introduced certain implements, but the results they claim for them are not justified by experience. I say, therefore, that Government should buy the machines and rent them to the people and convince them of their success. They should have no objection to doing so if the results claimed are true.

59302. As regards meteorological information and propaganda, would you advocate the use of vernaculars?—Vernacular papers should be given all this information, so that people may know exactly what happens.

(The witness withdrew).

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**Mr. J. H. G. JERROM, Superintendent, Civil Veterinary Department,
Sind and Rajputana, Karachi.**

Replies to the Questionnaire.

QUESTION 15.—VETERINARY.—(a) The Civil Veterinary Department should be independent.

(b) (i) All existing veterinary dispensaries are under the control of the district local boards. This system is not satisfactory.

(ii) No; for want of funds, Sind, with a cattle population of 1,813,957, and an area of 46,507 sq. miles, is served by only eighteen dispensaries. More dispensaries are very necessary.

(iii) Yes.

(c) (i) No; but there are signs that agriculturists are beginning to realise the benefits of veterinary science. Propaganda work by Veterinary Inspectors, touring Veterinary Assistance Surgeons and the local authorities are the only means of remedying this.

(ii) There are no touring dispensaries. Last year, a scheme for the employment of itinerating Veterinary Assistant Surgeons was submitted, but owing to lack of funds the proposal was not sanctioned.

(d) The chief obstacles are:—

1. Ignorance of the people.
2. Failure of local authorities in promptly reporting outbreaks of contagious disease.
3. Objections of the people to having their animals either inoculated with preventive serum or, in outbreaks of glanders or surra, to having the animals destroyed. In this respect there has been a considerable improvement during the last two years.
4. The influx of cattle (disease-carriers) for grazing, from Indian States, none of which have any organisation for dealing with contagious diseases. Legislation would certainly be of immense value in controlling outbreaks of contagious disease but would be very expensive and, at present, owing to the ignorance of the majority of owners of animals, very difficult to enforce. More dispensaries and systematic touring of Veterinary Assistant Surgeons will improve existing conditions and enable the people to appreciate the benefits which the Veterinary Department can give them.

(e) There is no difficulty in obtaining sufficient serum.

(f) There are at present no obstacles in the way of popularising preventive inoculation as no fees are charged. Some years back, preventive inoculation was not popular with the owners of cattle but having seen the good results obtained, they now, in many cases, ask for their animals to be inoculated during outbreaks of rinderpest and hemorrhagic septicæmia.

(g) Yes.

(i) I would advocate the extension of the Muktesar Institute.

(ii) Provincial veterinary research institutes working in conjunction with the Muktesar Institute might be started in the large Provinces.

(h) I would recommend that special investigation should be conducted by officers of the Muktesar Institute in the smaller Provinces, and in the larger Provinces by their own officers.

(i) Yes. The whole service would then be co-ordinated under one head. The Superior Veterinary Officer could outline a policy for the whole of India.

Mr. J. H. G. Jerrom.

Oral Evidence.

59303. *The Chairman*: Mr. Jerrom, you are in charge of the Civil Veterinary Department?—Yes.

59304. What is the principal cattle disease in Sind?—Rinderpest.

59305. Are you using the method known as serum-simultaneous inoculation?—We are only using the serum-alone method; we have not used serum-simultaneous. It is rather risky, and I have had no experience personally.

59306. You no doubt take an interest in the improvement of cattle?—When I first came to Sind cattle breeding was in charge of my department, but we have now handed it over to the Agricultural Department.

59307. What is the policy; to aim at the improvement of cattle as draught animal, or as milkers, or as dual purpose animals?—I was hardly in charge long enough. As regards the Karachi cattle they are purely milch cattle.

59308. Is there any non-Indian blood in that cattle?—None; it is pure Indian.

59309. Then, in your campaign for improving cattle in Sind, have you attempted to popularize castration?—It had not been very popular up to last year when we introduced the Burdizzo method of castration. Since then the numbers have gone up.

59310. You have no difficulty in obtaining sufficient serum and no complaint to make about the quality?—No.

59311. *Sir James MacKenna*: What is your relation to the Bombay Department?—We are under the Bombay Government.

59312. Are you under the principal veterinary officer in the Presidency or under the Director of Agriculture?—I am directly under the Government through the Commissioner in Sind. Practically, I am in the same position as the Superintendent, Veterinary Department for Bombay; I deal directly with the Government through the Commissioner in Sind.

59313. You have no relation at all with the Bombay side, except with the Government through the Commissioner?—No.

59314. When were you recruited?—I came to Karachi in 1921.

59315. Are you from the Royal College?—Yes. I qualified in 1907.

59316. *Professor Gangulee*: We are told that cattle-breeding is not a paying proposition in the Bombay Presidency; do you subscribe to that view?—I have no experience of the Bombay Presidency. As regards this Province (Sind) there is extensive breeding of cattle in Karachi district; the Karachi cattle are well known.

59317. Is it due to the export trade in cattle?—There is a big export trade in Karachi cattle; they are known in many places.

59318. Specially in Argentina?—They are exported to Java, Formosa and Ceylon.

59319. Having that export trade, you can say that cattle-breeding might be a paying proposition?—Yes.

59320. Is the demand for your Bhagnari cattle or for dual purpose animals?—I do not think there is any export trade in Bhagnari cattle. The export demand is mostly in Karachi cattle, which are milch cattle.

59321. Is the value of these cattle based on the milk yield?—Mostly on the milk yield; especially those cattle that go to Ceylon, they are all for milking purposes.

59322. Do you hold out any prospect for buffalo breeding?—I have had no experience of buffalo breeding; my experience of cattle breeding was only for nineteen months.

59323. You say that the present system of having veterinary dispensaries under the district local boards is not satisfactory. Have you any definite reason for that view?—It is a system of dual control; the Veterinary Surgeon in charge of dispensaries is provided by Government who pay his

Mr. J. H. G. Jerrom.

salary and travelling allowance, but the other expenditure is controlled by the local board.

59324. You think that this dual control will not work?—I want either Government control or local board control.

59325. You say that some years ago preventive inoculation was not popular, but having seen the good results they now in many cases ask for inoculation; you think the prejudice is not impregnable?—Propaganda and opening of more dispensaries will gradually make the people realise the benefits to be derived from inoculation.

59326. You consider that legislation would be of immense value in checking animal diseases?—Undoubtedly.

59327. But you are afraid of the unwieldy machinery that may be necessary?—I think the expense and the number of veterinary police required would be tremendous. I do not think, in the present stage, it would be possible. Near Sind we have several Indian States where there is no legislation; and I do not suppose there would be any advantage in enforcing legislation in Sind, unless the States also were brought under the same legislation. During the last few years we have traced several outbreaks of rinderpest and foot-and-mouth disease to cattle brought in from adjoining Indian States.

59328. *Mr. Jamshed Mehta*: What is your actual relationship with the Agricultural Department? How do you come in touch with them?—If the Agricultural Department wants us to do anything we always give them whatever help we can; but we have got no actual relationship with the Agricultural Department.

59329. A suggestion has been made that your department should be brought under the Minister of Agriculture; what is your opinion?—I am inclined to agree with that, but ours is a technical department and it should be under a veterinary officer.

59330. In paragraph 3 (d) (2) of your note, you complain of the failure of local authorities in promptly reporting diseases; what do you mean by local authorities?—The reporting of contagious disease is done by *tapedars*, but in actual practice these men have so much other work to do that they do not bother about reporting diseases. Although it has improved during the last three or four years, it still leaves much to be desired.

59331. Do you go outside Sind?—I go to Rajputana also.

59332. What staff have you got?—For Sind we have two Inspectors and twenty-one Assistant Surgeons. That is all the staff. For Rajputana, it is practically unorganised; there are only two dispensaries, one of which is in charge of a local board and the other in charge of a municipality.

59333. Do you attend to cattle disease only when you are called upon; or do you attend to it on your own initiative?—The Veterinary Surgeons in charge of dispensaries go on tour for one week in a month. They are not doing it just now, because we have not sufficient budget allotment. When they do tour they enquire in the villages about cattle diseases, and if there are any they attend to them.

59334. Your staff is insufficient?—Yes.

59335. Would you like it to be added to?—Yes; the ideal would be one Veterinary Surgeon in charge of each taluka.

59336. *Sir Thomas Middleton*: What are the usual diseases you treat in your eighteen dispensaries?—The great majority of them are wound cases of various kinds; it is the chief thing one sees in camels and bullocks.

59337. What is the usual class of animal?—Usually bullocks; then camels.

59338. Do you get surra?—It is always with us; we have a few cases each year. Last year we had about ten cases in camels.

59339. You said you had two Inspectors and twenty-one Assistants. There are eighteen dispensaries. What about the other three Assistants?—

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The three are kept in reserve. One I keep in Karachi where there is a very big dispensary.

59340. The whole of your staff is engaged for dispensary work, except the two Inspectors?—I have two reserve men who help in dealing with contagious diseases.

59341. Are there any dispensaries in which you ought to have a couple of men?—Karachi is the only one big enough to employ two Veterinary Assistants; most of the dispensaries have compounders in addition to the veterinary assistant surgeons.

59342. How do you recruit these Assistants: where do they come from?—They are all except one, Sindhis; they are given scholarships to the Bombay Veterinary College by Government; we are allowed six scholarships for Sind scholars; at present we have five men studying there.

59343. You have none from the Punjab College?—We have got one man who was recruited some ten or fifteen years ago.

59344. What do you pay them on appointment?—They start at Rs. 75, going up to Rs. 155. The two Inspectors start at Rs. 175 and go up to Rs. 225.

59345. You say that in a country like Sind you want twice as many?—Many more; the dispensaries are much too scattered.

59346. Supposing there were to be a large increase, do you think you would get men enough coming forward at the salaries now offered?—I think so; of course we could not get all Bombay graduates because they are at present all employed, either in Bombay or in Sind.

59347. You would have to train Sindhis?—I do not think, it would be absolutely necessary to train Sindhis, although the Sindhi is certainly more popular than an outsider amongst the people.

59348. You have come across no difficulties in the way of recruitment?—No, not up to now.

59349. What is the usual age of castration of the working bullocks?—From six months up to two years; we castrate them up to two years. The Italian methods that we are trying now we have found in practice to be not very successful with animals over two years old; we have some difficulty in crushing the cord. We have had a few cases where Veterinary Assistants have castrated old bulls but it has not been at all successful, so that we now limit our work to young cattle.

59350. Are there any districts in Sind where you have as big a class of working bullocks as you have in Rajputana?—I do not think so.

59351. Can you tell me whether these Rajputana cattle are castrated under two or three years old?—It is done by native quacks there.

59352. But do you happen to know the usual age?—No. I have very little experience of that; they are older, I believe.

(The witness withdrew.)

The Commission then adjourned till Tuesday; the 25th October, 1927.

Tuesday, October 25th, 1927.

KARACHI.

PRESENT:

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

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

Raja Sri KRISHNA CHANDRA GAJA
PATI NARAYANA DEO of Parla-
kimedi.

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

Professor N. GANGULEE.

Dr. L. K. HYDER.

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

Mr. B. S. KAMAT.

The Hon'ble Sir CHUNILAL V.
MEHTA, Kt.

Mr. JAMSHED N. R. MEHTA.

} (*Co-opted Members*).

Mr. J. A. MADAN, I.C.S.

Mr. F. W. H. SMITH.

} (*Joint Secretaries*).

Mr. A. A. MUSTO, C.I.E., M.Inst.C.E., Superintending Engineer,
Lloyd Barrage Circle, Karachi.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—I suggest the necessity of establishing and maintaining experimental stations at several points in the Barrage area for investigating particularly the reclamation of *kallar* lands, duties of water for various crops, prevention of waterlogging, efficient drainage methods, and suitable rotations of crops.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—If possible, crop experiments should be conducted on the lands of cultivators, with their normal water supply. Cultivators are sceptical of results obtained at Government farms, as they suspect that heavy waterings are given and that the statistics of manuring etc., are understated.

QUESTION 4.—ADMINISTRATION.—Road and rail facilities should be greatly extended and improved in Sind to enable easy marketing and export of crops.

QUESTION 5.—FINANCE.—Seed might be issued free of cost and value recovered from the crop till good strains are established. Seed depots might be wholly or partially financed by Government and administered either by co-operative societies or by Government.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—Please see Question 22 (b) (i).

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—When a holding has reached the economic limit of size, would it be possible to legislate that when, by the death of the owner, it is liable to fragmentation, the State should purchase it at an official valuation, or at the price fetched by its sale at auction, whichever be greater, the condition of sale to be that the holding

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is not to be reduced by part sale or future fragmentation? Any of the descendants of the late owner should have the option of retaining the holding unbroken, or could bid for it in auction. This may be difficult to arrange but might offer a solution to the serious danger of fragmentation.

QUESTION 8.—IRRIGATION.—(a) (i) 1. I would suggest the early investigation of the possibilities of a barrage on the Indus at the extreme north of Sind to regulate the supply to lands north of Sukkur and Rohri. Close contouring of the country should be done at once wherever not already done.

2. Similarly, the possibilities of a barrage in the neighbourhood of Kotri to supply the lands between that town and the sea on both banks should be investigated. It appears at first sight that the latter scheme would be difficult to make remunerative owing to the limited area to be served and the pooriness of much of the land, which is largely devoted to rice cultivation. The scheme has already been mooted many years ago. (*Vide* the Eastern and Western Delta Canal projects.)

3. I would suggest the early starting of rainfall recording stations in the Baluchistan mountains to the west and north-west of Sind, an investigation of the run-off available, and of suitable sites for storage reservoirs in these hills. Such reservoirs might be made to supply canals for feeding the rich submontaine tracts lying between the hills and the areas commanded by the Lloyd Barrage, and the areas between the hills and any further areas which can be commanded by other future canals from the Indus in connection with the possible barrages suggested in 1 and 2 above.

Such schemes for storage reservoirs are not likely to be needed for a good many years to come, but would undoubtedly become practical politics when the Barrage areas are fully developed. At present we have absolutely no information about the rainfall in this vast mountainous region. When storage schemes become necessary it will be an irreparable misfortune if rainfall statistics have not been collected for many years in advance so that reliable estimates of run-off can be framed and projects prepared therefrom.

The only indication we now have of this rainfall and run-off is in the great floods or spates which periodically pour through the gorges in the eastern boundary of these hills and debouch over the plains. There are many such gorges in the western Nara district of which the principal is the Gaj Nai, the torrent issuing from which has been estimated to carry as much as 200,000 cusecs for several days at a time and smaller floods for much longer periods.

These floods at present bring cultivation and prosperity to the submontaine tracts such as the Johi Pat, but bring ruin to the low-lying lands commanded by the canals from the Indus. If this water could be stored and issued by regulated channels it would be a source of great wealth to the district and would save much damage to present and future river irrigated lands and to railways. It is possible that an ample water supply under pressure could be stored for supplying Karachi city and irrigating high lands in Karachi district. These possibilities are mere suggestions and can only be investigated after information as to rainfall and sites for storage works have been collected. The torrents which issue from these hills periodically and cause so much trouble and damage to railways and canals are an indication that there is heavy rainfall in the interior of these mountain ranges which might be stored and utilised.

(b) The existing methods of distributing canal water in Sind are entirely unsatisfactory, i.e., by open *karia* heads or plain sluices usually excavated to canal bed level. This enables the *karias* in the upper reaches to take the major portion of the canal supply and makes it practically impossible to distribute the available supply equitably throughout the canal. A form of module or self-regulating outlet should be used for every outlet from the canal. There is a number of successful modules in use in the Punjab and on the Jamrao system in Sind. These should be adopted on all new canals, and wherever possible in existing inundation canals, though it is a more difficult matter to obtain completely satisfactory working of

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the modules under the extreme variations of level obtaining in the old inundation canals.

I have no personal experience of the working of moduled outlets but have inspected a number, and studied the literature and statistics on the subject, and am satisfied that they are fully satisfactory.

On the other hand, I have held charge of a canal sub-division and district with nothing but the open type sluices and have seen the impossibility of making an equitable distribution with such outlets.

QUESTION 9.—SOILS.—(a) (i) I consider that all natural valley lines should be kept entirely open and given a free outlet to some main drainage line. No canal or water channel of any kind should be allowed to cross such valleys or depressions, which should become the enforced boundaries of distribution systems, and sub-systems. Unless such valleys are well defined, i.e., having fairly steep sides and a well defined bottom (which they seldom have in Sind) a directing channel or drain should be excavated along their lowest line and be kept free of crops or undergrowth.

(ii) I believe much of the waterlogged (and therefore uncultivable, and in many cases alkali) land in Sind is due to the complete blockage of these main and sub-valley lines by canals and water courses, which not only prevent the run off of drainage, but actually form the depressions into waterlogged reservoirs which effectually block all drainage from the higher lands and raise the subsoil water level throughout the tract.

(b) Not from personal knowledge.

(c) It would be sound business to give full remission of assessment for the first year's crop, half remission for the second year and a quarter remission for the third year, after assessing ordinary remission according to the value of the crop. Some such sliding scale of preferential treatment would encourage progressive efforts at improvement of the soil and would eventually give a reclaimed area of good value to the State and the owner.

QUESTION 12.—CULTIVATION.—Where large holdings are prevalent, or even large areas in one open stretch consisting of various holdings, cultivation by steam or motor tractors should be encouraged, as this enables deep and rapid cultivation to be done and reduces the number of cattle necessary. Deeper cultivation will become more desirable as the intensity of cropping increases and as deep rooted crops are developed.

QUESTION 14.—IMPLEMENTS.—(a) Please see Question 12. With the great increase of cultivation which will follow the Barrage canals and the much greater outlet for manual and animal labour in attending to crops, it will undoubtedly be profitable and essential to economise such labour, wherever possible, by the substitution of machinery and more efficient implements than are now used by the cultivator. A better plough than the wooden country implement will be one of the first things necessary. It is probable that a well-made country iron plough, designed and made on the spot, will better meet requirements than European designs. It would seem advisable to encourage the opening of up-to-date workshops for making such ploughs and other implements at suitable centres throughout Sind. Chaff-cutting machines, reapers and binders, harrows, disc ploughs, winnowing machines, threshing machines, and other agricultural plant will be required and most of these could be made locally. Where the plant or capital on a holding is insufficient to provide engine power for driving the plant, an efficient bullock gear will be a desirable source of power. This could also be made locally. Cotton gins and baling presses, oil mills, etc., will be required, but private enterprise will probably meet the demand without intervention by Government.

(b) Apart from demonstrations by the Agricultural Department of the use of such implements and machines (and these demonstrations should be made on cultivators' land by a travelling party going from village to village with the implements), co-operative societies should be encouraged to stock and issue such implements on easy payment terms. The societies should, if necessary, be assisted financially to start by Government, but

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should almost immediately become self-supporting. They might also maintain a repair depôt.

(c) I believe the manufacturers of agricultural implements seldom have resident representatives who are in constant touch with the people and their requirements. (This would be obviated if manufacture were started at various centres in Sind.) Hence, they design and make unsuitable implements. To alter a design, and the plant for making it, involves considerable outlay and increases the price of the implement. Hence the necessity for the maker being on the spot, studying the requirements, and getting his design right, before manufacturing. The officers of the Agricultural Department are non-technical men who do not understand the manufacture side of the matter and I believe they do not realise the difficulty and expense of altering designs of even simple implements. It would, therefore, be far better for the makers personally to study the requirements on the spot and make their own designs rather than rely on the Agricultural Department for information. Probably the greatest difficulties in the distribution for sale of such implements are the lack of reliable selling agents in the *mofussil*, and the difficulty of the cultivator in putting down cash for his purchase. Both could be overcome by co-operative sale depôts as suggested above. One such depôt should be arranged for suitable groups of villages.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(d) Please see reply to Question 14. Private enterprise should develop these industries if facilities are given.

(e) Possibly, but part-time labour is not of much use to any industrial concern, whose plant and staff need to be kept constantly employed.

(f) Yes. By practical experts in such industries, not by amateurs or college youths good with their pens.

(g) With the introduction of perennial water there will be far less idle time for the rural population. (Vide pages 15 to 21 Vol. VI Lloyd Barrage Canals Project, 1919-20.)

(h) Yes. By the encouragement of flower and vegetable gardening round their houses and a certain amount of control over buildings in villages. Elementary town planning could easily be done by local bodies, assisted, if necessary, by Government; and the building of village "slums" should be prevented. If every house were compelled to have a certain amount of land around it and horticultural shows were instituted, with prizes for the best gardens, great improvement might be effected in the health conditions and amenities of their environment. Public bodies should be encouraged to plant and maintain trees in the villages and provide public gardens and play-grounds, on however humble a scale.

QUESTION 18.—AGRICULTURAL LABOUR.—(a) (i) and (ii) For permanent migration selected parties of agricultural labour and zamindars from over-populated areas might be brought by free excursions and shown the under-populated areas and conditions. Advantageous conditions for the purchase of land might be offered to these zamindars and the surplus labour might be introduced to zamindars who were short of labour. These men would then spread the news in their villages and others would follow if the conditions were satisfactory to them.

(b) I am not aware of any acute shortage of agricultural labour in Sind. I think land with a good water supply is never out of cultivation for want of labour, but I have been out of touch with actual agriculture as seen by the district officers for the past twelve years and conditions may have changed since the War. For the transplanting and reaping of rice a good deal of extra labour is needed for a short season, and in the principal rice tracts, viz., Larkana and Begari and the Mithrao and Karachi district areas this labour comes in from the adjoining country, i.e., from Baluchistan and the Thar Desert respectively, and returns in time for its own harvesting or cattle tending.

(c) I doubt whether this will be necessary in the newly opened areas under the Barrage. If the available lands are sold by auction, the buyers will import their own labour if necessary, more especially as a number of

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the buyers will doubtless come from over-populated and fully developed areas in the Punjab and elsewhere. If not, it would be possible to encourage the development (and sale) of such lands by giving free water and no assessment for the first one or two years after sale. This should prove a great inducement and would not cause a great loss to the State if it were found really necessary. The increased competition and sale value due to such concession would probably more than cover the temporary loss of revenue, or the collection of assessment might be postponed for one or two years and collected thereafter in instalments.

QUESTION 19.—FORESTS.—(a) I am not sufficiently conversant with present practice.

(b) Yes, by granting remission (partial or total) of assessment for areas sown with firewood producing trees, or fixing low assessments for same and for fodder crops.

(c) I should think there certainly would be, for the supply of firewood, charcoal and cheap timber for the villages.

QUESTION 20.—MARKETING.—This is a matter where the commercial community could give the best opinion.

QUESTION 21.—TARIFFS AND SEA FREIGHTS.—(a) The customs duties on agricultural implements and machinery must increase the price to the cultivator though they are very low, being only two-and-a-half per cent, I believe. Still, every little helps, and they might be removed. Even if local manufactures spring up, competition is always healthy, and there will be need for some imported implements and machinery for years to come.

(b) Sea freights are often very high. It should be considered whether supplies for co-operative societies could not be shipped by the Director General of Stores, London, under his freight contract, which is on more favourable terms than the open market.

QUESTION 22.—CO-OPERATION.—(a) Every possible step should be taken both by Government and non-official agencies to encourage the growth of co-operation which will be one of the greatest factors in future prosperity and development. I would suggest that Government should employ an expert in this work from, say, Sweden or Denmark, or from England, if 'his work has been sufficiently developed there to give real experts. I do not consider that the employment of amateurs from the ranks of the I.C.S. is the best method of developing specialised subjects. These officers may be able men and Jacks-of-all-trades, but they are masters of none, since they never devote a life time's study and practice to any one subject. It is not so much administrative capacity which is required as intimate knowledge of methods, and long experience of applying them. If the right type of man with these qualifications is selected, he will be quite able to tackle the administrative side of his work. There must be many such available.

(b) I am not sufficiently conversant with recent developments in the organisation of the various co-operative societies to know whether the following suggestions have or have not already been tried, but I give them for what they are worth.

(i) *Credit Societies*.—If these can arrange advances to meet the current expenses of cultivators for developments, and on reasonable terms, against fairly devised mortgages on holdings, live or dead stock, or crops, they should be of great value to the industry. The question of advances for domestic purposes is a very difficult one, since indebtedness on extortionate terms must react on the cultivator's ability to finance his land. If anything can be done to repay such existing debts and substitute a loan on reasonable terms, while at the same time preventing future extravagance, it would be a great help to agriculture.

(ii) *Purchase Societies*.—I have already suggested in reply to Question 14 (b) that co-operative societies should stock, sell on easy terms, and repair implements and machinery. They might also possibly hire out such implements purchased from co-operative funds, but this would probably be unsatisfactory and difficult to arrange on fair terms.

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(iii) *Sale of produce and stock*.—I believe very great success has been obtained in Europe by such work being done on a co-operative basis and it seems well worth while for an *expert* to investigate this, if not already done.

(iv) *General improvements to land*.—Where such improvements are of general benefit to the locality they might with advantage be carried out on a co-operative basis, but for improvements affecting individuals only, the granting of credit by the co-operative society would seem to be the only assistance possible.

(v) *Aggregation of fragmented holdings*.—Please see reply to Question 7. The carrying out of suggestions made therein might possibly be left to co-operative societies as regards the future. For holdings already uneconomic it would seem better for the State to acquire and re-distribute them by sale. Otherwise, much bitter feeling might be started which would ruin co-operative movements generally.

(vi) Wealthy societies might purchase and run the more expensive types of machinery such as power ploughs, threshing machines, sugarcane crushers, rice-hullers, etc., making fixed charges for the work done. It would probably be better to encourage private enterprise to supply this need, as business experience and management would be essential to economic success.

(vii) *Joint farming*.—I have no experience but it seems a very doubtful expedient.

(viii) Ditto.

(ix) Please see reply to Question 17 (h).

(c) Yes, provided a large proportion of the area affected was in favour of it, and provided the scheme was approved by experts.

(d) My personal knowledge of the working of co-operative societies was gained many years ago when they were in an incipient stage (about 1909 to 1912). They then promised to be very successful but I have only casual information about them since, as I have been on special duty for the past twelve years, and have had few opportunities of seeing their work in the districts.

QUESTION 24.—ATTRACTING CAPITAL.—(a) Improve the water supply by making it assured and thus reduce the great speculative element of agriculture. Capital and enterprise will follow where there is a reasonable probability of being able to raise crops every season.

(b) The greatest discouraging factor is probably the complete uncertainty as to whether water will be available. Its absence or deficiency means the complete or partial loss of all capital and enterprise put into the lands.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(a) Please see reply to Question 17 (h).

(b) All such enquiries are useful if the information obtained is properly applied. The cost would be considerable and the gain would probably not appear for a generation, but should be considerable eventually.

QUESTION 26.—STATISTICS.—(b) Results should be published much more quickly and in an intelligible and interesting form. The usual blue book is years out of date by the time it is published, requires a Cook's conducted tour through it to find what is desired, and is put up in the dullest and least interesting form possible, with masses of useless statistics which would be better omitted from the point of view of clarity and expense.

Oral Evidence.

59353. *The Chairman:* Mr. Musto, you are Superintending Engineer of the Lloyd Barrage Circle?—Yes.

59354. We have your note of evidence; would you like to make any statement at this stage?—I do not think so; if you examine me, other points may come out.

59355. Is the work in connection with the Barrage proceeding satisfactorily up to date?—Yes, I think so.

59356. So that, as far as you can tell, the water will be available in 1931; is that the position?—I am doubtful of that; 1932 I should say.

59357. Have you interested yourself, at all, in the drainage which will be necessary to avoid waterlogging?—Very much. I have provided a very large sum of money in the project for drainage works.

59358. The Commission has been told by another witness that, as far as the drainage goes, there has been some change in policy and, whereas it was the original intention to construct the drainage *pari passu* with the canals, it has now been decided to postpone the construction of the drains until the canals have been cut; is that so?—I have no official information on that point.

59359. But have you interested yourself in the details of the drainage scheme which it is proposed to put into effect?—Not since I prepared the project; I have nothing to do with that now.

59360. In preparing the project you also prepared the drainage schemes, did you?—Yes.

59361. In your judgment, are those schemes sufficient to guarantee that no undue waterlogging and soil deterioration will take place?—As far as I can tell, yes; I omitted nothing that I thought was necessary.

59362. Do you attach importance to drainage?—Very great importance, yes, and my personal opinion is that drainage works ought to be carried out side by side with the construction of the canals.

59363. You have, I think, had experience of the administration of irrigation schemes in India?—Yes, I have had charge of a canal district.

59364. Would you tell the Commission quite shortly what that experience has been?—I held charge of a district in which all the canals were inundation; there were no perennial canals. The inundation canals were fed direct from the river. Some of them were fairly modern canals, re-modelled inundation canals, and the others were very old ones, the relics of the days of the Mirs. The modernised canals had cross-regulators and it was possible to regulate levels to a certain extent to give rotations; but, owing to the cultivators' outlets being in all cases open outlets and in some cases without even pucca heads, it was extremely difficult to distribute the supply equitably. In the older canals there was no attempt at cross-regulation in the canals; there were no cross-regulators and many of the heads of the cultivators' outlets were simply cuts through the bank. With that arrangement it was practically impossible to effect any distribution of the water: the man at the head took all that he wanted.

59365. Have you any experience of distribution through A. P. M.'s?—Not personally, no; they have been introduced since I held charge of the district; but I have studied the literature on the subject and I have inspected many of them working, and I am quite sure they are a solution of the problem.

59366. Is it your intention to distribute through A. P. M.'s in this scheme?—Yes.

59367. They are more popular with the man at the tail than with the man at the head?—Yes, naturally the man at the head knows his share will be cut down to an equitable share of the total quantity in the canal; he naturally does not want to lose anything. The man at the tail, of course, will get a fairer share of the water.

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59368. Have you considered, at all the possibility of experimenting with the sale of water on the volumetric basis?—No, I consider it is impracticable at present; we have not had sufficient experience, so far as I know, in any part of India to justify it being sold by volume. I am not sure what progress they have made in the Punjab.

59369. *Sir Thomas Middleton*: In designing the drainage system, how far were you able to go into detail? You laid down the alignment of the main arterial drains; were you able to get to work on the main feeders?—Yes, I not only laid out the main valley lines but also any cross-valleys that I could find: any sort of tributaries into the main valley.

59370. But at this stage your design would represent the arterial drainage?—Yes, quite.

59371. Has any consideration yet been given to detailed drainage questions: the planning of the size of section for which you will provide a main feeder and that type of work?—In the project I provide a direct channel, as I called it, down the centre of the valley line: a channel with varying widths according to the size of the area that it fed. I do not know what has been done since; I am not connected with the details of the scheme since, except the Barrage.

59372. You were for some time connected with the Agricultural Department?—I was.

59373. In designing agricultural machinery I think?—Not exactly designing it: in purchasing and erecting, and so on, agricultural machinery.

59374. To what types of agricultural machinery did you give special attention?—Principally pumping plants, but also sugarcane crushers, cotton gins, rice hullers and so on.

59375. What are the classes of machinery that, in your opinion, want first attention by the Agricultural Department?—More the implements than machinery I think: first of all the plough and then the harrow and other tilling implements.

59376. Do you think there is much work to be done on these?—Yes, a great deal; the present country plough used is the primitive thing which must have been used by Adam in the Garden of Eden.

59377. But in the Deccan especially they have got on very well in designing the type of iron plough wanted?—I believe they have.

59378. They have also a very efficient harrow?—Yes, there is a local firm there that makes them; I believe it is Kirloskar Brothers.

59379. Did you pay any attention to chaff cutters?—Very little; I had no enquiries for them practically: I think I supplied one or two *jowar* cutters.

59380. There appears to be quite a big demand for chaff cutters in some parts of India?—There would be, I should think.

59381. What are the types of water lifts that you suggest?—Principally centrifugal pumps; that is the best and simplest form of water lift for most conditions.

59382. For very low lifts have you ever used the Archimedean screw?—I never have; I have seen it working on a lift of about a foot-and-a-half, I think; that is the only one I have ever seen at work.

59383. *Dr. Hyder*: You say on page 90 of your note of evidence that some of this water should be stored. What is the name of the district through which the Gaj Nai flows?—The Gaj Nai issues from Baluchistan and flows through the Western Nara district.

59384. Is it under Sind administration?—The Gaj Nai itself, or rather the mouth of it where it debouches on to the plain, is in the Western Nara district, but the whole course of the stream is in Baluchistan; the mountains from which it issues are in Baluchistan.

59385. I ask you this, because you might get into difficulties with another administration?—Certainly; we shall have to arrange with the other administration.

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59386. Then you want the use of tractors for deeper cultivation; do you think that is advisable in the circumstances of India?—Yes, certainly..

59387. Deeper cultivation?—Yes; not necessarily at present in Sind, but I think even now it would probably be one of the greatest factors in reclaiming *kallar* soil. I have very bad *kallar* soil in my own garden in Sukkur and I find the only cure for it is constant deep digging and exposing it to the air.

59388. What deep-rooting crops would you suggest?—There are not many in Sind at the present moment; sugarcane and castor are the only two I can think of at the moment, but with more intensive cultivation it will surely be necessary to plough deeper.

59389. Have you got any labour from Baluchistan?—Yes, a considerable amount.

59390. Brahuis?—Yes, many.

59391. They must have changed considerably then?—No; they come down. Do you mean in my works?

59392. Yes, the Baluch or the Brahui?—Yes, they both come down.

59393. *Sir Chunilal Mehta*: Is there much scope for pumping plants in Sind?—A certain amount. I think they might be substituted for Persian wheels in many cases where the lift is low.

59394. Would you also pump direct from the river; is that possible?—It is done already in a few cases, but of course there are very few waterlifts directly on the river. Just near Sukkur is the only place I know where there are many plants on the river itself.

59395. It would be a very big area spread over Sind that could be served by pumping plants?—Yes, certainly.

59396. There would be a big area?—Yes, lift areas generally; you could substitute pumping plants for Persian wheels everywhere, provided you had the capital to install them.

59397. What would be the advantage? You would serve a larger area I suppose?—Yes, and it would be cheap probably in the long run: perhaps not at present so much when the cattle are not employed all the year round, but when more intensive cultivation comes in they will have more work for their cattle, and then I think pumping plants would certainly pay them. Even now there are two pumping plants on the river bank at Sukkur, put in by the zamindars themselves and worked by them, which have taken the place of Persian wheels.

59398. You make certain suggestions here about fragmentation of holdings; do you consider the evil really serious yet in Sind?—Not so much in Sind I think; though I believe it is becoming serious in parts. But in the Deccan certainly it is.

59399. And you would like something done?—I should think it is very necessary.

59400. *The Raja of Parlakimedi*: On the first page of your written evidence, you speak of the necessity of investigating methods of preventing waterlogging. Do you apprehend any waterlogging on this system?—If the system is abused, certainly; if too much water is given, if drainage is not attended to.

59401. You are going to see to the proper distribution also?—We hope to; there is a great deal of agitation for lower duties and so on, and that is a thing which has to be definitely settled.

59402. I should like to know what has been the real cause of there being such a small number of roads in Sind?—That is very difficult for me to say; it is a matter of general policy; I take it that it is lack of funds.

59403. Is there a real need felt in this part of the country for transport?—Yes, very real; there is considerable difficulty in making roads in Sind. You see, there is no suitable material; it is a difficult problem. That is merely a question of cost; naturally you can bring materials from anywhere if you have got the money to do it. The serious difficulty in making roads in Sind

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is the lack of materials except in a few special areas like Sukkur and Hyderabad where you have stone available. You have to find some substitute for stone. The cost of carting stone and carrying it for long distances is almost prohibitive.

59404. The material has to be brought from long distances?—Yes; or you can make roads of brick. This is a matter for experiment. I tried to get experiments made years ago but could not get the funds for it. Mr. Harrison is now experimenting with oiling earth roads: putting waste oil on earth and ramming it; I believe it is extraordinarily successful and makes a very hard surface.

59405. What has been the effect upon the roads of the Reforms?—I am not a district officer now; I have not been a district officer for twelve years, so that I am not quite in touch; but I understand the district boards have let the roads go rather badly. I use hardly any roads except the ones I have made myself, so that I am not in a position to speak on the subject.

59406. What sort of interest do the municipality take in their roads?—Judging by the roads I have to drive over in Sukkur, none at all. I wish I could claim damages from the municipality for the damage they do to my car in driving over them.

59407. Have you had opportunities of trying tractors upon fields where wet cultivation is adopted?—No, never; I have used steam ploughing plant; I started the first steam ploughing plant in the Bombay Presidency; that was used in the Dharwar district; but it was black cotton soil and it was only used after the rainy season was over. It was impossible to use it in the rainy season.

59408. I think, even in wet fields, deep ploughing could be managed with tractors?—Yes, I think so, especially nowadays with the caterpillar tractors; they will get over almost any ground.

59409. Do you not think they will be useful?—Very useful I should say.

59410. What method would you suggest to make them easily accessible to the ryots?—I think probably the best way is either to encourage a company, private enterprise, to start a ploughing business, or get a wealthy co-operative society to do it; but private enterprise is best. What is necessary to make the thing a success is sound business management. If you make it easy for private enterprise to start, I think they could probably do it successfully with great advantage to the cultivator.

59411. Are not the co-operative societies interesting themselves in this?—Not that I know of; it is rather a big thing for a co-operative society to tackle; it would probably cost about a lakh of rupees to get a plant going.

59412. They would have a central organisation?—Yes, what I would suggest is either a firm or a co-operative society to have a plant and to take on ploughing for the different cultivators at a fixed rate per acre.

59413. Lending them?—Not lending the plant, no; they would work the plant themselves. The co-operative society or business firm would work the plant themselves and simply charge so much per acre for ploughing. I think that is the only way you are ever going to make it a success.

59414. *Professor Gangulee:* I want to clear up one or two points on the question of irrigation, based on remarks made by some of our witnesses. It has been said that the Lloyd Barrage, by cutting off the level of the Indus below it, is going surely to have a very adverse effect upon the non-barrage tract. Do you agree with that view?—No, I think the Lloyd Barrage will have very little effect on the water level below it; we are practically 300 miles from the next off-take and I think we shall have very little effect. We have an enormous reservoir between the barrage and the next off-take, and that reservoir will be filled up at intervals. It is only in very bad years that we shall take out practically the whole of the river water, and then only for a day at a time probably. In the interval the reservoir between us and the next canal will be filled up again.

59415. Then what will be the source of water to the non-barrage tract: from well irrigation or reservoir?—From the reservoir, from the river itself as at present; the river itself forms the reservoir.

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59416. The second point is as to the insufficiency in the number of regulators; complaints have been made of that by one of our witnesses; he says we want more regulators in big Government canals at short distances to give a constant level of water?—But is he speaking of the existing canals?

59417. Yes?—Yes, probably. Cross regulators are useful to a certain extent, but without regulated outlets they are of very little effect.

59418. The distance between one regulator and another is very great; he says within eighteen miles of the Fuleli Canal there is only one regulator?—I am not in a position to speak of the Fuleli; I do not know it well.

59419. He says modules have been introduced in hot haste in canals with fluctuating levels and they have failed to make equitable distribution; do you agree with that?—No, not at all. Modules have been under consideration for the past twenty years. I do not know whether he considers that hot haste; it may be for the East.

59420. There is one more point; he says sufficient attention is not paid to clearance of canals and he suggests that a special revenue should be earmarked for the purpose?—I think all that is required is spent. No money is earmarked for the purpose; the engineers survey the canal every year and see what clearance they consider necessary and they ask for funds for it.

59421. Turning to your note, do you consider that it is necessary to have a central research station to investigate the problems inherent in the modern methods of irrigation?—Yes, I have said so.

59422. I know you have said so. Would you have that sort of research station under the Provinces or under the Central Government?—Under the Provinces, certainly. I have not said a central research station; I said, maintaining experimental stations at several points in the Barrage area; I would suggest a number of experimental farms.

59423. Only to investigate agricultural problems arising out of irrigation?—Yes.

59424. Where would you carry on hydraulic experiments?—They could be carried on possibly at Sukkur. I have also suggested, not here but elsewhere, the appointment of a research officer to investigate purely irrigation hydraulic problems.

59425. Will those fundamental questions on irrigation be investigated provincially or centrally?—Both, I should think: provincial and co-ordinated by a central authority.

59426. What machinery do you suggest for that co-ordination?—I think the existing machinery is sufficient. Of course, the Inspector General of Irrigation has been abolished. I would suggest the replacement of that officer; he was an invaluable officer.

59427. You do not think it would be necessary to have a Central Irrigation Research Station under the Inspector General of Irrigation?—No, I do not think so.

59428. Are you satisfied with the contouring of the land under the Barrage?—Yes, certainly.

59429. Is it closely done?—Yes.

59430. That will be invaluable for your drainage schemes?—Quite.

59431. On page 91, you are discussing the question of assessment, and you say "It would be sound business to give full remission of assessment for the first year's crop", and you go on to recommend a series of remissions. Is that under the consideration of Government?—Not that I know of.

59432. Have you placed this view before Government?—No. I am not sure what the question is.

59433. The question is "What measures should Government take to encourage the reclamation of areas of cultivable land which have gone out of cultivation"?—It seems to me that some such scheme as I have indicated would be a good encouragement. You will notice that I say that we should give them remission in addition to the ordinary seasonal remission. That is to say, if a man produces a four-anna crop, he is in any case entitled to a

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certain amount of remission, and in addition to that I would give him remission of half the ordinary assessment. That is very good encouragement.

59434. Are you familiar with the co-operative movement in the Punjab?—No.

59435. Are you familiar with that of the Presidency?—I have stated that the only touch I had with it was twelve years ago, when it was in its infancy.

59436. You do not consider the co-operative movement involves a lot of administrative work?—Yes, a certain amount. Every business does.

59437. You say that you do not consider that the employment of amateurs from the ranks of the Indian Civil Service is the best method of developing specialised subjects. Are you referring there to the co-operative movement?—Yes; any specialised subject.

59438. Do I understand you to say that the Registrar of Co-operative Societies should be recruited from specialised officers?—Yes, if possible; if they are available. Or, if an officer of the Indian Civil Service is selected for the post, I think he should remain in it. Having been trained in the work, he should remain in it, and not go to another job as soon as a better job is available.

59439. *Mr. Kamat*: You foreshadow the possibilities of one or two other barrages in Sind, one at the extreme north of Sind and one below Kotri?—Yes.

59440. Within that distance of time, do you visualise the possibility of having these barrages in Sind?—That is an extremely difficult question to answer. As far as the desirability of them goes, I should say within fifteen years. But there is the political situation to consider, there is the financial situation to consider.

59441. Within fifteen years, supposing both these barrages come in, do you think they would be a financial success?—It is impossible to say until the project is prepared.

59442. About the possibilities of further extension of irrigation in the rest of the Presidency, have you any views whether all the possibilities of some of the bigger rivers have been thoroughly exploited?—I have no sufficient knowledge as regards that.

59443. It has been urged in certain quarters that the Bombay Irrigation Department is now making the fullest use of the Bombay rivers?—I am not sufficiently familiar with the conditions of the Presidency now. I have been away from the Presidency for over fourteen years.

59444. You say that the existing methods of distributing canal water in Sind are entirely unsatisfactory, and you also add that module outlets have been under consideration for some years?—Yes.

59445. Are you coming now to any definite, final conclusion about the desirability of module outlets?—I think we have come to that.

59446. It has been definitely decided?—Yes.

59447. Both for Sind and other parts of the Presidency?—I cannot speak for other parts of the Presidency.

59448. If they are suitable for Sind, they ought to be suitable for the other parts of the Presidency?—Yes.

59449. *Professor Gangulee*: Is that the A. P. module?—Each type has its own points. Some are more suited for some conditions, and some for others.

59450. *Mr. Kamat*: You were responsible for designing a boring plant called the Musto plant?—Yes.

59451. And you had some experience in that line?—Yes.

59452. Speaking about implements and their designs, you suggest that there should be workshops in Sind and possibly in other parts of the Presidency?—Yes.

59453. Supposing such workshops were to be established, do you think Government should start them, or should they be started by private enterprise?—It should be left to private enterprise.

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59454. You suggest private enterprise should start these workshops?—Yes. Government would never make a success of that.

59455. There are only two private firms, Kirloskar Brothers and another firm, that have applied their minds to the manufacture of implements, but in the other parts of the country there is hardly any private enterprise coming forward. Have you any views as to why private enterprise, say in Madras or Bengal or the Punjab, is not coming forward?—Manufacture of implements is a mechanical subject. India is hopelessly behindhand in mechanical matters, as you probably know. To start any industry of this nature successfully, I think you must have European control, not entirely perhaps, but I think you should have European organisation to start it anyhow, in the same way that the mills in Bombay have been started by Europeans and are now being managed largely by Indians. I think there is a good deal of political bias against this, and European firms are not keen to invest their money, especially out in the jungle, where these things are wanted.

59456. Can you suggest any remedies to stimulate private enterprise in this respect?—I have pointed out in my note that one of their principal difficulties at present is the difficulty in realising their sale values, getting their money in. If co-operative societies became responsible for that, I think a good deal of the difficulty would vanish.

59457. That is so far as the sale of the implements is concerned. I am talking of the mechanical knowledge required for the manufacturing concern?—I do not know how you can encourage Indian firms with mechanical experience to make a start. I am not sure that they would not start automatically if co-operative societies were prepared to put down the money for the implements that they made.

59458. You state that agricultural officers have not the requisite agricultural and mechanical knowledge to alter or suggest new designs?—I do not say not to suggest new designs. I think they have not sufficient mechanical knowledge to understand the difficulties that are involved when they suggest changes. To alter the design of an implement ever so slightly means a great deal of additional cost in manufacture.

59459. Your statement is "The officers of the Agricultural Department are non-technical men who do not understand the manufacture side of the matter"?—Yes.

59460. Do you imply that there should be more mechanical people recruited in the Agricultural Department?—No; certainly not.

59461. *Professor Gangulee*: There is the Agricultural Engineer's department at Poona?—Yes, but it is not his job to design implements. That is a matter for the trade. The remedy for that, I think, is for the trade to send their own men to the country to study what is wanted.

59462. *Mr. Kamat*: It would not be worth while recruiting purely mechanical men to the Agricultural Department?—No: no firm will accept other people's designs. If they do, they will only lose money. It is one thing for a man to design a thing that he thinks is suitable, if he is not responsible for making it a profitable investment, and quite another thing if the man who designs it is responsible to his firm, to see that it pays.

59463. *Mr. Jamshed Mehta*: What is your exact position in the Barrage?—I am in charge of the Barrage Circle. I am in charge of the building of the Barrage and head works and the head of the largest canal.

59464. When, do you think, will the building of the Barrage be completed?—I have already stated that I believe it will be completed between 1931 and 1932.

59465. Did you have a hand in the designing of the Barrage?—I designed the whole of the Barrage and the canals.

59466. You suggest the building of some other barrages, and you say that it will be necessary within the next fifteen years?—They may be.

59467. When, do you think, ought Government to start with the actual schemes?—In my opinion, they should start an investigation of them at once.

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59468. Do you know whether Government is considering this subject?—No.

59469. Do you think a special department of engineers for making such schemes will be necessary, or do you think the present staff of irrigation engineers can do it?—We have always managed to do so hitherto.

59470. Have you got the staff at present?—If the question is whether we have sufficient men, then the answer is, no. In my opinion, we have not got sufficient men to carry on the works we have in hand. They are understaffed.

59471. Therefore, you would recommend additional staff for making these schemes for Sind, or do you want a separate department?—No. Additional staff is all that is required. We want additional staff for working the Barrage and the canals when they are completed.

59472. You have made some statements about water coming from Baluchistan and other places. Are these places within the limits of the Bombay Presidency?—No. They are outside. That would be a matter for arrangement.

59473. On page 90, you say that in the Punjab the modules have been successful?—Do I?

59474. You say "There is a number of successful modules in use in the Punjab"?—Yes, and on the Jamrao system in Sind.

59475. Did you hear of that success from the zamindars or from the officials?—I do not meet the Punjabi zamindars. I have very few opportunities of going to the Punjab. I do not meet the Punjabi zamindar except occasionally in Sind. I got it from the literature on the subject.

59476. Have you had any opportunity of getting the opinions of the Sind zamindars or landholders about modules? Are they in favour of it, and do they like it?—I believe the tail zamindars are very much in favour of it, because they hope to benefit by it, but the zamindars at the head are very much against it, because they feel that they will lose a share of the water that they now get unfairly. That is human nature.

59477. There is a suggestion made by one witness, an important witness of the zamindar class, that the distribution of water should be left to the zamindars. Do you agree with it?—It would be a very nice state of things for him if he is at the head.

59478. You just stated in answer to a question that, in your opinion, Lower Sind will not suffer by the Barrage?—Not appreciably.

59479. Is it upon your own investigation?—It is my own investigation. You will find it all recorded in the Barrage volumes.

59480. *Sir Thomas Middleton*: You have expressed an optimistic view about the future use of the tractor in Sind?—Yes.

59481. Do you not think that the character of your soil, the amount of fine sand present, will give you very great trouble in various parts?—It will, to a certain extent, but nothing more than any other machinery. I do not anticipate any serious difficulty from that. It is a difficulty undoubtedly, but you run trains through it.

59482. I happened to come across the work of tractors in a very sandy tract in England; there they had great trouble with wearing parts?—It is not insuperable.

59483. It is not insuperable, but it is very costly?—Yes, it will increase the cost to a certain extent.

59484. It would require specially designed bearings?—Probably yes. That can be done.

(The witness withdrew.)

**KHAN BAHADUR AZIMKHAN INAYATALIKHAN, Assistant
Registrar, Co-operative Societies in Sind.**

Replies to the Questionnaire.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(a) Demonstrations of improved methods of farming on the fields of cultivators carried on through organised bodies consisting of leading zamindars and cultivators who command confidence are found useful in improving the practice of the cultivators. I have some experience of agricultural propaganda work having remained as propaganda officer in certain talukas in Sind for the last four years in addition to my own duties as Assistant Registrar of Co-operative Societies. I am given two Agricultural Inspectors and six District Agricultural Overseers with whose help demonstration and propaganda work is being carried on. In my opinion the co-ordination of the Agricultural and Co-operative departments has been of much success in improving the state of cultivators. The research side of the Agricultural Department finds out the various seeds, implements and methods of farming that will be suitable for particular tracts and in order to introduce and give wide publicity to the improvements suggested, some organisation is necessary, and taluka development associations have been deemed to be the best media for materialising this idea. The associations consist of zamindars of the taluka as a whole, most of them being members of co-operative societies. An executive committee is elected each year, under whose control and guidance the work of propaganda and demonstration is carried out. The programme of the associations' work is framed each year in consultation with the expert advice of officers of the Agricultural Department. Each association maintains a depôt of seeds and implements wherefrom select seed is issued for cultivation, and implements issued both on hire and sale. The associations also maintain their own *kamgars* and supervisors who, under the advice and guidance of Agricultural Inspectors and Overseers, carry on demonstrations from village to village, on the fields of the agriculturists, of various implements and methods of farming. As far as possible the *kamgars* work the improved implements side by side with those previously in vogue and this carries home to the people a first-hand idea of the superiority of the new types of implements over the old ones. The following are some of the improved implements, seeds and methods of farming which have been found useful and command great appreciation:—

1. *Implements.*—Egyptian plough, Meston plough, Rajah plough, Chhattanooga plough, Monsoon plough and Screw water lift.

The Egyptian plough has now very largely replaced the primitive Sindhi plough in the propaganda area assigned to me. In design it is as simple as the Sindhi plough and can be manufactured locally, but its work is far superior specially in the soft soil. The Meston is an iron plough as cheap as the Egyptian but is fit for hard soil too.

2. *Seeds.*—27 W. N. cotton, Bhitshah cotton and Pusa 12 wheat.

3. *Methods of Farming.*—*Dry ploughing of land after harvest.*—(b) Experience has shown that whatever be the number of leaflets and pamphlets issued, lectures delivered, or even farm demonstrations held, the agriculturists do not so much appreciate or understand the improvements as they do when demonstrations are held on their own lands. Once they appreciate them they take to them with fullest fervour. I am reminded in this connection of one practical instance. One zamindar of Mirpur Mathelo taluka had some time back ploughed one survey No. of his with the Egyptian plough and sown Pusa 12 (a select variety of wheat) in it. Side by side with that plot he cultivated another plot, ploughed it with the Sindhi plough and used an ordinary variety of wheat seed in it. The contrast was remarkable. Not only were the *harris* or the zamindar himself impressed with the superiority of the modern lines of agriculture, but several zamindars and *harris* of the neighbouring villages too came to see

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the two plots. The cultivation of such comparative plots, being highly successful and instructive, is deserving of every encouragement and the various taluka development associations have now concentrated their attention on it.

(c) An expert must try first to win the confidence of the people before people will abide by his advice. Further, I may be permitted to add that expert advice when conveyed through organised bodies like the taluka development association is likely to be followed and taken in more easily and rapidly than through direct communication with the individual agriculturists.

QUESTION 5.—FINANCE. (a) To meet the needs of the agriculturists, co-operative societies are the best organisations. They ought therefore to be developed in the areas where they already exist and introduced where they do not. In Sind such societies have been meeting the current needs of the members fairly satisfactorily as the district Central Banks which finance them have sufficient funds at their disposal. To meet the needs of big zamindars whose needs cannot be satisfied by the ordinary credit societies, zamindari co-operative banks have been introduced in three districts in Sind which finance individual zamindars upto Rs. 5,000 per head. As for big land improvement schemes or redemption of old debts long term loans are necessary and they could be negotiated through land mortgage banks. Steps are therefore very necessary for the organisation of such banks with powers to issue debentures. In Sind there are several big zamindars who have heavy old debts to pay and the land mortgage banks will be specially suited to redeem such zamindars as also to finance big schemes of land improvement. The third kind of agricultural finance is the Government *taccavi* grant. In my opinion such grants may be given only for land improvement schemes in the tracts covered by co-operative societies, through societies. In places however where co-operative societies do not yet exist the Government *taccavi* grants may be continued for current agricultural operations as well.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(a) (i) The main causes of borrowing in my opinion are:—

1. The debts inherited by the agriculturists from their forefathers.
2. General illiteracy and want of business capacity of the village agriculturists. These contribute towards their perpetual indebtedness and thralldom as they cannot check their personal accounts with the banias nor can they get adequate prices for their produce.
3. Heavy rates of interest which the agriculturists are required to pay to the usurers.
4. Their extravagant ceremonial expenses. The Sindhi zamindars are well known for their marriage and other ceremonial expenses which cost them much. Moreover their hospitality is proverbial.
5. Uncertain income due to uncertain and oftentimes inadequate water supply. There being practically little monsoon in Sind, cultivation depends largely on the caprices of river Indus.

(ii) The sources of credit may mainly be enumerated as under:—

1. The village *sowcar*.
2. Co-operative societies.
3. Government *taccavi* grants.
4. Sometimes the agriculturists contract forward sales and get advances from *sethias*.

(iii) The chief causes which prevent agriculturists from repaying their loans punctually are the failure of crops owing to absence of monsoon, uncertain water supply of the river and adverse winds. The agriculturists in Sind hardly get a good crop once in three or four years. Moreover, whatever yield they get does not bring them an adequate return as, at harvest time, the prices are found generally at an ebb. Nor have the agriculturists in their turn the means or the adequate business capacity to hold back their produce till better prices are attainable.

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The agriculturists are generally simple and honest folk and good paymasters so long as they have money. But the causes enumerated above make it oftentimes very hard for them to repay their loans punctually, much to the detriment of their outside credit.

(b) Some of the remedies against agricultural indebtedness have already been indicated in stating the causes therefor. While very facile credit is the agriculturists' bane, it ought to be remembered that productive debt is by no means an evil.

Among others, the following remedies will go a great way to remove agricultural indebtedness:—

1. Formation of co-operative credit societies and land mortgage banks.
2. Organisation of purchase and sale societies to supply the agriculturists with their daily requisites as also to obtain better prices for their produce, and improve market conditions.
3. Inducement to the agriculturists to employ their spare time usefully, e.g., in cottage industries, etc.

(c) In Sind owing to the enforcement of the Deccan Agriculturists' Relief Act and the Sind Encumbered Estates Act the credit of agriculturists has fallen considerably with the sowcars and they do not therefore generally advance cash loans to them except by obtaining out right sale deeds executed by them for land worth several times the value of the loans advanced. An oral agreement however exists between the parties that the land will be restored to the borrower if the loan is repaid within a certain period. Experience has shown that the properties thus sold are seldom restored to the original owners. To prevent this the enforcement of the Land Alienation Act to Sind appears very necessary. This will enable the agriculturists to retain possession of their land and if at all they are inclined to raise money by selling it they will at least get the prevailing market rate, from the agriculturists who alone will be entitled to purchase it.

I am strongly of opinion that non-terminable mortgages should at once be stopped.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(a) On an average, the cultivator generally works from April to December on his fields. During the slack season the good agriculturist generally engages in dry ploughing, carrying produce to the market for sale, clearing water-courses, collecting manure, etc., but most of them remain idle. Those who have a good number of cattle are engaged in rearing them, and disposing of milk, butter and ghi.

(b) The Sindhi agriculturist is rather averse to adopt any industry other than that connected with agriculture. He is very fond of cattle-rearing and cattle-breeding, but this industry cannot be pushed on any extensive scale on account of want of pasture lands. There are some people whose only avocation is cattle-rearing and they, in the absence of pasture lands, move about from place to place in search of such grounds. If such pasturages were provided in convenient places, it would be easy for the cultivator to take more interest in cattle-breeding as a subsidiary occupation.

Poultry and dairy farming are two other forms of subsidiary occupation which appeal to the Sindhi agriculturists and they will take to them with great zeal and fervour if steps are taken to run them on modern methods and provide adequate transport arrangements for the produce.

(c) The chief obstacle in the expansion of the subsidiary industries referred to in Sind is that the Sindhi zamindar generally considers it derogatory to do any manual work not connected directly with agriculture. Moreover he is rather apathetic by nature and does not easily make up his mind to employ his leisure time usefully and profitably. It requires therefore some propaganda to induce him to action.

(e) I would very much advocate the establishment of industrial concerns in rural areas. This has the advantage of removing congestion in big

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towns and distributing population between towns, cities and villages in a more rational proportion. Government can prohibit establishment of more factories in big towns on grounds of sanitation, etc., and attract them to rural areas by grant of concessional plots to them and providing easier facilities for water, etc. The factories cannot have permanent labour in the *mofussil* as there is already shortage of labour in Sind, but the leisure time of the agriculturists could very usefully be employed by the proposed arrangement.

(f) The idea is well worth giving a trial.

(h) The best way to induce the village people to devote their spare time to village sanitation is by requiring in the first instance the Sanitary Department to depute their inspectors to deliver lectures as to the precautions to be taken against malaria, influenza, pneumonia and other common diseases. The advantage of quinine against malaria should be brought home to the people. Magic lantern shows may be organised, wherein the people may be shown what dangers there are in allowing unhealthy tanks and pools round about the villages, as they are the breeding places of mosquitoes. How to fill up such tanks, how to purify wells, where and how to dispose of the filth and refuse of the village, should be some of the chief subjects on which lectures should be delivered. When such ideas of sanitation are well rooted in the agriculturists they will of their own accord form their village committees to look after proper sanitation in the village in their spare hours.

QUESTION 18.—AGRICULTURAL LABOUR.—(a) (i) The Province is sparsely populated and the area of arable soil is very vast. Naturally, therefore there is a cry of general deficiency of labour. Fortunately, however, Sind is bounded all round by dry tracts such as Cutch, Marwar and Baluchistan where rainfall is generally scanty. The people inhabiting these tracts therefore migrate to Sind in search of labour and thus make up for the local deficiency. When these tracts, however, get plentiful rains and the migratory tribes return to their hills and plains for cultivation, some difficulty is experienced on account of shortage of labour.

(ii) As stated above, Sind possesses cultivable area far in excess of the population available in the country to cultivate it. Besides, irrigational facilities are not available for cultivation of the whole of the arable soil. There is, moreover, shortage of labour even for the occupied cultivable area. People, therefore, carry on extensive cultivation of crops by rotation. The remedy seems to be in the permanent migration of the tribal labour from the bordering countries and the following measures might succeed in securing it:—

1. Grant of liberal terms of *batai*.
2. Humane and equitable treatment on the part of the landlords towards the labourers.
3. Grant of facilities to labourers to get village sites and water arrangements.
4. Grant of small holdings to selected labourers to settle down as peasant proprietors.

(b) In Sind, the shortage of labour is due to the fact that there is generally little monsoon and cultivation is carried on on the river water only, which too is very uncertain. During the last three or four decades irrigational facilities have been considerably improved and large areas rendered fit for cultivation. On the other hand, there has been no commensurate increase in the labour. This accounts for the shortage of labour in the Province.

The remedies to meet the shortage have already been suggested in paragraph a (ii) above, viz., inducing the migration of the bordering tribes.

(c) The question does not arise in Sind at all as there is no surplus agricultural labour.

QUESTION 20.—MARKETING.—(a) and (b) The present marketing system in Sind is defective, specially as regards cotton which is the chief commercial product in Sind.

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There are no regular markets for cotton to which it could be carried and sold. Cotton-ginning factories are situated in some of the important cotton centres. The owners of such factories appoint agents in big villages and the agents in their turn appoint sub-agents who are generally the local village *sowcars*. Daily quotations of cotton are communicated by the factory owners to their agents and the agents in their turn arrange to communicate them to the sub-agents. Owing, however, to lack of proper postal and telegraphic arrangements in the *mofussil*, the village sub-agents cannot get quotations daily but they do get them every third or fourth day. The village zamindars effect transactions of cotton with the village *sowcars* who generally do not quote the proper market rates. The agriculturist is thus at the mercy of the village *sowcar* so far as the rates of cotton are concerned. In weight also he is at his mercy as the *sowcar* does not generally use true weights.

The factory owners make their own transport arrangements for the transport of cotton from the fields to their godowns and, after ginning and pressing, send on the pressed bales to the big firms at Karachi who in their turn arrange for shipment of the bales to the proper destination.

The present arrangement is defective from the following main stand-points:—

1. That the producer does not get adequate price or weight of his produce.
2. There being too many middlemen, *e.g.*, the village *sowcars*, agents of factories, the factory owners themselves and the intermediate firms at Karachi, the actual cost to the consumer is very heavy as each middleman charges his own percentage of commission.
3. The factory owners gin and bale cotton generally without sorting or grading it and so, except in rare instances, no premium is given to the cultivators who grows a superior variety. There is, therefore, no inducement to the cultivators to grow select varieties of cotton.

To meet the above difficulties, I would in the first instance suggest that the Government may provide means whereby daily quotations of cotton, market conditions and general information regarding cotton may be made available to the cultivator. The other difficulties, *e.g.*, of proper weights, etc., will, in my opinion, be well solved after the Marketing Bill is passed and comes into operation as a regular Act.

QUESTION 22.—CO-OPERATION.—(a) (i) The co-operative movement is primarily the people's movement and as such all attempts for its expansion and development should legitimately be expected to emanate from the people, the function of Government being mainly to arrange for audit and to see that no infringement or violation of the Act and rules takes place. Commensurate with the growth of the movement should, therefore, be the strength of the Government staff for the above functions. As regards propaganda, supervision and development, I would submit that till the Co-operative Institute and other non-official bodies are able to gather sufficient strength, the official and honorary staff should be adequately maintained. Honorary organisers are non-official gentlemen, recruited generally from the agricultural class, and as such command much confidence of the people. While, therefore, they are required for a long time still to educate the people in the principles of co-operation and management of primary credit societies in the tracts already covered by the movement, their need is far greater for the formation and development of similar societies in tracts where co-operation has not yet set its foot.

As regards agricultural non-credit societies, they require much business capacity and experience to make them successful. With a view to encourage their growth and development, a special propaganda officer is necessary who, after studying the local economic conditions, should be able to furnish advice and opinion how these institutions may be run successfully. The feasibility of entertaining special propaganda officers for non-credit societies should receive sympathetic consideration from Government.

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(ii) The Central Co-operative Institute, Bombay, and its branches are the best non-official bodies which could carry on the work of propaganda and development of the co-operative movement. They should, therefore, enrol more members and collect more funds to be really able to execute the legitimate portion of their duties. Government might also subsidise them adequately to enable them to play their part well.

Taluka development associations and supervising unions are also non-official bodies which can and do play an important part towards the growth and development of the movement. These institutions also deserve sympathy and encouragement.

(b) *Observations on credit societies.*—(i) The growth of primary credit societies in Sind has been fairly satisfactory. In 1918 when the Province of Sind was placed in charge of the Registrar, Co-operative Societies, Bombay Presidency, and a separate Assistant Registrar appointed for it, there were only sixty-three simple credit societies with a membership of nearly 3,000 and a working capital of 1½ lakhs. To-day there are over 900 co-operative societies with a membership of nearly 40,000 and a working capital of nearly 1½ crores. These societies are fully satisfying the needs of their members so far they relate to their current agricultural requirements. Some of the societies have gone still further and have (out of their own resources) redeemed the old debts of some of their members and finance them also for small land improvements. With such adequate finance the agriculturists have in several villages severed their connections altogether with the moneylenders. They have effected improvements in cultivation and increased both the area under cultivation as also the yield of the land. Some have, partly with their own savings and partly by raising loans from societies, purchased new lands also. In short, a distinct change for the better is visible in the life of the agriculturists where co-operative societies have been established.

In the beginning, co-operative credit societies were confined only to *khatedars* (persons actually holding lands) but subsequently it was found that the *hari* (tenant at will) also stood in as much need of finance as the landlord. Gradually, therefore, steps were taken to enlist *haris* also into societies. For getting loans, however, they are invariably required to furnish, as sureties, only such of the members as are actual holders of land.

The maximum lending limit in primary credit societies being rather low for large landholders, steps have been taken to organise zamindari banks on the same credit principles but while simple societies can lend money only up to Rs. 500 in the ordinary course and Rs. 1,000 with the special sanction of the Registrar, the zamindari banks can advance loans to individual zamindars up to Rs. 5,000. Three institutions of this kind have so far been established and are working satisfactorily. They have gone a great way to meet the requirements of big zamindars and as such have become very popular with them.

(ii) *Purchase societies.*—There are a few seed and supply societies in Sind, but, in my opinion, they could be run better if their area of operations were widened and if they were supplied with seeds, implements and other agricultural requisites from some big central agency. For this, special Government facilities are required, e.g., half the cost of running expenses may be borne by Government for the first five years and one-fourth for the next five. Free advice of Government specialists on the technical side of the business should also be afforded.

(iii) *Sale Societies.*—Whatever arrangement may be made to provide adequate and cheap credit to the agriculturists, or select seed, manures and implements, experience has shown that they do not stand to gain much by them unless and until arrangements are made for the disposal of their produce at proper rates. On account of the tricks of the middlemen in rates, weighments, etc., the agriculturists do not realise fair prices for the produce. Through co-operative sale societies they get proper rates, prices and true weighments. Besides, if at harvest time there is a slump in the market on account of the rings formed by the *sowcars*, the sale societies advance about three-fourth of the value of the grain deposited with them

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to the agriculturists for their needs and dispose of the grain when favourable prices are restored. In the absence of co-operative sale organisations, the produce is purchased by the village *sowcars* who do not generally make full payment for the whole quantity purchased. They pay the amount piecemeal. Moreover, in several instances the *sowcars* adjust the produce towards the old debts of the agriculturists. By selling through sale societies prompt and full payment is ensured. There are, however, difficulties peculiar to Sind in the working of cotton sale societies, e.g.—

1. The big merchants generally contract forward sales with the agriculturists and grant advances. Produce must therefore go to them. The sale societies cannot undertake this speculative sort of business.

2. Again there are transport difficulties. The agriculturists generally do not carry their produce to the central places for sale. They sell on the spot to the agents of factory owners who make their own transport arrangements. The sale societies in their turn find it difficult to do so in the beginning.

3. Before entrusting the produce to sale societies the agriculturists insist on immediate settlement of the rates, and co-operative sale organisations cannot offer quotations before getting the produce and actually disposing it of.

The Marketing Bill on the table of the Bombay Legislative Council might to some extent meet the difficulties but a special Government officer for non-credit work is, in my opinion, very necessary for organising and developing the sale societies.

Oral Evidence.

59485. *The Chairman:* Khan Bahadur Azimkhan, you are Assistant Registrar of Co-operative Societies in Sind?—Yes.

59486. The Commission has before it your note of evidence, which we have had an opportunity of reading. Do you wish at this stage to add anything to that statement, or may we ask you a few questions?—You may ask questions.

59487. I think you have been Assistant Registrar of Co-operative Societies in Sind since 1918?—Yes.

59488. So that, you have witnessed a very considerable progress of the co-operative movement in Sind?—Yes.

59489. Would you tell the Commission what is your experience and your training in co-operation generally prior to 1918?—I had inspected societies in Sind when I had taken over charge, and they were on the deposit system. People had to deposit Rs. 5 once and they became members. There was no principle of thrift.

59490. What I really want to get from you is whether you had seen any co-operative work in other parts of India or elsewhere?—When I was appointed, I was deputed to study co-operation in the Bombay Presidency, the Punjab and other parts.

59491. You made a tour?—Yes. I toured for about three months in the Presidency and in the Punjab.

59492. Did you find that valuable?—It was of very great value. It helped me a great deal in organising societies here.

59493. On page 108, you have given us a statement of the progress of the movement. The growth of primary credit societies in Sind is fairly satisfactory?—Yes.

59494. There were only 63 primary credit societies in 1918, and to-day there are 900?—Over 900.

59495. Can you give the Commission any idea as to how many societies have been closed down owing to their being in an unsatisfactory state?—About 15.

59496. What is your policy; to close down where things are unsatisfactory, or leave them alone?—We close down when there is mismanagement, and when the people are found to be heavily in arrears.

59497. Do you find that the individual co-operator in Sind understands the principles of co-operation?—Yes; generally.

59498. How has he learnt those principles?—We have been holding conferences annually in every district, and there are the training classes for managing committee members and secretaries.

59499. You hold conferences in districts?—Yes. There are the training classes for managing committee members and secretaries. Then there are the honorary organisers who go about from village to village and explain the principles of co-operation to the members of the managing committees and other members in general. Then there are the auditors and myself. All of us meet the people and explain to them the principles. The societies that have been in existence for more than three years are now doing well, and the members know their business and principles very well.

59500. You have a centralised meeting for all Sind?—Yes, we have got a Co-operative Institute for Sind, with headquarters at Hyderabad, which organises centralised meetings.

59501. You hold an annual conference?—Yes. Such conferences are held under the auspices of the Institute.

59502. That is something quite different from the district conferences that you have told us about?—Yes.

59503. In what language are the district conferences conducted?—In the vernacular, Sindhi.

59504. Is the meeting at which representatives from all Sind gather together conducted in the vernacular?—Yes. In the district conferences

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the representatives of all the societies of the district attend; in divisional conferences, representatives of all the districts attend.

59505. The business is conducted in the vernacular?—Yes.

59506. Are you satisfied with the working of the Central Banks?—They are doing very good work.

59507. How many Central Banks are there?—Six.

59508. How about the audit? Are you satisfied with your audit?—Yes. Audit of every society is conducted every year by the Government auditor, and for the banks a special auditor comes from Bombay.

59509. How long a time does it take for your auditor to audit the books of primary societies?—Two or three days.

59510. Is that not going pretty fast?—No. It is quite enough, because in the village societies the transactions are very small.

59511. Your experience has been that when you get outside the credit purpose, there is some difficulty in obtaining management?—Yes.

59512. Is it your general policy rather to extend on the credit side than to make experiments on the side of sale?—After establishing credit, in one area we have organised four sale societies. Two of them are doing fairly well and two are yet new. But we have difficulties in organising such societies, which I have stated in my note.

59513. I think the link between the co-operative movement and the Agricultural Department in Sind is very close?—Yes.

59514. And you yourself have worked hard at recommending agricultural improvements when you have been going round, quite apart from your work in connection with the co-operative movement?—I have been doing agricultural propaganda work in addition to co-operation.

59515. Is the co-operative movement in Sind distributing any seed?—Yes, there are the taluka development associations which have been distributing seed.

59516. But that is through the taluka development associations?—Yes.

59517. There is no co-operation?—They are registered under the Co-operative Societies Act.

59518. Are they registered as co-operative societies?—Yes.

59519. All of them?—All of them in Sind.

59520. Are they credit societies?—They are not credit societies.

59521. Are they better farming societies?—Yes, they are similar institutions. There are three functions that they are doing. In fact, the aim of the taluka development associations is an all-round development of agriculture and the general amelioration of the condition of the agriculturists. First they develop agriculture, and then co-operation. They have many other activities also. As regards agriculture, I have given full details in my note. They have each a trained *kamgar* who goes from village to village, and demonstrates on the fields of the cultivators modern implements side by side with the local ones, and proves to the people the superiority of the modern implements. For co-operation they entertain a supervisor who inspects all the societies in the taluka and trains secretaries and managing committee members. He places the inspection memorandum before the managing committee of the association, and in that way they have been helping co-operation. There are other activities also which they perform in addition to this. They ventilate the grievances of the agriculturists. On the representation of associations, several silted canals have been cleared, water facilities have, in some cases, been afforded to people, inconveniences have been enquired into and remedied, and forest facilities offered. Besides this, they have been distributing quinine free. These are the things that most of them are doing.

59522. How are these taluka development associations, when they are co-operative societies, organised? Have they any capital?—Yes. Each ordinary member has to pay one or two rupees. There are two classes of ordinary members, paying one rupee and two rupees; a life member pays

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Rs. 25, and patrons pay Rs. 200. In these associations there are a good number of life members and ordinary members. Government also gives them a subsidy, equal to the amount of expenditure, subject to a maximum of Rs. 1,000.

59523. Is any work of this nature being carried on in districts where there is no taluka development association at work?—I was given eleven talukas for intensive agricultural propaganda work, and I organised taluka development associations in them, in order to carry on agricultural propaganda work through them; but in other places we have supervising unions who have supervisors, and they too have been carrying on the same work, to some extent. Beyond these there is no other agency.

59524. Are there any taluka development associations which are not co-operative societies?—No. All of them are registered as co-operative societies.

59525. In answer to Question 6 (iii), you say that the cultivators do not hold up their crops in hopes of obtaining a better market. Is that due to lack of marketing credit?—They stand in need of money at the time of the harvest.

59526. That is it. They lack marketing credit?—Yes.

59527. They cannot hold the crop?—No, they cannot hold the crop generally.

59528. Is any wood for fuel grown co-operatively in any district?—No.

59529. Have you interested yourself in the improvement of the breeds of animals?—No, at present we concentrate our attention on credit, but we are going to non-credit also; we have started some non-credit societies.

59530. Are the taluka development associations taking any interest in animal husbandry?—No.

59531. They interest themselves only in cultivation?—Only in cultivation.

59532. Not at all in animals, improving breeds or improving the practice of looking after animals?—They are considering it.

59533. When was the first taluka development association founded?—About four years ago.

59534. So that they are quite young?—Yes.

59535. What about your cotton sale societies; are they doing well?—We have no cotton sale societies in Sind; we propose to start them as early as possible.

59536. Have you considered, at all, the advisability of forming cotton salt societies?—Yes, we are thinking of starting some.

59537. What about management?—For that we will have to secure competent managers. The Sind Central Co-operative Bank has appointed an officer and deputed him to go to the Presidency to see how the sale societies are being run there; after he returns from the Presidency we will make a beginning here.

59538. What exactly is your staff?—I have got one auditor for every district (in all six), one Deputy Assistant Registrar whose post has been in existence for the last four years in order to relieve me to do agricultural propaganda work; besides these, there are honorary organisers.

59539. How many honorary organisers have you?—About sixteen district honorary organisers.

59540. Do you think they are enthusiastic; are they doing good work?—Yes.

59541. Is the movement guided mainly by officials?—No, by non-officials.

59542. Mainly by non-officials?—Yes. In the beginning, the movement was initiated by the department and societies were organised by it; but later on the work was given to honorary organisers; and then came the Co-operative Institute which has taken up the work of organisation and supervision to some extent.

59543. Do you find that many of your primary credit society members borrow from the society and also borrow from the *soucar*?—Among members

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of those societies which have been in existence for more than three years, there is hardly any member who borrows from the *sowcar*. In the case of new societies which have been in existence only for one or two years, the members generally borrow from both the *sowcar* and the society in the beginning. But I do not know of any society of three years' standing whose members borrow from the *sowcar*.

59544. Have many societies financed their members' debts?—Yes. Small debts have been liquidated by many societies; in some cases the Central Banks have also advanced loans to them for that purpose.

59545. To individuals?—To individuals through the societies, to liquidate old debts. And I think members of a good many societies are now free from debt, but there is still a large number of members who require long term loans.

59546. When a Central Bank makes a loan for the liquidation of a member's loan, what form does the loan take?—Debt redemption loans; they are long-term loans.

59547. For ten years?—For five years, generally.

59548. Secured on mortgage?—Yes. The old mortgages are redeemed, and loans are advanced on the mortgage of the land of the borrower.

59549. Do you think that the activities of the co-operative credit societies have yet had any influence on the rate of interest charged by the *sowcar*?—Yes; I think the rate of interest in areas in which co-operation has developed has been brought down to a certain extent.

59550. What, in your judgment, is the principal factor which tends, in Sind, to prevent the more rapid spread of co-operative credit?—It is the illiteracy of the people.

59551. Do village feuds tend to prevent the growth of village societies?—No. We have generally few big villages; we have many hamlets. In places where co-operation has developed, I think village feuds have been brought under.

59552. You group hamlets together?—Yes.

59553. *Sir James MacKenna*: Do you find repayment of loans regular?—Mostly regular in Sind.

59554. And as soon as a loan has been repaid, do you issue a similar or a larger amount on the same day?—Not on the same day; after some time, when the normal credit statement is prepared the amount is given according to the agriculturist's requirements.

59555. Has there been a marked improvement in the quality of societies during the last nine years; are the societies registered in 1918 on a better footing now than they were in 1918?—Yes; they have accumulated very large share capital and also reserve funds, and they are in a flourishing condition generally.

59556. Have they got their own capital?—Yes; they borrow from the banks, and they have their own capital as well.

59557. And reserve funds?—And reserve too.

59558. Who are the guiding spirits of your societies as a rule?—The members of the managing committee.

59559. Who is the secretary as a rule?—He is an agriculturist generally.

59560. Not a schoolmaster?—Sometimes, when we are not able to find any agriculturist as secretary, then a schoolmaster is selected, but generally we have agriculturists as secretaries.

59561. And you find that the agriculturist secretaries have got sufficient education to keep accounts and books?—Yes.

59532. What sort of education have they; 4th standard?—4th, 5th or 6th standard.

59563. *Professor Gangulee*: You state that the taluka development associations are registered under the Co-operative Act. Under what classification are they put down?—They are non-credit societies.

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59564. You say that the executive of the taluka development association is elected every year. Could you tell us how they are elected?—They are elected, as managing committee members of other bodies are elected, by the general body.

59565. One man one vote?—Yes.

59566. Who are the members of the taluka development associations?—The zamindars and the people of the taluka, most of whom are members of co-operative societies.

59567. Is there any *hari* (cultivator) as member?—Yes.

59568. He has the same number of votes as the zamindar?—Yes, everyone has got one vote.

59569. You described the taluka development associations and you told us, in brief, their programme of work. Do you find that they have developed a spirit of self-help?—Yes, a good deal; in fact, the propaganda work is being carried on by them; they have got their own establishment, and the associations which have been in existence for the last three years have been doing work independently.

59570. With the Government subsidy of Rs. 1,000?—Yes; they get half of their expenditure subject to a maximum of Rs. 1,000.

59571. Do you think that for extending their activities the taluka development associations require more money?—No; I do not think so; what they get is quite enough. I know that in the Presidency they have asked for more than Rs. 1,000 and Government have given the same to them; but I think the funds in Sind are quite adequate to meet the expenditure.

59572. Turning to the co-operative movement, before you form a primary society do you undertake a preliminary survey of the area in which the society is going to be established?—The work of organisation is being done by honorary organisers nowadays. They go to the place see the people, explain to them the objects of societies and ask them to see the working of neighbouring societies and so on. Sometimes they have to go twice or thrice. They see whether a good chairman and a secretary are available and whether good managing committee members can be got to conduct the work. Then they hold an enquiry into the needs of the people, etc., and make a report to us; we examine the papers and submit them to the Registrar.

59573. Who are the members of the primary societies; landlords or *haris*?—Both zamindars and *haris*.

59574. Both belong to the same society?—Yes. But, as I have stated, for big zamindars we have organised a few zamindari banks and zamindars who pay an assessment of Rs. 500, and more can become members and get a loan up to the maximum of Rs. 5,000. At present we have organised only three such institutions, one in Thar Parkar, one in Larkana and the third one in Shikarpur.

59575. Could you tell us what proportion the membership of *haris* bears to the membership of the zamindars in the best organised of your primary societies?—In Thar Parkar district more than half are *haris*, and in the Hyderabad district, where the number of small holders is larger, we have got a larger number of *khatedars* as members.

59576. You told us that the members of the societies understood the principle of co-operation; do you find those members acquiring the virtue of thrift?—Yes. Every member is required to invest in the shares of the society a certain amount every year; the very fact that they have invested more than they are bound to invest and that the share capital has reached in several societies up to Rs. 4,000 or Rs. 5,000 shows that they have understood that principle. Each member as a rule is subscribing in shares ten rupees in the first year, twenty rupees in the second year, fifty rupees in the third year, and so on, quite voluntarily.

59577. You explained to us that loans are sanctioned for redeeming old debts; for what other purposes are loans sanctioned?—For small land improvement schemes, for seeds, for manure and for all current needs.

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59578. Supposing a member borrows from the society Rs. 500 for land improvement, but spends out of that three hundred rupees on a marriage ceremony, is there any check?—Yes. In the case of land improvement loans, a great check is exercised by the managing committee.

59579. But how do you do that?—The managing committee is required to see to that.

59580. *Sir Chunilal Mehta*: Will you please explain yourself a little more clearly?—In the case of land improvement loans special care is taken to see that money that is given for land improvement is devoted to that purpose only. Even in the case of loans for current needs, the managing committee are required to see that every member uses the loan for the purpose for which it is taken.

59581. *Mr. Calvert*: Suppose a man takes Rs. 500 for land improvement, and instead of spending that loan on land improvement spends it on the marriage of his daughter, what happens then; that is the question?—I know of no such instances. Under our rules and practice the managing committee is required to see to it and they do keep a vigilant watch over the proper use of loans.

59582. *Sir Chunilal Mehta*: You said that you knew of no such instance. In the case of loans for land improvement the managing committee is perhaps capable of seeing how far the money has been used for the purpose for which it is taken. I suppose loans are taken also for current needs. You know that in Sind you can take loans up to a maximum of Rs. 1,000. Supposing one-third of the loan is used for purposes which are not current needs of agriculture, then what is the result? If the managing committee find out that the member has misused the money in this way, what happens?—We recall the money.

59583. That is all; there is no other punishment?—No. The movement was in its infancy, and no punishment was given.

59584. And now?—Now, there is a strict watch which is effective and has given good results.

59585. How do you keep a strict watch?—Through the managing committee.

59586. *Professor Gangulee*: Is there any limit to the maximum amount of loan admissible to a member?—Ordinarily Rs. 500 is the limit, but with the sanction of the Registrar loans up to Rs. 1,000 may be advanced.

59587. You state that in Sind owing to the enforcement of the Deccan Agriculturists' Relief Act and the Encumbered Estates Act the credit of agriculturists has fallen considerably with the *sowcar*. Can you explain that?—The Manager, Encumbered Estates, has power to cancel mortgages and take possession of the land. What happens as a result is that the village *sowcar* nowadays gives only seed, grain and provision to the zamindar on credit but no cash. Cash is given in the case of big and influential zamindars only, but to ordinary zamindars the *sowcar* refuses to give cash loans except on outright sale of land.

59588. Is it your view that the Deccan Agriculturists' Relief Act and the Encumbered Estates Act have functioned successfully in Sind?—Yes, they have.

59589. You say the enforcement of a Land Alienation Act in Sind appears very necessary. What is your reason for holding this view?—Because, at present, on account of the Deccan Agriculturists' Relief Act and the Encumbered Estates Act, outright sale deeds are executed, and in most cases the land is not returned to the zamindars. If the Land Alienation Act is passed, the land, if sold, will go only to agriculturists who will pay the market price for it at least. As I have said, it now goes at less than the market rate.

59590. Are you familiar with the Punjab conditions? You visited the Punjab; did you not?—I visited the Punjab for only a short period.

59591. Do you know how the Land Alienation Act works there?—I heard from people there that it was working very well.

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59592. Do you think that the conditions in Sind are similar to those of the Punjab?—I do not know exactly, but as this Province is a neighbouring Province, the conditions should to a certain extent be similar.

59593. The point is, do the conditions which compelled the Punjab administrators to pass the Land Alienation Act exist in Sind so as to justify the enactment of such legislation for Sind?—In my opinion, on account of the existence of the Deccan Agriculturists' Relief Act and the Encumbered Estates Act, it is more necessary here.

59594. As regards labour, you speak of humane and equitable treatment by the landholders of their *haris*; what is the position now?—The zamindars take hard work from the *haris* and do not treat them well in some cases.

59595. Have many instances of such treatment come to your notice?—At least some.

59596. Are these *haris* who are badly treated members of co-operative societies?—Not necessarily.

59597. *The Chairman*: Is the *hari* able to treat the zamindar badly?—Yes, at times the *hari* runs away with the zamindar's money.

59598. *Professor Gangulee*: He cannot run away very far; can he? You are familiar with the Cotton Markets Bill in Bombay. Do you think that Bill will answer your purpose?—Yes.

59599. You say that the co-operative movement is primarily the people's movement in Sind. Most of the people are *haris* (cultivators); are they not?—Yes; but there are also many zamindars.

59600. But the *haris* predominate?—Yet the land belongs to the zamindar.

59601. Yes; the people are the *haris*. I suggest that it is not primarily a people's movement because the demand for co-operative societies did not originate from the *haris*?—In fact the *haris* are in greater need of credit than the zamindars and they have also joined the movement.

59602. Do you think the co-operative movement was of great use in the recent flood relief work?—Yes. Soon after the floods the Central Banks sent down their inspectors and other officers to enquire into the details of damages, and they advanced loans to members of societies. At the end of August about two lakhs were distributed.

59603. These two lakhs were distributed through the co-operative societies?—Yes, through the co-operative societies to members of co-operative societies. Now, we have under contemplation the formation of housing societies for those people whose houses have been damaged or demolished. We have already organised about ten societies, and I think before the end of November we shall organise societies in about thirty villages more.

59604. You said that the co-operative movement is primarily a people's movement; may I ask you whether the communal poison has entered into this movement?—No, not so far.

59605. *Mr. Kamat*: You have been working as propaganda officer for two years, combining the two posts of Assistant Registrar of Co-operative Societies and Agricultural Propaganda Officer. Do you think this arrangement is suitable for large areas? How many do you manage at present?—At present I am managing eleven talukas.

59606. Without any detriment to the co-operative movement?—Yes, because I have been given one deputy who relieves me of my co-operative work to a certain extent. I have put him in charge of two districts, and four districts I have taken over myself.

59607. If that deputy were not given to you, as combined Propaganda Officer and Assistant Registrar how many talukas would you be able to manage?—I think three or four talukas.

59608. Have you any agricultural training?—No. I have been given a staff of agricultural experts, graduates, who have been carrying on the work.

59609. But in your own capacity as Agricultural Propaganda Officer you have no knowledge of technical questions?—No knowledge of technical

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questions; but here we have to propagate only a few things: pure seeds to be distributed, modern implements to be popularised and modern methods to be adopted; so, in consultation with the agricultural officers, the work is done through the taluka development associations; I simply help them in the work.

59610. Has this system been tried in other parts of the Presidency to your knowledge?—No, I do not think so.

59611. Is this the first example in Sind?—Yes.

59612. And you think it can work satisfactorily?—It has worked satisfactorily.

59613. From your own point of view?—Yes. The Agricultural Department have also appreciated it.

59614. With regard to the taluka development associations, on an average, how many villages in the taluka have you here in this part of the country to look after?—We have got *dehs* consisting of hamlets and villages; there are about fifty to sixty *dehs* in a taluka consisting of several hundreds of hamlets and villages; sometimes a *deh* consists of even ten or fifteen hamlets.

59615. You are counting it in terms of *dehs*; I am trying to find out how many taluka development associations would be really necessary for a taluka: whether one or two?—One I think is quite enough.

59616. One would be quite able to cope with the work of all the villages concerned?—Yes; they can appoint more *kamgars* if they find it necessary.

59617. Take a concrete case and tell me how many villages that particular taluka has and with how many of those villages your has association come into contact?—As a matter of fact, all the associations have visited all the *dehs* in the taluka within these three or four years.

59618. That does not mean much. You mean to say that each village has been visited on one day out of the 365 days? Will you make your statement clearer. I want to know whether each village has received your attention sufficiently in regard to propaganda so as to make your work effective?—Yes.

59619. Now take any particular village and tell me how many days you work there?—We can take in the Hyderabad taluka, the Hatri group. The taluka is divided into groups; there are four groups in the taluka. In each group, of course, in the beginning I spent about ten or fifteen days, and then again after two or three months I went there and spent about five or six days. In that way three times at least in a year I have been going there.

59620. I have not yet received an answer to my question. Take a particular village. On how many days or how many times has that village received your attention?—I say from time to time, not at one time.

59621. Never mind that. Take any village in Hyderabad taluka; which one have you in mind?—Hatri.

59622. How many days could you pay attention to that village, say in one year, or in two years or four years?—I do not remember exactly the number of days, but I have been there several times a year and the work is actually carried on by the agricultural experts under the control and guidance of the taluka development association's committee; I simply help them, draw up a programme for them and see how they have been working.

59623. In short, each village gets sufficient attention from your *kamgars* in a steady continuous manner so as to make the work effective; is that it?—Yes.

59624. With regard to these demonstration plots, you have illustrated the fact that demonstration is effective if there are comparative plots, twin plots?—Yes, that is very successful because it convinces the people very much.

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59625. Where demonstration is done on the cultivators' plots, is it quite essential in your experience to have these comparative twin plots?—Yes.

59626. A single plot is of no use?—A single plot is not of much use. If the new and old methods of farming are demonstrated to them in this way, it appeals to them very much.

59627. So that it is essential for good work to have two rival plots?—Yes, for demonstration purposes.

59628. You refer to the effects of the Deccan Agriculturists' Relief Act here. Are the provisions of that Act very much applied in Sind?—Yes, except some sections, it is applicable to Sind.

59629. *The Chairman*: I am not sure the witness understood that question. Is this Act often invoked?—Yes.

59630. It is often used?—Yes.

59631. Your answer was that it applied except as regards some sections?—Only one section.

59632. *Mr. Kamat*: Except for one section the Act is applied to the rest of Sind?—Yes.

59633. Are the effects of that Act good or bad?—They are good.

59634. Are you aware that in other parts of the Presidency there is a feeling that the Act ought to be repealed?—No, I think here it is working well.

59635. If it is working well, why do you want the Punjab Land Alienation Act?—It has become necessary on account of the above two Acts to apply the Land Alienation Act to Sind, as stated by me in the written note.

59636. Under the Deccan Agriculturists' Relief Act, what happens, if I understand you aright, is this: if a man wants a small loan as compared with the value of his land (say his land is worth Rs. 5,000 and he wants a loan of Rs. 500), he borrows it from somebody on a nominal sale deed of his land; is that the case?—Yes, in most cases.

59637. Now if the Land Alienation Act were applied to Sind and the same man wanted a small loan of Rs. 500 on his land of the value of Rs. 5,000, to whom would he go: to an agriculturist?—Yes, because generally the sales to the *sowcar* are done for a nominal price, and it would therefore be preferable for him to go to an agriculturist who will give him the market value.

59638. Yes, but you desire that one agriculturist should go to another agriculturist for a loan?—Yes, in order to get the market price if the land has to be sold.

59639. But is that possible?—Yes.

59640. You mean to say there are agriculturists who are richer and who are in the habit of giving loans?—No, no agriculturists give any loans; I am thinking of the position if the land is to be sold.

59641. You are talking of sales only?—Yes.

59642. But what will be the position of those wanting loans, under the Deccan Agriculturists' Relief Act?—They can have co-operative societies.

59643. You are branching off on to something else; you mean you want to drive them to societies?—Not drive them exactly, but that is the best solution.

59644. In that case neither the Deccan Relief Act nor the other Act will work; your case does not cover either?—The people can get their loans from the societies easily.

59645. Then you say you want societies?—Yes, for the good of the agriculturists. At present, on account of these Acts, much of the land passes out of the hands of the agriculturists.

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59646. In this Province, is there a very large number of rich zamindars?—There are big zamindars but not rich zamindars; there are very few rich zamindars.

59647. Say from twenty thousand acres and upwards?—Yes, in some cases.

59648. Generally do they contribute to the taluka development associations to the extent of Rs. 1,000 in full, or even more if you want it from them?—No. Ordinary members pay only one rupee subscription, life members twenty-five and patrons two hundred rupees; the association also receives a subsidy from Government according to the expenditure.

59649. Are all those associations drawing the full value of the subsidies?—Not all, but some of them do get Rs. 1,000.

59650. That means they have not made up their private subscriptions of Rs. 1,000 in the case of all the associations?—Yes, not all.

59651. Although there are rich zamindars in Sind. Are there rich zamindars on their subscription lists?—There are some.

59652. They also contribute only one rupee?—No, they are mostly life members and pay twenty-five rupees.

59653. Why are you suggesting that there should be special propaganda officers for the establishment of co-operative purchase or sale societies? Is your department, as at present equipped, unable to understand the business principles of sale or purchase societies?—No, the point is that the propaganda officer will first study market conditions and see how these sale societies have been working in the Presidency; then he will be a member of our staff and will carry on the work.

59654. *Mr. Jamshed Mehta*: You have been speaking about the Deccan Relief Act and the Encumbered Estates Act. The statement has been made that owing to these two Acts credit has come under dispute; that means that the *sowcar*, the moneylender, is not willing to lend the money owing to the restrictions imposed by the Act?—Yes.

59655. Now, supposing the co-operative societies are not started, you are not able to start them at various places or the people do not want co-operative societies, do you still propose that these Acts should be maintained?—Yes. I told you that at present the village *sowcar* ordinarily gives his customers only grain, seed and some money for miscellaneous expenses, but not big cash loans. A rich zamindar who has got credit with the village *sowcar* or with whose influence he has been dealing with his *harris*, is given some cash loans also, even without executing a bond; but in ordinary cases he refuses to give cash loans except when an outright sale deed of land is executed.

59656. You have been carrying on agricultural propaganda for some time; have you been doing this because of your own personality, because you come in touch with the people, or on behalf of the Co-operative Department working as such?—I was the first man to organise co-operative societies in Sind and they were found very successful. That is why I was given this work.

59657. I will make my question clearer. Would you recommend or advocate that the Co-operative Department should be given charge of agricultural propaganda?—No, not the charge but there should be co-ordination.

59658. You made a statement that so far the co-operative societies have worked absolutely without any communal poison; do you anticipate or fear or have you seen any signs of that feeling?—No. In the case of house construction societies, however, we have been organising in every town one society for Hindus and one for Musalmans.

59659. But in the ordinary credit societies you have not yet seen any particular preference given to one community or the other?—No.

59660. *Mr. Kamat*: With regard to this last question, as to communal societies, I suppose such societies have been formed years ago?—I do not know that about village societies.

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59661. Hindu housing societies have been formed round about Bombay for years?—Yes.

59662. I mean it is not a recent phase? It is well recognised by your department?—But I am talking of the villages; in the villages we had only one credit society for a village so far, but now we have separate ones for Hindus and Musalmans, in case of house reconstruction. What I am trying to point out is that it is not a recent poison as you suggested.

59663. *Mr. Jamshed Mehta*: Do you think the zamindari banks are quite in accordance with the principles of co-operation; do you approve of the zamindari banks on the principle of co-operation?—Yes. The big zamindars are as much in need of loans as the small landholders and so these banks are started.

59664. But why need we start co-operative banks? Would not they go to the Imperial Bank and the other banks to get the money?—No, I do not think so; the joint stock banks refuse to give them loans generally.

59665. So that this is a *via media* or tentative measure which you think ought to be encouraged?—Yes.

59666. You must have learned that the Bombay Government are starting two mortgage banks in the Presidency?—Yes.

59667. Do you not think one is necessary in Sind also?—Yes, very necessary.

59668. Would you like the Government to wait until they see whether the experiments in the other parts of the Presidency are successful, or do you desire that a land mortgage bank should be set up immediately?—I should like it to be done immediately because already co-operation in Sind is well founded.

59669. A witness makes a complaint with regard to *taccavi*. You know that we give *taccavi* sometimes through the co-operative societies to members?—Yes, for land improvement.

59670. Have you any suggestion to make for the improvement of the distribution of *taccavi*?—None except that it may be distributed through co-operative societies.

59671. Through societies or by any other expedients?—Through societies the system is working very well. The *taccavi* should be given adequately. At present it is inadequate. The *mukhtiarbars* give hardly Rs. 200 or Rs. 300 per head. It is not given in accordance with the requirements of the people as is the case in co-operative societies. Moreover, *taccavi* must be given at proper times; sometimes people get it in June and July when the agricultural operations are nearly over.

59672. But could you suggest any method of improvement in the agency of distribution?—No, wherever we have societies we have got enough funds in our banks; they have been lending freely. The *taccavi* which at present we get from Government is for land improvements only.

59673. That was not my question; my question was as to the actual medium of distribution. From your experience can you suggest any improvement; do you find that the people suffer from the present method of distribution?—I cannot suggest anything.

59674. You said in answer to one of my colleagues that the *haris* also are members of the societies?—Yes.

59675. Have you prepared any kind of statistics as to the percentage of the members of your nine hundred societies who are *haris* and the percentage who are landowners?—The ratio depends on each district separately.

59676. Have you any statistics?—No.

59677. Do you not think statistics would be desirable?—Yes.

59678. You have come into touch with many societies, and you have made the statement that the *haris* run away with the money. In your experience, what is the relationship between the zamindar and the *hari*? Do you think

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the zamindars are at fault or do you think the *haris* are at fault? Can anything be done to improve the status of the *haris*? My question is: do you think the relationship between zamindars and *haris* in Sind is good?—Yes, on the whole I think so; but some *haris*, being very poor, actually run away with the money and the zamindars have consequently been put to loss and trouble. Similarly there are also complaints from the *haris* that they are not properly treated and that hard work is exacted from them.

59679. *The Chairman*: *Haris* are a little scarce, are they not?—Yes.

59680. And a little coy occasionally?—They being tenants, the zamindars can turn them out at any time; they are at the mercy of the zamindar because they have not a permanent hold on the land.

59681. *Mr. Jamshed Mehta*: That is what I wanted to know. You have been Assistant Registrar of Co-operative Societies and have been instrumental in starting many societies, as I know; have you ever thought of, or tried, any special kind of society for the *haris* by which the co-operative movement could help them to stand on their own legs and be free from the zamindars in some way?—No, they have no security, and the bank cannot advance loans to them because they do not own any land.

59682. In other words, they ought to be in permanent bondage?—Yes, they must be with the zamindars.

59683. There is no hope for them at all?—No separate societies could be formed for *haris* alone.

59684. With regard to the cotton sale societies, you know that in Sind the ginning factories generally buy up cotton?—Yes.

59685. Either as soon as the cotton is ready, or they make advances on the cotton they buy beforehand?—Yes.

59686. If such is the case, do you see any chance of the cotton sale societies succeeding, or do you think the co-operative movement will have to start a kind of co-operative ginning themselves in order to make the cotton sale societies a success?—If sufficient propaganda is carried on among members of co-operative societies, I think they will come round and give their produce to sale societies even without starting ginning factories.

59687. Would you advocate co-operative sale societies of cotton to advance money on the crop beforehand?—No, because the members of co-operative societies already receive loans from their credit societies, and hence there is no need for sale societies to advance any money to them.

59688. You have suggested in one of your answers that the credit societies should give five-year loans for redemption of mortgages. Is that done in Sind? How many societies are there of that type?—Yes. The Sind Central Bank has advanced large loans to district banks and the district banks have similarly advanced to credit societies.

59689. No, that is not my question. You answered that there are societies in Sind to whom money has been advanced as a loan for five years?—Yes. For debt redemption.

59690. To how many societies has such a loan been given?—Between fifteen and twenty.

59691. Fifteen or twenty out of nine hundred?—Yes.

59692. You also said that some of the *haris* are members of the co-operative societies?—Yes.

59693. When the zamindars or the landholders take them into their societies, what security have they got?—The zamindars stand surety for their *haris*.

59694. Is that owing to the good relationship which exists between zamindars and *haris* or is it that the zamindars get loans in this shape even through their own *haris*?—No. The zamindars generally stand sureties for their *haris* in accordance with the usual custom.

59695. With regard to the seed societies, would you advocate the purchase of seed, say potato seed, through the Stores Department of the Government? I will put it more clearly: seed has to be imported from

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Italy; do you know that one of the societies tried it in our own place?
Yes.

59696. Owing to some difficulty, the purchase was possibly made through some Bombay merchants, but would you advocate that we should move the Government to give us facilities for purchasing seeds through the Government Stores Department?—Yes. That would be a good thing.

59697. One of the witnesses has said in his statement that there is some kind of arrangement by which the sea freight can be made a little cheaper if we purchase through a certain department of Government; would you advocate that the Government should give this facility to seed societies?—Yes.

59698. You noted that the Bombay Government makes advances to the housing societies at six per cent, which has now been reduced to five per cent. Do you think that the housing societies in the cities or even the reconstruction societies for the floods should get money from the Government at a cheaper rate of interest through the Central Banks?—Yes, we have already advocated that.

59699. What percentage have you advocated?—I think five per cent.

59700. *Mr. Calvert*: You have formed your societies in Sind on the Punjab model of the share system?—Yes, more or less on the Punjab model.

59701. With the result that you have now about twelve lakhs of owned capital in your primary credit societies?—More than that I think.

About nine lakhs shares and three lakhs reserves?

Sir Chunilal Mehta: Those are last year's figures.

59702. *Mr. Calvert*: What staff have you under you for co-operative work?—I have six auditors and one deputy, sixteen district honorary organisers and about seven or eight taluka honorary organisers.

59703. Are the sixteen honorary organisers unpaid or paid?—They are honorary but they get travelling allowance.

59704. From what class are these honorary organisers drawn?—From the agriculturists.

59705. Are they trained?—Yes, they are.

59706. For about how long?—They are generally chairmen or secretaries of co-operative societies, and as such they have got sufficient experience and knowledge of co-operation.

59707. There are no special classes for them?—In the beginning we had classes, as the movement was new and young, but later on we selected the best from among the chairmen and secretaries who had already got enough co-operative knowledge and training.

59708. Who is responsible for teaching the members of primary societies?—Now we have got a co-operative institute at Hyderabad which has a secretary who moves about; also I and the auditors, whenever we inspect societies, hold managing committee classes for a day or two, imparting to them the main principles of co-operation and the main points to which they should give attention. The honorary organisers also attend to this.

59709. Do these honorary organisers supervise the working of primary societies after they have organised them?—Yes.

59710. They continue to look after them?—Yes.

59711. Who is responsible for liquidation?—The liquidator who is appointed for that purpose.

59712. The actual order for liquidation must be passed by you?—No, by the Registrar.

59713. On whose report?—On the report of auditors or inspecting officials. The societies have also the option to go into voluntary liquidation.

59714. Do the honorary organisers ever recommend a society to be liquidated?—Yes, in case of mismanagement, but an enquiry is invariably held to see how far his report is justified.

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59715. Who holds the enquiry?—Myself or the Deputy Registrar and sometimes the auditor.

59716. Do you use your honorary organisers as liquidators?—Yes, sometimes but not of the particular tract in which the society exists.

59717. If an honorary organiser organises a bad society, he is not made the liquidator?—No. Not generally. The adjoining organisers are made liquidators. But as a rule liquidation work is done by auditors and other officials.

59718. That is to say, liquidation work is done by paid Government officials?—Yes, to some extent.

59719. However much non-official effort you may have in propaganda, all the unpleasant work must be done by paid Government officials?—Not necessarily. We have been taking work from non-officials also. In the beginning of course it was difficult. But the movement has been spreading, and we have now-a-days been getting good help from non-officials.

59720. As liquidators?—Yes.

59721. Who supervises them now?—There are quarterly statements to be sent by liquidators, and I see how the work is progressing.

59722. A paid Government staff is responsible for liquidation?—Yes, to some extent, in order that the work may be carried on efficiently and expeditiously.

59723. Any mistakes made by non-official organisers ultimately come back to the paid Government staff?—Yes, but that cannot be helped at times.

59724. To what extent are the directors of your Central Banks drawn from primary societies?—Generally there are nine directors of every district bank, of whom four are elected by societies, four by shareholders, and one is nominated by the Collector of the district. The societies have thus a voice in the management.

59725. In your Central Banks, is the voting power with the primary society or with individual members?—Each society sends its representative, and they have to vote. Individual shareholders have also the right to vote.

59726. The voting power is equal usually?—Yes.

59727. In some cases?—In all cases.

59728. Actually in Larkana, Sukkur and Thar Parkar, the individual members have outnumbered the society members?—Yes.

59729. Members of the Central Bank?—Yes.

59730. You do not try to get the whole voting power of the Central Banks into the hands of the primary societies?—No, not the whole, because there are a good number of individual shareholders also, who too have the right to vote.

59731. In these cases where you have more society shareholders than individual shareholders, you still have the half and half directors?—No. We allow one additional director after every fifty affiliated societies.

59732. Has not the Sind Central Co-operative Bank 448 society members but only 118 individual members?—Yes. But the capital of the Central Bank in the beginning mainly came from individual shareholders. They were allowed to elect five directors from themselves, three from the societies, and one was nominated. Later on, when the number of affiliated societies and capital increased, according to their rules and bye-laws they added one more.

59733. You have got nearly four times as many shareholders from societies as from individuals?—We looked to capital. The capital in the beginning came from individual shareholders mainly, and therefore they were given an important voice.

59734. In the Central Bank, does each member have one vote, or is it based on shares?—Each member has got one vote.

59735. Left to themselves, these 448 society members would be able to elect all the directors?—Not all. The individual shareholders elect their

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own members. A certain number of directors is fixed in the bye-laws for individual shareholders as also for societies.

59736. Do the Central Banks in your circle derive their deposits from local sources?—Yes.

59737. You have in the rural primary credit societies round about twenty-two thousand members, and in all you have about forty thousand members?—Yes.

59738. To what extent are the remaining eighteen thousand members already accounted for in the twenty-two thousand members of your credit societies?—The membership given in my note, viz., forty thousand, covers all types of societies, i.e., credit, non-credit, etc.

59739. You have at times some members accounted for twice over?—Yes, in the case of Central Banks.

59740. And in the case of taluka development associations also?—Yes, partly.

59741. And sale societies?—Yes, but we have only two sale societies working.

59742. Practically, your forty thousand members are forty thousand separate individuals?—Yes, mostly.

59743. I think you mentioned to one of my colleagues that *haris* have no security to offer?—Yes, they have no tangible security to offer.

59744. What security do you insist on in primary credit societies?—Personal security generally.

59745. Is one *hari* allowed to stand surety for another *hari*?—Yes, but the general practice is to have the zamindar as surety for his *haris*. There is, however, no objection to a *hari* becoming a surety.

59746. You have no societies purely for *haris*, without the landlords?—No.

59747. Have you any societies for village menials?—No, not for villages. The Shikarpur and other municipalities are now organising such societies. At present, we have only two sweeper societies.

59748. What area do the zamindars' banks cover?—The Larkana bank serves the whole district: while Thar Parkar only two divisions.

59749. What is the liability: limited or unlimited?—Limited.

59750. What are the shares?—Nearly one lakh rupees shares in each bank.

59751. How much per share?—Fifty rupees.

59752. What is the source of your long term capital in these banks?—The banks finance their members generally for current needs. They are on the same basis as credit societies.

59753. I think you mentioned to one of my colleagues loans for ten years?—Those are special loans for land improvement and debt redemption. Zamindari banks advance loans to big zamindars for current needs, as credit societies do to small landholders and *haris*.

59754. They get most of their capital from Central Bank loans?—No. They have got deposits also besides share capital; they get some loans from the Sind Central Bank too.

59755. As security, I understand you take a mortgage deed or personal surety in the case of zamindari banks?—Mortgage of land.

59756. Mortgage of the land of the borrower?—Yes.

59757. Does he also give personal sureties?—No.

59758. Mortgages on special conditions; with possession or without possession?—Without possession.

59759. Are the recoveries so far satisfactory?—Yes. Only about seven per cent is in arrears.

59760. Generally speaking, do you find the share system popular?—Yes.

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59761. *Dr. Hyder*: Do the two Acts to which you have referred, the Deccan Agriculturists' Relief Act and the Encumbered Estates Act, apply to the *haris*?—Obviously they do not. They apply to the agriculturists.

59762. But the *hari*, the cultivator, owns no land?—The Encumbered Estates Act applies to zamindars, and not to the *haris*.

59763. These two Acts do not apply to the *hari*. The point is that the credit of the *hari* or the cultivator cannot suffer on account of the existence of these two Acts, because he owns no land. That is obvious?—Yes.

59764. Do you not think that it is a good thing to place an obstacle in the path of the zamindar who is on the road to ruin? Should the law place an obstacle, or should it not?—It should, with a view to saving him.

59765. *Sir Chunilal Mehta*: You were in the Revenue Department?—Yes.

59766. How many years did you serve in the Revenue Department?—Seventeen years.

59767. You have therefore had a great deal of knowledge of the conditions of the cultivators?—Yes.

59768. Then you had this special duty in co-operative work?—Yes.

59769. Were there any special circumstances why you were put in charge also of agricultural propaganda?—Because I had toured round in Sind and organised societies there, I therefore knew almost all the zamindars of the Province. These societies were working well, and that is why I was selected.

59770. You explained that you have a system of training members of primary societies, especially members of the managing committees of primary societies: What is your system?—We organise managing committee classes, which last only for a day or two. In these classes we train them in the main principles of co-operation and the main business of the managing committees, and so on.

59771. How often do you have those classes?—Once in two years or so. In very many societies, where the members already know the principles well, there is no need for training, and we rely upon them to carry on the work independently, but in weaker societies we do as a rule hold training classes for managing committee members.

59772. How often in weaker societies?—Once a year. The honorary organisers also go and explain the principles to members. Besides the auditors, the Institute secretary and I, from time to time, when on inspection, explain the same to them.

59773. In an approved society, when a class is once held after two years, is it held for the same people?—This system has been brought into vogue only lately. Since the last two years only we have been doing it.

59774. Do you consider it useful?—It is very useful.

59775. How many times do you yourself visit societies? Do you visit each society once or twice a year?—Some societies, especially non-credit societies, I visit even three or four times a year. As regards credit societies, I concentrate my attention on the weaker and indifferent ones. As regards good societies, I inspect them on my way to the bad ones. The number has become so large that I cannot see all the societies every year.

59776. Do the honorary organisers visit the societies after they are formed?—Yes.

59777. Do they visit them often?—Yes, they generally help the managing committee members in their work and so have to visit them often.

59778. Do you take special care in the appointment of honorary organisers?—Yes.

59779. Why has special care been found necessary?—Because, if the honorary organiser is a good man, and knows his business, the societies are well organised, and give less trouble.

59780. You found some of the honorary organisers not up to the mark, and you now take special care to see that the honorary organisers are good

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people?—Yes, the unfit men have been removed from time to time, and only those who have been doing good work maintained.

59781. Do the Central Banks appoint any persons to examine the working of primary societies?—Yes, they have their own inspectors; every bank has two inspectors.

59782. The working of these societies is placed before the Divisional Board of Agriculture?—Yes. Quarterly reports on co-operation are placed before the divisional board of agriculture.

59783. On which there are officials as well as non-officials?—Yes.

59784. You said that when a loan is misapplied, you do not know what happens to the persons who took the loan?—The money is recalled from him ordinarily. In extreme cases, when a member of a society is bad or incorrigible, he is removed.

59785. Do you not think that attention is required to be paid to this side of the societies' activities?—Yes, because much depends upon the proper use of the loan.

59786. What steps do you take to ensure that that is done?—We call for reports from the honorary organisers as to whether the managing committee is doing its work properly, and whether any loans are misused or misapplied. The auditor also goes there once a year, and he is required to test at least ten cases. They report cases of misapplication and necessary action is taken thereon.

59787. You recognise that in Sind it is very desirable to see that the principles of co-operation and proper application of loans are understood and followed?—Yes.

59788. Especially in Sind?—Everywhere.

59789. The Registrar of Co-operative Societies has also drawn your attention to it, and you are yourself paying a great deal of attention to this side?—Yes, it was so because the people were illiterate and backward, but now several of our members understand their business very well.

59790. In the directorate of the Central Banks you said that the societies get four directors out of nine?—Yes.

59791. Formerly there used to be no representatives, at least in Bombay, and gradually this system has been developed, by which the primary societies will ultimately control the banks?—Yes. Here also we propose gradually to give more representation to societies.

59792. You think that has been working well?—Yes.

59793. As you find the system working well, you will go on expanding?—Yes.

59794. I think you said in answer to a question that the members of the societies do not now borrow from *sowcars*?—I said that the members of those societies which have been in existence for three years or more do not generally borrow from *sowcars*.

59795. That is largely because the limit of loan has been very considerably raised in Sind?—Yes.

59796. It is much higher here than it is in the Presidency —Yes.

59797. Consequently, there is not so much need to go to the *sowcar*?—There is not, because our societies have been satisfying the needs of their members.

59798. What was the rate of interest formerly paid to the *sowcar*?—Thirty-six per cent, and even more. It depended, as a rule, on the credit of the zamindar also. Some zamindars were charged twenty-five per cent, but the ordinary zamindar had to pay thirty-six per cent, or even more.

59799. The *sowcars* used to charge scarcely less than eighteen per cent before the co-operative societies came into existence?—Yes. They used to charge more.

59800. Can you tell the Commission what have been the tangible benefits of the co-operative movement that you see now?—The members are getting sufficient loans for their agricultural operations. On that account they

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are able to sow more valuable crops and there is an increase in the cultivated area, as also in the yield. Formerly, they used to sell their produce at low rates, but now they sometimes hold it up and sell when favourable rates are offered.

59801. Are the members of the societies free from debt now?—A good number of them are free from old debts. The small landholders had small debts, and after they joined societies they have become free.

59802. Do you notice any difference between the working of supervising unions and taluka development associations?—Taluka development associations deal with both agriculture and co-operation, but the supervising unions mainly look after co-operative societies.

59803. The taluka development association has a much wider field?—Yes.

59804. Why have they not included cattle-breeding amongst their activities?—They are considering it. So far, they have concentrated their attention on the use of improved implements, seeds and modern methods of farming.

59805. For instance, dry ploughing in winter?—Yes, they have been doing it on a large scale.

59806. How many taluka development associations have you now?—There are eleven taluka development associations in my charge, and three have been organised in the Jamrao tract which is attached to the Deputy Director of Agriculture.

59807. So that, each taluka under your charge has already got an association?—Yes, for agricultural propaganda work.

59808. Do you feel any necessity for having sub-associations for smaller areas under the taluka development associations?—No, not so far. No such need arises, because the taluka development associations, in some cases, have appointed even two *kamgars* to look after their work. Instead of having sub-associations, one association will do well for the taluka.

59809. If necessary, more *kamgars* could be appointed?—Yes.

59810. *Mr. Jamshed Mehta*: You said that the *sowcar* charges thirty-six per cent interest. In your experience, is that the limit?—I have said that the zamindars who have got good credit can get money at twenty-four or twenty-five per cent.

59811. Is thirty-six per cent, the maximum?—It is not the maximum.

59812. What is the maximum?—Fifty or even sixty per cent.

59813. Do you know the co-operative societies for sweepers that have been started in Karachi?—Yes.

59814. What was the rate of interest which the sweepers had to pay before?—I do not know exactly.

59815. Do you know that a census showed that they had to pay one anna to three annas per rupee per month as interest?—I have heard that.

59816. *The Raja of Parlakimedi*: How many agricultural societies pure and simple have you?—Out of nine hundred about eight hundred.

59817. Eight hundred agricultural societies?—Yes. They are agricultural credit societies.

59818. Do they also take up the supply of manures and the supply of proper seed?—They only do credit business.

59819. They do not concern themselves with the improvement of agriculture?—Only in talukas where we have taluka development associations, is the supply of seed, manure and implements, etc., carried on.

59820. There are no separate societies to look after agricultural development?—We have about five or six seed societies in addition to taluka development associations.

59821. They confine themselves entirely to the supply of seed?—Yes.

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59822. Nothing else?—No. In two cases, we have started purchase societies. They purchase and supply agricultural necessities in the taluka. In Tando, Allhyar and Hatri, we have got such societies.

59823. Do they also take up joint sale? Do they collect the produce of the *haris* in the proper season and secure a proper market for it?—No. We contemplate starting such sale societies.

59824. In the seed supply societies, do you not have the *haris* as members?—Yes.

59825. You are satisfied with the work they do to safeguard the interests of the *haris*?—Yes.

(The witness withdrew.)

**KHAN BAHADUR NABI BAKSH MUHAMMAD HUSSAIN, M.A.,
LL.B., Manager, Encumbered Estates in Sind.**

Replies to the Questionnaire.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—The agricultural demonstration farms in Sind have not exercised any considerable influence on the practice of the cultivators. The reason for this is that these Government farms are not carried on on commercial lines and have not been paying concerns, whereas the cultivator has to make a living out of agriculture. Unless the cultivator is convinced that a better crop than his own, with a higher yield of profit, can be grown with the same amount of labour and water, demonstration cannot be successful.

Till lately the propaganda work carried on by the Agricultural Department in Sind did not produce any marked results. Since a part of the propaganda work has been entrusted to the Co-operative Department, it has achieved considerable success. The Co-operative Department has done a great deal of work in popularising improved kinds of seeds and ploughs through the taluka development associations.

I would suggest that instead of Government demonstration farms, greater attention may be concentrated on carrying out demonstrations in selected fields of the zamindars themselves, in rotation. The demonstration and propaganda work should be left to taluka development associations which should be formed in every taluka with the co-operation of the Agriculture, Co-operative and Revenue departments. The taluka development associations should be granted some subsidies by Government as well as district local boards.

QUESTION 4.—ADMINISTRATION.—(c) (i) I am not satisfied with the Agricultural and Veterinary services in Sind from the agricultural standpoint. In my answer to the previous question I have already indicated the shortcomings of the Agricultural Department so far as the demonstration and propaganda work is concerned. The department has failed to arouse public enthusiasm and to reach the public.

The veterinary dispensaries in the Province are few and far between. A larger number of such dispensaries and travelling veterinary graduates is needed.

(ii) A greater expansion of feeder railways in the Province is very necessary.

(iii) Roads in Sind, with a few exceptions, are in a bad condition, and some are almost impassable during a certain portion of the year. Consequently there is great difficulty of transport in the Province. Better main and arterial roads are needed.

(v) A greater expansion of postal facilities in the Province is needed.

QUESTION 5.—FINANCE.—(a) Short-term credit is sufficiently well catered for by the co-operative societies and district co-operative banks. An expansion of co-operative societies is necessary to cope with the demand for short-term credit and to eliminate the village *bania*; but so far as long-term credit is concerned, introduction of land mortgage banks seems to be the only solution.

(b) Cultivators generally avail themselves of Government *taccavi* both for improvements and buying seed and no further inducement appears to be necessary, except that there may be greater promptness and fewer formalities in granting these loans.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(a) (i) The main causes of borrowing are:—(1) Capricious inundation, (2) illiteracy, (3) unbusiness-like habits and want of method, (4) expenses of ceremonies, (5) difficulty in selling produce at proper rates in reasonable time to pay off the Government assessment, and (6) purchase of seed at high prices.

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(ii) The sources of credit:—At present the *bania* moneylender is the only principal source of credit.

(iii) The reasons preventing repayments are:—(1) Inability of the zamindar and the tenant to face a bad season without further borrowing, (2) want of method in liquidating debts, (3) high interest, and (4) dishonesty of moneylenders.

(b) In my opinion, to lighten agriculture's burden of debt, there are four remedies:—(1) Improvement in the agriculturist, (2) improvement in the civil law, (3) check on the moneylenders, and (4) creation of facilities for supplying credit to the agriculturist and thus making him independent of the moneylender.

It is often alleged that the zamindars incur debts owing to reckless extravagance. This epithet of extravagance may justly be applied to about ten per cent; the remaining ninety per cent lead a very simple life, their standard of living being very moderate. Their indebtedness is chiefly due to bad seasons which make them responsible for the debts of their *haris*, defective water supply, difficulty in selling grain, buying all commodities on credit at high prices, and expenses on ceremonies, coupled with the fact when once an agriculturist gets into the clutches of a moneylender he is exploited so mercilessly that the debt goes on piling up without any chance of freedom. To improve the zamindar, dissemination of education among that class of people is very essential.

It is an axiomatic truth that the judicial system introduced by the British Government has been entirely favourable to the moneylender at ruinous cost of the cultivator. It is a notorious fact that there was no agricultural indebtedness in Sind during the Mahomedan rule. Mahomedan law did not favour the moneylender. Even the Hindu law of debtor and creditor was very mild. According to Jagannath (Colebrook's Digest), except as regards dishonest debtors, lenient rules were prevalent. A respectable man was to be released on promise, confirmed by an oath, that he would pay up when his resources enabled him to do so. Even a *Sudra* was entitled to the benefit of this rule. A debtor whose inability to pay was caused by a calamity was allowed to discharge the debt in small instalments according to his means. If he was quite indigent, the creditor was obliged to give him a further sum and from the gains he made thereby he was to pay back the old and the new debt. Confinement in a civil jail was unknown under the Mahratta Government, while, owing to the feeling of the permanent connection between the family and the estate, enforced sale of land was never restored to as a means of satisfying a creditor's demands. The facilities afforded by the British civil courts for recovery of debts, enforced sale of land in execution of decrees and the admirable opportunities that the civil law affords to the strong intellect for cheating and deluding the weaker has stimulated the moneylender to lend freely and without restriction. The superimposition of the European forms of law of debtor and creditor on Indian society, not yet ripe for them, has wrought great havoc. Some relief has been afforded to the agriculturists by the Sind Encumbered Estates Act and the Deccan Agriculturists' Relief Act in this Province and by similar enactments in other parts of India. But more is still needed. Since India is mainly an agricultural country, the happiness and contentment of the agricultural population should be the chief care of Government. Unfortunately this has not been the case so far. Acting on the well-known juridical maxim: "The greatest good of the greatest number," Government ought to afford special legal protection to agriculturists. There should be special courts to deal with agricultural indebtedness. Land should not be sold in execution of decrees and debts should be repayable in small instalments.

The rapacity of the moneylender who has sucked the life blood of the agricultural population by high interest, false accounts, inflated claims, deceit and fraud should be checked by special laws such as:—

(1) Legislation prescribing the maximum rate of interest which a moneylender can charge an agriculturist.

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(2) Section 302 (a) of the German Penal Code—"Whoever, taking undue advantage of the distress, simplicity or inexperience of another, makes to that other a money loan and in virtue of such loan obtains material advantages which, considering the circumstances of the case, are extraordinarily disproportionate to the service rendered, shall be punished as a usurer with imprisonment, which may extend to six months and also with fine not exceeding M. 150."

The Court may also sentence the accused to loss of civil rights.

(3) An enactment making it compulsory upon moneylenders to maintain proper business books.

We have precedents for this in France, Italy, Spain, Russia, Germany, Austria and Greece.

In those countries, the moneylender must keep a day book, letter file, balance sheet showing complete assets, the debts due to and by him, with the value of each debt. The day book and balance sheet register must be permanently bound books, paged, initialled and sealed each year by the Commercial Court or the local Mayor. If these regulations are necessary in Europe, they are far more necessary in a country where the agriculturist cannot read or write and keeps no private accounts.

(4) An enactment similar to the Punjab Restriction of Alienation Act.

In Tsarist Russia Jews were prohibited from acquiring land, while in Russian Turkistan Hindu moneylenders were subjected to a similar disability. Considering the large amount of agricultural land that has passed from the hands of agriculturists to those of moneylenders since the advent of British rule, an enactment like this is very essential for the preservation of the agriculturists and zamindars.

The fourth aspect of the remedy lies in supplying facilities for credit to the agriculturists in the shape of—(1) Land mortgage banks, (2) co-operative supply societies, and (3) co-operative societies for the purchase of produce.

In very few cases does the *bania* restrict his business to moneylending only, except *soucars* in large towns. The village moneylender, who is the chief source of credit of the rural population, deals also in provisions, stores, cloth and grain for seed and is thus able to supply all the wants of his clients. He can feed them until harvest time, clothe them, advance them seed, grain, or cash for the purchase of cattle and other necessities. He charges a very exorbitant price for the commodities sold and piles heavy interest thereon. Every moneylender is a grain dealer also and acts as a middleman in disposing of the zamindar's produce. He purchases the grain from the zamindar at a very low value and cheats him in weight also. While the land mortgage banks will save the agriculturist from the clutches of big moneylenders, supply and purchase societies should save him from the two-sided ruin which the village moneylender causes him.

I think the Usurious Loans Act of 1918 may be made generally applicable throughout India. It should further be so amended as to bring it in line with the English Moneylenders Act of 1900 (63 and 64 Vic., Ch. 51) so that a borrower can also apply for relief; and proviso (i) to section 3 (1) may be deleted. This proviso considerably retards the beneficial effects of the Act. I would further suggest that an enactment like this can better be administered by courts in sympathy with agriculturists than by the existing civil courts whose sympathies for moneylenders are well known.

In my opinion, it should be the function of the land mortgage banks to facilitate redemption of mortgages.

(c) I have already indicated that an enactment similar to the Punjab Restriction of Alienation Act is very necessary to preserve the landholder.

Non-terminable mortgages must be prohibited.

QUESTION 11.—CROPS.—Apart from improvements in crops by the introduction of better agricultural methods, use of suitable manures and fertilisers, a marked improvement in existing crops can be achieved by supplying zamindars and *havis* with pure and selected seed of the principal crops grown.

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Co-operative seed supply societies are a great necessity for this purpose. The actual work of distribution should be done by these societies, while the Agricultural Department should be charged with the duty of supplying pure seeds to such societies.

QUESTION 14.—**IMPLEMENTS.**—There is plenty of room for replacing the ordinary cumbersome Sindhi plough and introducing suitable implements and machinery. The taluka development associations have already done much to introduce improved forms of ploughs. Further propaganda to popularise this work should be left to such associations.

QUESTION 17.—**AGRICULTURAL INDUSTRIES.**—(a) An average cultivator works out on his holding for about 180 days. The rest of the time he generally idles, or employs in carting or cutting fuel and selling it or migrating to large towns to work as a manual labourer.

(b) Only such subsidiary industries will succeed as are suitable to the temperament and nature of the agricultural population. Weaving and poultry breeding might be successful in Sind. Government may open rural weaving classes and also encourage poultry breeding.

(c) Bee-keeping is unknown in Sind. Poultry are reared spasmodically but not systematically or scientifically. Fruit-growing is not possible owing to lack of irrigation for eight months in the year in rural Sind.

Sericulture is not possible owing to rigour of climate.

Pisciculture is out of question owing to abundance of fish everywhere in Sind and owing to the fact that a large number of the population namely the Muhanas already subsist on it.

Lac culture is possible up to a certain limit only, as the number of trees in arable fields is not very large.

Rope-making is done to some extent already.

Basket-making is also done already.

The obstacles in the way of any subsidiary industry fall under two heads:—(1) lack of initiative, and (2) lack of money.

(d) I think emphatically yes.

(e) I am doubtful of this in Sind because there are not very many industrial concerns in Sind.

(f) Yes.

(g) Beyond the stimulating of subsidiary industries, I cannot suggest any other measures for more extensive rural employment.

(h) By propaganda.

QUESTION 20.—**MARKETING.**—(a) and (b) There are no markets in the proper sense of the word. There are buying centres in large towns where a zamindar sends his produce for sale, but the majority of the zamindars and the entire mass of *haris* generally sell their produce locally to the village *bania*. Every moneylender is an extensive grain dealer also, and acts as a middleman in disposing of the zamindar's produce. Owing to the necessity for cash at the time of the assessment collections, far more grain is put on the market than there is a demand for, and the zamindars often have the greatest difficulty in obtaining proper prices for their grain, if the rates are low, unless the *bania* as a speculation buys up the grain cheaply. To escape all the worry and trouble over assessment, the zamindars frequently obtain money by selling their produce in advance, stipulating to deliver grain for a low price, thereby avoiding the embarrassment of having to sell their grain in a flooded market. The profits made by the *bania* are large, as he has simply to hold out until seed time, when the rate rises automatically and he can sell back to the same zamindars at twenty per cent profit, and often higher, the same grain which he purchased from them six months previously.

(d) Yes. I think co-operative grain purchase societies ought to eliminate the *bania*.

QUESTION 22.—**CO-OPERATION.**—(a) (i) State aid to co-operation should be limited to—(1) propaganda, (2) organisation, (3) finance, and (4) audit.

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(ii) Non-official agencies can best encourage co-operation by—(1) propaganda, and (2) education.

(b) So far as Sind is concerned, the development of co-operation has taken place mainly on the credit side and credit societies are doing very well. I think the development of co-operation on the non-credit side is very essential. The formation of grain-purchasing, seed supplying and distribution societies is very essential to free the peasantry from the clutches of the *bantias*.

QUESTION 23.—GENERAL EDUCATION.—(a) In my opinion, the present form of (i) higher or collegiate, (ii) middle school and (iii) elementary school education is completely divorced from agriculture. It has not in any way improved the agricultural efficiency of the people; on the contrary it has had an adverse effect thereon. A farmer's son who has managed to pass the vernacular school final examination looks upon the profession of his father with disdain.

(b) (i) Unless rural education is so modified as to make a farmer's son a better farmer, it cannot improve the ability and culture of agriculturists while retaining their interest in the land.

(ii) Compulsory education is only now being introduced. Unless it is altered as shown in my preceding answer it cannot benefit the agriculturists.

(iii) They are called away to help their parents in their work.

QUESTION 24.—ATTRACTING CAPITAL.—(a) In my opinion, capitalists do not take to agriculture because they do not possess the requisite knowledge or have sufficient interest in it.

(b) (1) Want of initiative, (2) lack of capital.

QUESTION 25.—WELFARE OF RURAL POPULATION.—(a) Apart from the economic uplift of the agriculturist, I think rural welfare may be developed on the following lines:—(1) Provision of more dispensaries or travelling doctors, (2) inculcation of sanitary habits among the people by propaganda, lectures, and lantern slides, (3) supply of pure drinking water, and (4) spread of education.

QUESTION 26.—STATISTICS.—(a) (ii) In my opinion the estimates of the yields of agricultural produce in Sind are not satisfactory. I think it should be made compulsory on every revenue officer from the sub-divisional officer down to the *tapedar* to be present every year at the actual division of produce between zamindars and *haris* in typical villages in rotation and to keep an accurate account thereof.

Oral Evidence.

59826. *The Chairman* : Khan Bahadur Nabi Baksh Muhammad Hussain, you are Manager of Encumbered Estates in Sind?—Yes.

59827. You have sent a note of the evidence which you wish to put before the Commission; do you desire to add anything to it now?—Nothing.

59828. Before I turn to your own particular responsibilities, I should like you to tell me what contribution you think the co-operative movement is making towards the welfare of the countryside?—I have nothing to do with co-operation.

59829. But in your experience, has the co-operative movement made an important contribution towards the welfare of the countryside?—It has.

59830. Is it sound in your judgment?—So far as small men are concerned, it is; it has not yet touched the big zamindars.

59831. Have you many members of co-operative societies whose estates you manage under the Encumbered Estates Act?—Some come under my protection.

59832. Is it within your power to encourage the spread of the movement so far as the lands within your jurisdiction go?—Not with regard to those.

59833. What are the circumstances which bring estates within your control?—When a man is in debt and threatened with the sale of his lands he comes to me.

59834. On whose motion?—On his own motion.

59835. Invariably?—Invariably he has to make the application himself.

59836. In the case of minors, do the courts move?—In the case of minors also, either the Collector moves or his relations; and then the Commissioner has got the power to decide.

59837. Has an application to be made to the courts in the case of minors?—No; in the case of minors their relations can make an application directly to the Commissioner or to me.

59838. Could you give the Commission, shortly, the extent of your responsibility towards the estates when they come under your charge?—The first thing is to publish a notification asking claimants to put in their claims, and as soon as those claims are received, hearings are fixed. I have to go into the history of every claim, not as a civil court, but as a court of equity; I have to go beyond the bounds of the civil court and documents and see what the actual debt is and then award the claim. Then I have to manage the lands; I lease them by public auction. Out of the income realised, first I take the management charges which come to about seven per cent now, and out of the remaining give one-third to the zamindar for his maintenance and then the rest goes for liquidation of debts.

59839. Generally you do not manage the lands?—Generally we lease them.

59840. For what period, on an average, is the estate in your hands?—Some for two years, some for three years, and some even up to twenty years.

59841. From the point of view of agricultural improvement, is it true that on the technical side you have no opportunity to encourage it?—Yes. Generally we give to lessees. Direct management by the department is not possible because the Province is big and there are many estates to manage.

59842. Have you estates in charge of your department within the area which will be irrigated by the Barrage scheme?—Yes.

59843. Does that raise any problem so far as your own responsibility is concerned?—Not yet.

59844. Do you find yourself in a position in which it is your duty to say to the lessee: "I think you are mismanaging the technical side. This or that practice is better than that which you are carrying out at present?"—If it is departmentally managed, there might be leakage of the produce. From the economic point of view it is better to lease the estate to the highest bidder at the auction. We guard against wilful deterioration of lands.

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59845. So far as agricultural matters are concerned do you administer in any case?—No.

59846. Agricultural problems as such do not come before you at all?—No; they do not.

59847. What has been your experience of the Agricultural Department?—I have been an officer in the Revenue Department, and as a Revenue Department officer I have come into contact with the Agricultural Department, and I think it is a very good department.

59848. How long have you come into contact with the Agricultural Department?—For the last eighteen years.

59849. I do not know how long you have been in charge of the Encumbered Estates?—For four years.

59850. You still come into contact with the work of the Agricultural Department?—Yes.

59851. Has it improved since you first came into contact with it?—It is gradually improving.

59852. In what has it failed in the main?—In the main, on the demonstration side. The demonstrations do not arouse any enthusiasm in the public at large. It is only after the taluka development associations came into being that the public have come to realise the value of the researches of the Agricultural Department. The demonstrations are not carried out on economic lines. The Agricultural Department do not know what they spend and what they realise. The agriculturist finds that he will have to spend a good deal more than he actually gets; he is never able to make the initial outlay on the scale Government are able to make, nor can he afford to employ the staff that Government employ.

59853. One more question about your own particular responsibility. Do you as a department lend money?—Never.

59854. *Sir Thomas Middleton*: I am not quite clear as to what you do for the landowner; is any landowner at liberty to apply to you?—One who pays more than three hundred rupees as annual assessment.

59855. And you, on the other hand, are able to refuse to take up his affairs or to accept the charge of his affairs?—I have to make a recommendation, and it is for the Commissioner to decide.

59856. Your management is exclusively financial; you look after his accounts?—More or less, exclusively financial.

59857. I do not quite see, if the technical management is bad, how your financial management can assist him?—It is generally indebtedness that drives these people into debt, and not any defect in the technical management; technical management has nothing to do with it.

59858. Then, their difficulties arise from improvident borrowing and such things?—Yes.

59859. You endeavour to reduce the rate of interest that he has to pay?—I think we have reduced it very much. I have got a statement prepared of what the department has done ever since it was formed, and I can show it. In the first year, interest was reduced from ten lakhs to four lakhs.

59860. What percentage of landholders has come under your department?—So far, there have been twelve hundred estates from the beginning of the department.

59861. What percentage do they form of the landholders of Sind?—It means that almost all the big landholders have been through it once or more.

59862. You are looking after the financial affairs of nearly all the zamindars of Sind?—Most of them have been through it.

59863. *Dr. Hyder*: What is the total amount of assessments paid of over three hundred rupees?—I cannot say exactly; about one thousand I think.

59864. You have had more than twelve hundred estates?—Yes; from the beginning, in serial order, up to date there have been twelve hundred estates.

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59865. *Sir Thomas Middleton* : Your criticism of the Agricultural Department is from the financial point of view?—Yes, of course.

59866. You think that they themselves would be encumbered estates if they had not Government at their back?—I think so; I have not the least doubt about it.

59867. *Mr. Calvert* : What exactly is it that you do which a private firm could not do?—I have got the power to enquire into the claims just like a civil court; a private firm cannot do that; I can even go beyond the civil courts.

59868. Can they not do that under the Usurious Loans Act?—No. Here the debtor has no power to apply for relief.

59869. Is not the Usurious Loans Act applicable to Sind?—Under section 2 of the English Act a debtor can apply for relief. It is not possible under the Usurious Loans Act.

The Chairman : Have you seen the amendment of the Act?

59870. *Dr. Hyder* : You quote in your note the German Penal Code. Where did you get it from?—From the *Encyclopædia Britannica*.

59871. *Professor Gangulee* : Have you been able to effect any agricultural improvement in any of these twelve hundred estates which have passed through your hands?—Agriculture does not come within our control. These estates are well looked after; they are not worse than they were under the zamindars; in some cases they are even better; the lessee who gets a long-term lease does better.

59872. You state that the judicial system, as introduced by the British Government, has been entirely favourable to the moneylender at the ruinous cost of the cultivator. So far as Sind is concerned the cultivator is the *hari*; are you referring to him when you say "cultivator"?—The *hari* as well as the zamindar.

59873. You say that the zamindar is at the mercy of this judicial system?—Yes.

59874. Have you any views as to the changes to be introduced?—I have suggested the establishment of special courts to deal with agricultural indebtedness.

59875. Do you think that the Deccan Agriculturists' Relief Act and the Encumbered Estates Act have not functioned successfully?—They have functioned, but not successfully. The Deccan Agriculturists' Relief Act is generally administered by the civil courts. I do not think proper remedies have been applied. In most cases the decrees against the cultivator are obtained *ex parte*, and in other cases it ends in compromise. If you see the records you will see very few cases which were decided under the exact provisions of the Act.

59876. You state that expenses on ceremonies is one of the causes of agricultural indebtedness?—I say reckless extravagance; ceremonies everybody has to go through.

59877. To what extent is the extravagance of the people in matters of ceremonies responsible for the indebtedness?—Not to a very large extent.

59878. *Mr. Kamat* : In the case of the Deccan Agriculturists' Relief Act, have you not heard of a large number of cases where instalments are decreed?—I am not talking of the Presidency proper; I am talking of Sind; here the relief is not so very good as it ought to be. Generally they end in compromises; very few cases are decided under the Act finally.

59879. The instalment system is enforced very rarely?—Yes.

59880. In that case, it is not the fault of the Act, but the fault of the administration?—I have stated that it is the fault of the administration, and therefore I advocate that there should be special courts; you require courts of equity, not courts of justice.

59881. But under the Deccan Agriculturists' Relief Act, the courts are empowered to fall back on equity?—But the courts have urban training.

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59882. Would you have a Moneylenders Act for the whole of the Presidency?—Yes.

59883. On the lines of the English Act?—Not on the lines of the English Act. The Indian Usurious Loans Act is already based on the English Money-lender's Act. I want an Act whereby moneylenders would be compelled to keep proper books and accounts.

59884. You know that in the Punjab a similar enactment was passed by the Legislative Council?—I have read about that, but I have not been able to get a copy of it. There was a movement of that kind, but I do not know exactly what it was.

59885. The Bill was passed by the Council there; I think it was a non-official Bill; it was not given sanction by Government, but Government promised to draft a similar Bill and look into the question?—I think it will be very interesting if it is done in the case of Bombay too.

59886. A similar enactment for Bombay?—I cannot say a similar enactment, but an enactment to make it necessary to keep sealed *bandis*, so that they may not be tampered with.

59887. In that case, what would be the highest rate of interest in your opinion chargeable by the *sowcar*?—At present it is nothing less than twenty-four per cent, and if you calculate the deductions made on account of the method of account keeping, it will come to thirty per cent. I think eighteen per cent should be the highest rate.

59888. In case such an Act were passed, do you think the present *bania* would try to get round the enactment?—They always try to get round it, and I think law-breakers will find means to break the law.

59889. How do you prevent it at present?—At present when a document is written for Rs. 10,000, it is generally the case that they deduct the interest for one year (Rs. 2,500) and give only Rs. 7,500. So if the examination of accounts from the beginning is done, true things will be revealed.

59890. In such a case how would the zamindar prove his claim? What is the use of such an Act?—Special courts of equity should be set up for dealing with agricultural indebtedness. As I said, I do not look to the document only; it may be for a lakh of rupees, but I will award only Rs. 1,000, if that is the real debt. The remedy for agricultural indebtedness is to set up special courts of equity.

59891. And to pass a Moneylenders Act?—Yes, and a Moneylenders Act. The enactment should be administered by courts which have got a bias towards the agriculturists.

59892. Your courts should have a bias towards the agriculturists?—By bias I mean sympathy; the courts would have sympathy with the agriculturists.

59893. *Mr. Jamshed Mehta*: You just now mentioned that you had very little to do with agriculture and you only looked after the finances. Do you not see that the lands are properly cultivated by the lessees?—Yes. We see that lands are not damaged.

59894. You mentioned that you would look to equity, and when there was a debt on a document for one lakh you would award only Rs. 1,000?—If that is the true debt.

59895. That means that you want to take indefinite powers, powers beyond those enjoyed by any court of justice?—It is not any extraordinary power. Ordinary civil courts are courts of justice only. Such powers are enjoyed by all courts of equity.

59896. Have you ever found that some zamindars take very unfair advantage of the Encumbered Estates Act to avoid paying *bond fide* debts?—They cannot avoid *bond fide* debts; it can be found from the books whether the debts are *bond fide* or not. When we take over estates, we take good care to see that the zamindars' intentions are good. For instance, if a zamindar

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is a zamindar and merchant combined, and has lost money as a merchant, then we do not take his estates under management.

59897. I am not talking of a combined merchant and zamindar; I am talking of the pure zamindar?—If the debts are *bond fide* they will be paid by us for him; there is no fear of the creditor losing genuine debts. When large claims are pressed on the zamindar and his lands are to be sold for execution of civil court decrees, when his debts are too heavy so that he cannot discharge them, then he comes to us.

(The witness withdrew.)

KHAN BAHADUR GULMAHOMED ABDUR RAHMAN,
Acting Deputy Director of Agriculture, Sind.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(a) (i) Two years ago not much could have been said in this direction though a small beginning had been made on the Mirpurkhas farm in 1922 by the appointment of a Cotton Breeder. The want has however since been partly met in the shape of the establishment of a farm at Sakrand in the Indus Left Bank Circle. At this station agricultural problems which will crop up under post-Barrage conditions four years hence are designed to be investigated. These problems in brief are:—

- (1) The testing of the Baker-Lane Scheme of eighty-one per cent intensity of cropping. In this cropping two-thirds of the area will be under *rabi* wheat and one-third will be under *kharif* or hot weather crops.
- (2) Finding out the requirement of irrigation water of a crop.
- (3) To see the effect of perennial irrigation on the soil.

Provision has yet to be made as recommended by the Committee of 1924 for two more research stations, one in the Indus Right Bank area and the other in the Eastern Nara tract for work on an extensive scale, on rice, *dubari* (double cropping), *jowari*, wheat, etc.

QUESTION 2.—AGRICULTURAL EDUCATION.—It is not possible to deal with the questions under this head given in the Questionnaire because no agricultural school exists in Sind. I therefore confine my remarks to a general note for the information of the Commission.

The problem of agricultural education had been engaging the attention of the department since 1910, but it was not until 1912 that the scheme of opening an agricultural school at Mirpurkhas materialised.

The school commenced with a suitable programme of work, calculated to impart a fair elementary education, both theoretical and practical. It was a one-year course only. Arrangements with regard to the boarding, lodging and tuition of the students were duly made, but with all that the attendance began falling off from year to year, till after about ten years of its struggling existence, the school had to be closed down.

The experience of ten years' working of the school showed that the right class of boys had not patronised the institution; while those who came had probably three objects in view, *viz.*—

- (1) to educate themselves free by securing a scholarship of Rs. 14 per month;
- (2) to claim a grant of agricultural land on the strength of this education; and, finally,
- (3) to get some kind of job.

The majority of them, however, failed to achieve their object, with the result that future recruitment was adversely affected.

The latest development in connection with agricultural education is the introduction by the Education Department of agricultural bias schools. There are now six such schools in Sind but, being yet in an experimental stage, nothing can be said about them.

Whatever be the fate of these primary schools, I feel that they do not solve the problem of imparting real education to landholders, whether large or small, under the peculiar conditions of Sind. Something different from what we have been actually following is required in order to touch the real agricultural community as a whole.

Under the present arrangement the majority of the boys receiving agricultural teaching are either of the *kari* class possessing no land of their

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own or are the sons of very small landholders who do not depend for their living upon the land. The natural consequence of this is that the knowledge they gain is not directly taken advantage of by being applied to the land. After passing the prescribed test they will either be recruited as teachers or will seek some other kind of Government job. Thus a very small fraction of them, if any, might return to the land.

The type of instruction should be such as, apart from estate management and the teaching of technical processes in the field, to teach the boy account-keeping, so that after the completion of the instruction he should feel himself fit only for land work and not for any Government job. The tendency to seek Government jobs is very strong in Sind, as is recognised on all hands, and unless we change this by our method of education we can, I feel, never succeed in making them turn their agricultural knowledge to useful account.

In this connection I had drawn up an elaborate note on the basis of an outline by my predecessor Mr. T. F. Main for the information of the Committee which had met in 1920 with the Commissioner in Sind as Chairman. In this note while pointing out various difficulties in making education accessible to the zamindar class, I had recommended the following type of school:—

- (a) An agricultural school which should be definitely zamindari;
- (b) should be really local;
- (c) should teach the principles of scientific agriculture in all its bearings;
- (d) should give the boys a fair general education with a fair knowledge of English, especially colloquial, and account-keeping;
- (e) should give a thorough training in estate management on its business side.

This note was accepted by the Committee in the following words:—

“As regards the second main question, that of agricultural education, the Committee feels that some remarks are required to explain the reasons which underlie their resolution on the second subject of the agenda. In the first place the Committee feels that agricultural schools must definitely be, at least for the present, intended for the sons of zamindars who are substantial or fairly substantial landholders. The class corresponding to the *khatedars* in the Presidency does not exist, except in rare instances, in Sind; and there will be little use in establishing agricultural schools for the sons of *haris*. The only existing school of the kind, that at Mirpurkhas, has not been very successful, partly because zamindars of the agricultural type dislike sending their sons to a distance, and partly because they have regarded the sending of their sons to the school as rather a favour on their part to meet the importunity or desire of their local officers, and a favour for which they expect some recompense, generally in the form of a grant of land either to the pupil or to the parent who has sent him. The latter idea is, of course, absolutely fatal to the permanent success of any such school, but it can be best counteracted by proving to the zamindar that the school is of real use to the boys who go there. The Committee thinks that the most legitimate inducement is the undertaking to impart a knowledge of simple English to the boys. The zamindars are now very anxious for their sons to learn English; this may be due partly to the desire to add to their dignity by raising them above the common herd, partly with an idea of coping more successfully with minor officials, but probably chiefly to a vague but not ill-founded feeling that English would be an advantage to a man in the general development going on throughout the country. In any case the Committee thinks that the teaching of English in these schools will be perfectly legitimate, because a really useful inducement to offer.

As regards locality, it would be undoubtedly desirable to have a school in each district, where the boy would not be too far from his home and where the zamindar would occasionally visit him. But that is not yet possible. In the meantime the Committee recommends a school at Ruk, which would be

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convenient for the three districts of Sukkur, Larkana and Upper Sind Frontier, and another at the existing school at Mirpurkhas which would be convenient for Hyderabad and Thar-Parkar, and not too far from at least some portions of Karachi and Nawabshah.

While the Committee cannot recommend agricultural school for *haris'* sons, they think that it might be possible to give some simple agricultural training in *Mullas'* schools, as the Committee understands that *mullas* are eager to be trained in simple methods of teaching and most of the *mullas* themselves come from local cultivators' families. In their resolution on Subject III the Committee has considered that the experiment of closing elementary schools in village areas during the busiest agricultural season should be tried. This may remove something of the present excuses (founded on real hardships) advanced by *haris* for not sending their children to school."

Nothing however came of this scheme. The school I propose should be self-contained. A 100-acre farm would be sufficient to deal with field and fodder crops, animal husbandry and dairying, with vegetable and fruit gardening. A small dairy herd could be attached to the estate for the supply of milk and butter to the colony and also for imparting practical instructions in animal husbandry. A Veterinary Assistant should be in charge of this section to look after the health of the livestock and give lectures in veterinary practice and stock-management. A Hospital Assistant looking after the health of the students could give lectures on sanitary principles and rural hygiene. These two medical sections will be desirable in order to make the institute attractive and create in the students' mind a favourable impression which may lead them to utilise these two departments for the benefit of the village community in their life's career as heads of the village. Such an institution should turn out a class of men who would look after their estates on the right lines. The cost of such an institution may come to a lakh of rupees, but if it is desired that agricultural education should reach the real agriculturist of which the number in Sind is as high as eighty per cent, it is, in my humble opinion, the only method and is one on which no amount of expenditure should be grudged.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(a) Before describing the measures which have proved successful in influencing cultivators, I consider it important to discuss briefly the conditions of the mass of the agricultural population with which we have to deal. The Province of Sind comprises a fairly large number of big estates whose owners, either as tribal heads or as powerful neighbours, wield a considerable influence on the petty "*khatedars*" and their *haris* (tenants).

The tenant class, which is by far the largest class of agriculturists, is entirely dependent upon the landlord not only for the seed and other agricultural requisites, but also for its very maintenance. Therefore our demonstration and propaganda, chiefly consisting of popularising improved seeds and implements, has been directed to influencing the landlords of the tract, and recently through co-operative societies and taluka development associations.

1. The propaganda consists chiefly of village to village demonstration of improved implements which are invariably worked with village bullocks in the presence of gatherings of cultivators and zamindars. Improved seeds are introduced by sowing a small area on the zamindar's holding under the local system of farming, and improved methods of cultivation are taught by employing trained coolies to attend to the operations. In the Jamrao tract where immediate cash payment entailed hardship, improved implements were advanced with the concurrence of the revenue authorities as *taccavi* loans. The result of all this propaganda has been that the "Sarkar" plough which is a modification of the Egyptian plough is universally adopted in some districts and on account of the heavy demand it is now locally manufactured in thousands annually. Similarly the hand archimedian screw, the imitation Meston and other light iron ploughs of local manufacture are on the market and are being used to some extent.

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2. Ploughing zamindari lands on the hire system is another important feature of propaganda by which the *haris* (tenants), encouraged by their landlords, are trained in their own surroundings in the actual handling of improved implements. The charges claimed for such operations are nominal (Rs. 1 to Rs. 2 per acre).

3. Small sub-stations or demonstration plots have also served a useful purpose in popularising improved seeds and implements. Of these, Jamesabad and Nawabshah sub-stations established in the newly colonised tracts have served as mediums to the new entrants to land business for copying the improved methods of farming. The essential feature of management of these sub-stations is that they are run on zamindari lines.

4. Apart from the village to village demonstrations, agricultural shows are periodically organised, when demonstrations of improved implements and machines prove educative.

5. Awarding of *afrin-namas*, medals or certificates of merit during district durbars also stimulate zeal in agricultural classes for departmental "stock-in-trade"; such rewards and recognition in open Durbars create much interest and healthy competition.

6. Periodical publication of leaflets containing agricultural matters of importance, experimental results and crop treatments and their free distribution among the educated agriculturists is another move, although such literature has not proved very effective among illiterate cultivators.

Owing to shortage of staff, however, a good deal of the country has yet to be touched on the above lines. Under the new development scheme, the number of scholarships has been increased from 2 to 6 and it is hoped that in due course the strength of the staff will be sufficiently increased to cope with the present as well as future propaganda work.

(b) The effectiveness of field demonstration can be increased by following the methods detailed below:—

- (i) Our district demonstrators should be of the right class of men, drawn mainly from the agricultural class.
 - (ii) The agricultural officer guiding the demonstration should be courteous, of winning manners and should understand the needs of the zamindars.
 - (iii) The present propaganda staff, which is extremely small, should be increased several fold.
 - (iv) There should be closer co-operation of the Revenue and Irrigation Departments with the Agricultural Department.
- (c) Cultivators can be induced to adopt expert advice by—
- (i) giving them improved strains of seeds and improved implements of practical value, on credit or in place of *taccavi*, or at concession prices if in cash;
 - (ii) giving rewards, medals, titles or *afrin-namas* to those who adopt the superior methods or help in introducing them among others, according to the value of the help rendered;
 - (iii) giving land extensions to those who take to improved methods but such extensions should invariably be made at the recommendation of the Agricultural Department.

QUESTION 4.—ADMINISTRATION.—(c) (ii) The services rendered by railways and steamers are fairly satisfactory to the agriculturist but railways should be extended in rural tracts. The present freight rates could with advantage both to the railways and to the agriculturist be reduced. I know of several places, where alternative transport facilities exist, where agricultural produce is often transported in boats or bullock-carts rather than by rail or steamer. Such transport exists between Jacobabad and Shikarpur, Sukkur and Shikarpur and the Punjab and Sukkur.

(iii) In my opinion, the number of roads is insufficient and where roads exist their condition is unsatisfactory. Owing to the alluvial nature of the

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tract even the existing modest vehicular traffic cuts the roads badly, with the result that they become very dusty. This is not only a hindrance to mechanical transport but retards the expeditious transport of produce and causes rapid wearing of vehicles. Moreover, during the inundation season certain roads remain under water for a long time.

(iv) Any forecast that the meteorologist could make regarding the weather, if circulated forthwith in the country, would be very much appreciated.

QUESTION 5.—FINANCE.—(b) The following measures would induce cultivators to make fuller use of the system of *taccavi*:—

- (1) The rate of interest charged on *taccavi* advances should be reduced to correspond with what is paid by Government to the public, to which cost of establishment may, if necessary, be added.
- (2) *Taccavi* rules should be sufficiently relaxed to enable the legitimate demands of the cultivator to be fully met.
- (3) The disbursement of *taccavi* should be entrusted to senior and vigilant officers.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(a) (i) The main causes of borrowing are:—

- (1) the inherent poverty of the cultivating class;
- (2) accumulation of interest upon interest over a series of years;
- (3) the low yield of agriculture, due to lack of resources, yielding barely a living wage;
- (4) the necessity for borrowing to obtain seed and livestock for cultivation purpose;
- (5) illiteracy and ignorance of accounts;
- (6) dependence on, and consequent bondage to, the usurer;
- (7) precarious inundation;
- (8) to some extent, social customs.

(ii) The sources of credit are:—

- (1) co-operative societies,
- (2) *taccavi* advances,
- (3) last, but most important, the village *bania* (moneylender).

(iii) Reasons preventing repayment are:—

- (1) failure of crops owing to poor or late inundation or wholesale crop pests such as rats on rice, rust in wheat and bollworm in cotton;
- (2) mortgage of produce to the village *bania* and consequent low rates accounted for by him and possibly his other extortions.

(b) Any measure of legislation to protect the agriculturist debtor from the clutches of the usurers will tend to affect the credit of the cultivator, as has already been the case where land grants have been made under restricted tenure. The only way, in my opinion, of protecting the agriculturist is to introduce compulsory primary education and provide cheap credit through agricultural banks, Government *taccavi* or co-operative societies in such a way as to meet fully the needs of agriculturists for the time being.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(a) The law of inheritance which is mainly responsible for the fragmentation of holdings should be amended or legislation introduced to prevent holdings from being divided to such an extent as to become uneconomic; that is to say, a minimum limit may be prescribed beyond which no fragmentation is to take place. A change of the law of inheritance may be against the sentiment of the people but I believe the economic pressure which is now being felt on all sides will tend gradually to overcome the feeling.

QUESTION 8.—IRRIGATION.—(a) (i) A great change is shortly to take place in the Province as the result of the Lloyd Barrage and canals under which

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perennial water supply will be guaranteed for the agricultural needs of the tract.

(iii) With regard to the non-barrage area, wherever wells are successful they are naturally being developed and some further encouragement in the shape of *taccavi* loans from Government or credit societies will do what is necessary.

(b) The present working of the canals and the distribution of water is in certain cases not satisfactory owing, I believe, to the vagaries of the river Indus; this defect cannot be remedied till the Lloyd Barrage is completed.

QUESTION 9.—SOILS.—(a) (ii) Of the reclamation of *kallar* (alkali) land we have two outstanding instances at Sukkur and Doulatpur, where alkali soils were reclaimed by surface drainage and then continuously cropping them. The work at Doulatpur, however, could not be completed on account of the failure of the Jamrao Canal to meet in full the irrigation demands of the farm.

QUESTION 10.—FERTILISERS.—(a) The fallow system of taking a crop from the soil once in three years or more has obviated the necessity for any great use of manure. Rice occupies the largest area (about one million acres) and this has been sown continuously year after year on the same land without manure, except where *dubari* (double cropping) with a pulse crop in the cold weather wherever circumstances permit has been adopted.

(d) It is only in scattered areas where intensive cultivation is practised, chiefly in garden crop areas, e.g., the sugarcane and potato tract around Chak in Sukkur district, the Malir tract in Karachi district, the Bhitshah cotton tract in Hyderabad district and the sugarcane areas on the Baghar Canal in the river delta, that the necessity of manure is felt, and the local supply of farmyard manure has been meeting this limited demand. In cotton tracts, however, another source of supply is tapped, namely, the mounds of old village sites, of which Brahminabad, eight miles east of Shahdadpur, taluka is the most conspicuous. There is also a practice of saline efflorescence from "*kallar*" soils or silt from canal banks being applied to cotton fields.

(f) Wholesale cowdung-burning is not at all a common practice in Sind as is the case in the upper Provinces. In mosquito-infested localities dry and semi-dry dung is used to smoke off the mosquito to save human beings and cattle against their depredations but the ashes are returned to the manure pit. Cowdung is utilised on a small scale especially to heat milk on a slow fire. Some quantity of dry dung is transported to towns and sold as fuel. I think legislative measures would stop the last practice which is objectionable and is likely to drain off a considerable quantity of useful material from rural tracts. *Huri* grants allotted as necessary adjuncts to every village will provide cheap fuel and hence are calculated to dissuade the cultivators from using the cowdung for other than manurial purposes.

QUESTION 11.—CROPS.—(a) (i) Cotton, wheat, rice and *jowar* are the four important staple crops of Sind. The work of improving these is done by seed selection, isolation of superior strains and their maintenance by pure line culture. As regards cotton, of a large number of strains isolated by pure line culture on factors of ginning percentage, yield and earliness, one known as 27 W.N. has proved superior to local varieties and has satisfied the trade and the zamindar alike. It is now maintained in a pure state, by renewal of stock of seed from self-fertilised seed every year. This is carried out and seed multiplied through the departmental agency till the fourth generation when it is distributed in group of villages for further multiplication.

In the case of wheat, the direction the department took in the improvement of local wheats was to have a number of strains with superior characters (of strength, colour, yield, etc.) isolated from local varieties. The most promising that have now been retained are C.P.H. 47, A.T. 38 and G.S. 25. Of the introduced varieties from outside Sind only two, viz., Pusa 12 and Punjab 11, are replacing the local wheats.

Similarly, improved types of rice are being developed by selection from representative local varieties and by testing a number of foreign ones with a view to introducing the most promising types from among them. Attempts

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are also being made at crossing local with foreign varieties to produce hybrids of high market qualities and superiority to local varieties as regards yield and early maturity.

(ii) During the existence of the department a variety of new crops, including fodder crops, has been tried. Of the fodder crops, *berseem* has come to stay with us permanently. Of the other crops, Egyptian cotton did show promise of success as long as perennial irrigation facilities existed on the Jamrao. Among American cottons, Punjab F4 has proved to be healthy and prolific, fitting in with the present conditions of water supply and possibly other environmental conditions. It has become popular with the growers inasmuch as no less than 36,302 acres were sown with this cotton on the Jamrao Canal in 1926-27 in spite of the water supply being a month-and-a-half later than the proper sowing time. This cotton is, however, a low class one so far as its staple is concerned*; hence it will be desirable to evolve a strain having all the desirable characteristics of this cotton, but having a superior staple of an inch or more for cultivation under the Barrage.

(iii) The zamindar generally depends upon the village *bania* or the *mofussil* merchant for his seed requirements. There is, however, an excellent exception to this rule in a tract called Bhitshah in Hyderabad where the cultivators and merchants co-operate to maintain a pure cotton seed supply of Bhitshah cotton. The state of things with the village *bania* or the town merchant elsewhere is anything but desirable because not only are their stocks of seed hopelessly mixed up, but no less than fifteen per cent of the seed is of low vitality owing to weevilisation, etc. The cultivator is alive to the disadvantages of sowing such seed, but cannot help taking it because of his poverty. The departmental pure seed supply organisation, whether of improved cotton, wheat or rice, though very limited at present, appears to be on right lines and requires developing.

(c) *Vide* reply under (a) (ii) above.

QUESTION 12.—CULTIVATION.—(i) One of the main activities of the district staff from almost the commencement of the department in Sind is directed towards introducing improvement in the method of tillage.

The practice of dry ploughing of fields long before the sowing season in order to aerate and enrich the soil has caught on with the cultivator in some progressive tracts as a result of departmental demonstration.

Interculturing cotton, ordinarily done by costly human labour, is now being taken up by progressive zamindars by working the plough in between the crop whether it be drilled or broadcast.

(ii) No practice of mixture is generally adopted in Sind in the sense in which it is adopted elsewhere. In cotton the cultivator puts in a sprinkling of *jowar*, *bajri*, *maize*, *til* and *guar* seed to supply him with early fodder for his working cattle.

Rotation.—As the existing irrigation facilities generally admit of one-third of the land being cultivated per annum, the necessity of practising a rotation of crops has not been felt and therefore not practised. Under the improved irrigation conditions, however, it would be necessary to devise a good rotation in which *berseem* should play an important part. This matter would be for the Sakrand farm to investigate.

QUESTION 13.—CROP PROTECTION, INTERNAL AND EXTERNAL.—The seed for the main crops is produced within the Province but large quantities of seed potatoes are imported from Italy as well as from Kalka and Farukhabad, outside Sind. The question of imported disease in this seed does not appear to have arisen.

QUESTION 14.—IMPLEMENTS.—Sind agriculture is very poor in implements both as regards quality and variety. The most successful introductions are light kinds of ploughs such as the Meston and the modification of Egyptian ploughs which are now largely used and manufactured. There is scope for the heavy inverting plough, but as the quality of cattle is too poor to work them effectively they are not being taken up extensively. The tenant or *hari* system and comparatively cheap labour are obstacles in the way of the

* *Vide* note on page 154.

adoption of heavy machinery and labour-saving appliances such as seed drills, reapers, binders and threshers.

I give a list of new implements that are being brought to the notice of the agriculturists:—

- (1) Screw water lift.
- (2) Leveller.
- (3) Jowar stone thresher.
- (4) Tractor.
- (5) Chaff cutter.
- (6) Pumping plant.
- (7) Raja, Chattanooga, Oriental and Meston ploughs.

These have in some cases been purchased by zamindars and are in use. Labour-saving appliances have, however, an excellent future under post-barrage conditions when both introduced machinery and that devised by the Mechanical Engineer's department for the needs of the country will play an important part.

QUESTION 15.—VETERINARY.—(a) I think it should be under the Director of Agriculture, being more or less an allied subject.

QUESTION 16.—ANIMAL HUSBANDRY.—(a) (i) Cattle-breeding needs immediate attention because cattle supply the only motive power in the agricultural practice of the Province. There are three excellent breeds of cattle along the borders of Sind:—

- (a) The red Sindhi or Karachi cattle, recognised as the best milk-producing cow in India.
- (b) The Thari or Dhatti breed reared in the desert of Thar Parkar and recognised as a dual purpose breed.
- (c) A third breed consisting of purely draught cattle bred in the desert tract along the river Nari to the north of Upper Sind Frontier district has proved valuable for producing first class heavy bullocks suited to all kinds of farm operations.

These breeds have so far not been developed. A central station for each breed is essential with a view to supplying bulls of first class quality for distribution in the interior of Sind, where the cattle are all nondescript and of poor quality and consequently unfit for working improved agricultural implements.

There is already a farm for the Karachi cattle to supply pedigree bulls to organisations and bodies in towns and rural areas for improvement of milk supply. The other two breeds should similarly have separate breeding stations.

The Thar Parkar or Dhatti breed should have a separate breeding station somewhere at Hyderabad or Tando Mahomedkhan to supply draught animals throughout the Lower and East Sind tract, to which this breed is admirably suited.

The Bhagnari cattle should have a central breeding farm at Jacobabad or Shikarpur to produce acclimatised bulls for Larkana, Sukkur, Upper Sind Frontier districts and Khairpur State.

(iii) The system of animal husbandry as carried on in the country is far from satisfactory. The methods of castration of young bulls and selection of sires are either unknown or not followed systematically. Immature bulls of obscure origin being herded with cows at night or allowed in the pastures, the result is nondescript progeny. Therefore, the supply of breeding bulls to villages and castration of all male calves except a few of the promising progeny of these bulls should be the first step. The provision of forage and green fodder in sufficient quantities should be made. During the hot weather grazing in waste or fallow areas is scarce and green fodders are rarely cultivated, with the result that most of the cattle are starved out and have little energy to produce or work. - Unfortunately the irrigation conditions are responsible for this shortage of fodder supply.

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(b) (iii) The large percentage of cereal crops cultivated presupposes a sufficiency of dry fodder throughout the Province, but a large quantity is sold off. The cultivator, as a rule, feeds the cattle properly during the busy season only, turning them out to graze in the recently harvested fields and waste lands for the remaining part of the year, with the result that the animals are almost starved out. The pecuniary liabilities of the farmer are the main incentive to the sale of fodder.

(iv) In the dry season, December to July, green feed is not available and its absence tells much on the yield of milch cattle.

(c) April to June is the period of fodder shortage in the Province. Scarcity of fodder exists for twelve weeks throughout April, May and June. Preliminary flooding takes place in July. After this, young growing cattle begin to thrive on cultivated fodders and grasses which last till October-November.

(d) Better facilities for irrigation water will improve fodder supply.

(e) 1. For the benefit of village cattle Government should make *huri* grants for the growth of *babul* trees and natural grasses to each village, to be managed by the villagers themselves on the basis of co-operation. Each *huri* may be about ten acres or more, depending upon the size of the village.

2. Breeding bulls from Government cattle stations should be issued *gratis* in the first instance to important villages.

3. Annual cattle exhibitions on a small scale may be held in each taluka, prizes being awarded on the basis of actual performance and constitution.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(a) In places where both *rabi* and *kharif* cultivation is possible, the cultivator has work all the year round; but where there is *kharif* cultivation only he has only six months' work.

In the slack season he—

(1) takes a holiday to attend fairs, of which there is a good number in Sind;

(2) attends religious or social functions in or out of his village;

(3) does carting and camel driving on wages;

(4) is engaged in canal clearance work;

(5) tends his livestock;

(6) works for daily wages on construction works, especially near towns.

(c) Extremes of climatic conditions do not favour bee-keeping and sericulture. Poultry rearing is already done on a limited scale. Fruit growing will not be undertaken by the cultivator as he has no permanent interest in the holding, nor are the conditions of water supply favourable. For lac culture and rope making there is some scope and they are practised wherever the necessary material is available. There is no scope for pisciculture as there is already a large quantity of fish available naturally.

(e) Wherever there is raw produce, concerns such as ginning factories and rice hulling mills have already established themselves near rural areas and these absorb some of the spare labour. Similarly small flour mills may with advantage be opened in wheat growing tracts.

(g) In view of the anticipated agricultural development of Sind due to the Lloyd Barrage, rural population will have sufficient employment in agricultural operations all the year round.

(h) Travelling health officers should be appointed whose duty it should be to tour rural areas periodically and lecture on the elements of hygiene.

QUESTION 18.—AGRICULTURAL LABOUR.—(a) (i) This Province being sparsely populated, there is no need to attract agricultural labour from one area to another.

(ii) Large tracts of cultivable land remain uncultivated at present for want of water. When the Barrage is in working order people from congested areas outside Sind will have to be attracted by giving them grants of land,

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at concession rates if necessary, as has been done on the newly colonised area of the Jamrao and Nasrat Canals.

(b) The causes of the shortage of labour are:—

(1) The naturally thin population though it is sufficient for the present needs of cultivation.

(2) Want of extended irrigation facilities.

(c) There is no surplus population in Sind at present.

QUESTION 20.—MARKETING.—(a) and (b) There are no regular markets in the sense in which they exist elsewhere but there are trade markets which appear to suit the *mofussil* growers. These trade markets are adequate as regards *bond fide* transactions and the zamindar who is not in debt generally secures fair terms. This is particularly true of the Jamrao, Tando Adam and Shahdadpur cotton tracts. The existence of ginning factories belonging to several responsible firms like those of Ralli Brothers, Volkart Brothers and Indian firms, is a fair guarantee of fair values being obtained. The ginning factories give reasonable conveniences to the growers in the disposal of their produce; they have their brokers who arrange sales even on the grower's estate and supply empty *bardans* (gunnies). There is also a system of forward sale when they get about Rs. 2 after every *maund* of *phuttis* offered at a critical time.

As to wheat, European exporting firms like Ralli and Volkart Brothers have their sub-agencies at principal centres like Sukkur, Shikarpur and Larkana where they either purchase from big zamindars direct or through the local traders. The prices offered are generally satisfactory. The position of the small grower is different; he disposes of his produce to the village *bania* who offers him much lower rates.

The rice market is controlled by local capitalists who have their rice hulling mills amidst rice growing tracts and this trade is so much localised that while there is no difficulty in its marketing, prices may not always be fixed on considerations of supply and demand. Should rice factories combine, which they sometimes find expedient for their mutual good, paddy, being unfinished produce, has no market beyond the walls of these rice mills. Now, owing to the increased number of rice mills, (within the past eight years the number of these in Larkana has risen from forty to fifty-four) this tendency is slowly dying out. These trade markets cannot be called very satisfactory and the *mofussil* cultivators will not be benefited unless we have a chain of markets scattered over the rural areas. This is not practicable at present for want of better roads and feeder lines.

(c) Grading and packing of agricultural produce both for foreign and Indian markets are matters requiring serious attention. The grading should be standardised in order to maintain the quality. This should be done by legislation.

(d) Yes.

QUESTION 22.—CO-OPERATION.—(a) I think non-official agencies will be more effective in the spread of the co-operative movement.

(b) The number of credit societies has in the last few years increased by leaps and bounds but societies mentioned in items (ii) to (ix) have not, with two exceptions, been organised. I think all these societies are very necessary to enable increased credit to be employed in the best possible way and should receive attention.

QUESTION 23.—GENERAL EDUCATION.—(i) and (ii) I have tried to give a comprehensive scheme with regard to agricultural education under Question 2 above.

(iii) With regard to (a) (iii) a few agricultural bias schools have been recently started by the Educational Department but they are still in an experimental stage. But even if these become successful I do not think they will in any way benefit the agriculturist to any desirable extent.

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(b) (i) Agricultural middle schools as proposed by me appear to me the only way of improving the ability and culture of the zamindari class while retaining their interest in the land.

QUESTION 24.—ATTRACTING CAPITAL.—(a) There are the following factors which frighten the capitalist from taking to agriculture:—

(1) The dull life of the country.

(2) Precarious seasons.

Notwithstanding this, the advantages of bringing the capitalist or enterprising man to the land are so many that every effort should be made by propaganda to attract him to the land. In my opinion, this will naturally come about with the prospect of guaranteed water supply under the Barrage.

(b) The factor which discourages the zemindar from carrying out improvements on his lands is want of capital; hence long-term credit at low interest should be given.

QUESTION 26.—STATISTICS.—For want of the necessary staff, this is not being done by the local Agricultural Department. The figures of cultivation are communicated by the Revenue Department direct to the Director of Agriculture, Bombay Presidency, Poona. To my mind, they are not accurate and reach the public too late when published. It is, however, important that this should be done by the local Agricultural Department and for this additional staff will be necessary.

Oral Evidence.

59898. *The Chairman*: Khan Bahadur Gulmahomed Abdur Rahman, you are Acting Deputy Director of Agriculture in Sind?—Yes.

59899. We have your note of evidence; do you wish to add anything to it at this stage?—No.

59900. Would you give the Commission some account of your own past appointments and experience?—I have twenty-three years' service now in the Agricultural Department. I have had no collegiate education, but I was the first man to be taken up in the department when the department was started in Sind in 1905. Since then I have studied the subject of agriculture in the course of my service.

59901. The whole of your service has been in Sind?—Yes.

59902. Have you ever attended at Poona?—I have gone there two or three times to attend some conferences; but otherwise I have all the time been in Sind.

59903. Then, have you acquired your agricultural knowledge in the course of your service, or have you attended any courses?—I received practical training in the early days of my service from the then Deputy Director of Agriculture, Mr. Fletcher, and I have acquired further knowledge during the course of my service.

59904. But, strictly speaking, you have no scientific qualifications?—No.

59905. What is your responsibility towards the research station at Sakrand; have you any responsibility?—No; I have no connection with it; it is directly under the Director of Agriculture.

59906. Is any research being carried on directly under you?—There are three farms in which research work is going on, but that work is in charge of a committee. This committee sits three times in the year to see the progress being made; and I am on that committee.

59907. Between the meetings which are held three times a year, you are expected to see that the work at these three farms is carried on within the policy laid down by the committee, is that so?—Yes.

59908. Are the three stations which you mention doing work which is largely preparatory to the extension of the Barrage irrigation in Sind?—No; that work is being carried on at Sakrand.

59909. Entirely?—Yes.

59910. What work are you doing in these three farms?—We work for the improvement of the main varieties of rice, wheat and cotton. That work is being done and the seed is multiplied from year to year.

59911. How much land is there in Sind under cultivation which is not irrigated in any manner whatsoever?—I cannot tell you; I do not remember the figure, but it is a good bit.

59912. One does not expect people to carry the figures in their head; is it an important area?—It is.

59913. What attention has your department given to cultivation of land of that sort?—That land is lying waste because of want of water. Until irrigational facilities are given it cannot be cultivated.

59914. There is no cultivation on that land?—That is so.

59915. Cultivation without irrigation is impossible in Sind?—Yes.

59916. Does that apply to the whole of Sind?—Yes, except to the desert portion of Thar Parkar district.

59917. Is the cultivation carried on there dependent upon the rainfall?—Yes, as also a good bit of Karachi district which gets a little rain.

59918. Has your department contributed anything important to dry cultivation in Sind?—There is already some dry cultivation in northern Sind, where wheat is grown without irrigation. First the land is flooded and the seed sown; after that it does not receive irrigation. We have improved that cultivation to some extent. Beyond that we have done nothing.

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59919. In answer to Question 2, on agricultural education, you describe the history of the agricultural school at Mirpurkhas; is that still in being?—No.

59920. At what age did the boys attend that school?—From twelve years upwards to fifteen.

59921. Do you believe in teaching practical agriculture to boys of that age?—Certainly, from twelve to fifteen, that is the proper age to teach practical agriculture.

59922. How about the expense; can you remember at all how much it cost to educate each boy at that school?—We used to give them some scholarships of twelve rupees a month; we gave them free quarters and then there was some other contingent expenditure.

59923. Do you recollect the cost per boy?—It came in all to about eighteen rupees to twenty rupees per month per boy.

59924. Is that for the whole year or for the term?—No, per month.

59925. Per month for those months in which the boys attended school?—Yes.

59926. How about the type of boy that was attracted by that school?—We did not get the sons of agriculturists; boys came whose object was to get some service.

59927. To get jobs?—Yes.

59928. Did you teach English there?—No.

59929. Has the Agricultural Department as such any connection with these agricultural bias schools of which you say there are now six?—Yes, there are six and we have a connection with them.

59930. What exactly is it?—So far as laying out of the farms for them is concerned, and then just visiting the schools two or three times a year to see what progress they are making; but the administrative control is in the hands of the local boards.

59931. How about the school masters who are responsible for working these farms?—They have a training for six months at Lyallpur in the Punjab, and when they return they are directly employed by the district local boards for teaching the agricultural subjects in the school. We are simply an advisory body; we hold their annual examination and advise them on agricultural matters.

59932. Are these six schools Government schools?—No, they are local board schools.

59933. At what age do the boys leave?—We generally teach agriculture in the senior standards from the fifth to the seventh; in those standards we find boys of thirteen to eighteen or something like that; we do not teach agriculture in the junior standards.

59934. Are they conducted more or less on the Punjab model?—I cannot say; I have no idea of the Punjab model; but these are the schools which exist in Bombay Presidency also; they were started three or four years ago and in Sind also they have existed for the last three years.

59935. Have you intimate knowledge of the working of these schools?—Yes.

59936. Do many cultivators' sons go through these courses?—Very few of them; the large percentage is of other boys.

59937. What is their idea in going through the agricultural course?—They are simply studying in this school, and as this class has been introduced, they have to learn that, but they are not specialising.

59938. With no idea of taking up agriculture; is that so?—Yes.

59939. What does the practical training amount to?—They have a small farm of about an acre or so attached to each of them.

59940. One pair of bullocks?—One or two schools have their own bullocks but other schools hire bullocks, and as the area is generally small, about

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an acre or so sometimes, the work is done by the boys themselves, whether it is digging or interculturing. Whenever they have to do ploughing, of course, they buy or hire bullocks.

59941. Do you know how many hours a week are given to practical farming?—I think three times a week for about an hour and a half.

59942. But you sum up, I think, by suggesting that the system in Sind is not working satisfactorily because the right type of boy is not receiving agricultural education at this moment; is that your view?—Yes.

59943. Can you suggest any remedy for that?—I suggested a type of middle school, a special type of school.

59944. Are you thinking of teaching English at these schools which you recommend?—Yes, in order to attract boys of the real agricultural class.

59945. Is it any good trying to keep boys on the land by refusing to teach them English?—I do not think so.

59946. If an English education is what they want, they will go elsewhere for it; is that the point?—Yes, English should be taught in a direct method, colloquial English, so that they can speak in English.

59947. Talking about agricultural propaganda, the Commission has heard a certain amount of criticism of the department in Sind on the ground that in the past it has not on its demonstration side been equal to its opportunities; do you agree with that criticism?—Yes there has been criticism, because we have not been able to touch the whole tract for want of staff; we have had no staff. It is only in the last two or three years that we have been getting boys from the college who are coming up. Formerly we had only a handful of men and we could not tackle the whole Province of Sind. It is only in places where we concentrated that we have done really useful work. That has been the cry of the previous Deputy Directors who were my predecessors, that the staff should be increased.

59948. How about your methods of demonstration; do you depend upon your demonstration farms, or are you demonstrating on the cultivators' own holdings?—I have described fully in my written evidence the method we employ in demonstrating our implements and seeds. We have demonstration plots which are worked by the *hari* system which is the usual system here in Sind, so that that might appeal to the zamindar instead of employing any hired labour or keeping any elaborate staff on it. At the same time, when we give out any new seed to any man, of course he becomes conversant with it on the demonstration plots; then we just show that seed side by side with his own seed on his land so that he may see the effect of it and compare it with his own seed.

59949. Where land is cultivated on behalf of the department by *haris*, are they paying a rent in the ordinary way?—No, they generally give over some piece of land just to sow the seed there.

59950. Have you also an arrangement by which land, the property of the department, is cultivated by *haris* for the department, as it were?—Yes, we have; at the present moment we have a large area of 400 or 500 acres which is being cultivated by means of *haris* where we multiply seed.

59951. That is what I want to know about; in that case are the *haris* farming on a commercial basis?—Exactly on a commercial basis.

59952. Are they getting any manures from you?—No; of course here there is no necessity for manure. As a matter of fact, we have to leave one-third of the area uncultivated for want of sufficient water, and as such lands lie fallow, they regain their fertility.

59953. What I want to know is whether these *haris* are getting from you anything in the way of credit or advance or anything else, which they would not naturally get if they were the tenants of ordinary zamindars?—They were the tenants of ordinary zamindars first, but they are now working with us, with the result that they are getting much better produce than they were getting before.

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59954. Are they enjoying any advantages now that they are your tenants which they did not enjoy when they were the tenants of zamindars?—Yes.

59955. What?—The advantage is this, that they are getting more produce out of the land by getting better seed.

59956. That is an advantage from better cultivation, but are they getting any advantages in terms of, for instance, cheap cartage or free cartage, bullocks at an advantageous price or anything of that sort?—No, they are getting the advantage of two things: better seed and better cultivation.

59957. And nothing else at all?—Nothing else at all. We give them an advance without any interest and we recover at the harvest time; but we chiefly employ them on cultivation work; we do not get any other work from them as zamindars generally do.

59958. Their produce is for distribution as improved seed?—Yes.

59959. How do you pay them for their produce?—In the case of lift irrigation we take one-third and give them two-thirds of the produce, and in the case of flow we get one-half.

59960. You are on the *batai* system which is general in Sind?—Yes.

59961. Do they get an improved price for their share of the improved variety seed?—Yes, they get from twelve annas to one rupee more per *maund*.

59962. They sell for seed as well, do they?—Yes.

59963. You see, I am trying to reconcile your note with what has been suggested by more than one witness, namely, that where the department fail in Sind is in their lack of demonstration under cultivators' conditions?—There is no doubt that we have had failures in the past, but at the same time we have succeeded where we have adopted the proper method of demonstration. The only thing is that whenever a cultivator went to an experimental farm, of course he got prejudiced; but that we could not help; we never invited him to see anything there because that was simply an experiment going on.

59964. Is the demand for improved seed active?—It is very active.

59965. Can you meet it?—No, we cannot sufficiently meet it.

59966. Do you hope to meet it in the future?—Yes, we hope to meet it.

59967. By extending your present organisation?—By extending and by getting better facilities for irrigation.

59968. Have you experimented with a tractor at all?—Yes, we have three tractors at present; one is confined to Sakrand; there are two which are working on farms under me. We have been able to get some figures by which we find we can cultivate an acre of land with an expenditure of about seven rupees.

59969. What depreciation are you allowing?—We allow thirty per cent depreciation in the first year and ten to fifteen per cent in subsequent years.

59970. And interest on capital?—Interest on capital at eight per cent. But there is some difficulty in working these on cultivators' land, because they have very small compartments, whereas a tractor requires a bigger unit of land in order that it may work freely. On the Jamrao Canal they have one-acre plots which they have necessarily to keep under the irrigation rules. On such small fields it is difficult to work tractors; and, besides, they have undergrowth of roots and scrub jungle; that also is a hindrance.

59971. Have you experimented with steam tackle?—No, we have not done that in Sind.

59972. Would not that be a good thing for clearing the scrub jungle?—That I could not say; I have no experience of it.

59973. Have zamindars taken up tractors at all?—One zamindar has purchased one.

59974. When did he purchase?—About a year and a half ago.

59975. What does he say about it now?—He is using it on his land.

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59976. Is he happy about it; is he pleased?—He appears to be pleased.

59977. I suppose people who are annoyed with the department tell you about it, while people who are pleased with the department keep quiet: Is that so?—Very often.

59978. No news is good news, is it not?—No, it is not like that. Of course we are in touch with that zamindar who is using the tractor; we are always in touch with him; in fact, we supplied him with the driver in the beginning; if any part goes wrong, we try to have it replaced by ordering it, and any other difficulties which arise we try to solve.

59979. Do you make him a present of all this service and material?—Yes; but of course when we have not got any, we have to order it out for him.

59980. Who found the capital for purchasing it?—Of course the zamindar; we do not pay for it.

59981. I thought you said you helped him out with his repairs?—We help him in getting the parts from the firm at his own expense and give him any other suggestions or any other advice which he requires.

59982. Have you any views about the agricultural statistics in Sind; do you think they are reasonably accurate?—No, I do not think they are reasonably accurate; I have said something in that connection in my note; it is at page 149.

59983. Now I want to turn to another subject. You mention at one point that you do not regard Punjab 4F. cotton as very satisfactory. What is your view about 4F.?—I have said that for the present purpose it is all right; it suits the cultivators and I have said that in the last year we had no less than about forty thousand acres under it.

59984. I see, now that my attention is called to it, that you call it a low class variety; is that what they call it in Lyallpur?—We call it medium variety.

59985. Medium staple cotton?—Yes.

59986. But not a low class variety?—No.

59987. *Sir Thomas Middleton*: You say it is "a low class one so far as its staple is concerned"?—As compared with the long staple.

The Chairman: It may stand if you wish it to.*

59988. *Sir Thomas Middleton*: In 1920 you drew up the scheme for an agricultural school?—Yes.

59989. I do not think that scheme was adopted in any case, was it?—No, it was recommended by the committee which sat to consider this matter as well as the other matter, and it went to Government; since then nothing has been heard about it.

59990. Your main requirements were that it should be definitely zamindari and really local?—Yes.

59991. What do you mean by "really local"?—It should be in as central a place as possible so that it may be convenient for zamindars' sons.

59992. Did you think of it as representing one district in Sind or the whole of Sind?—It should represent, say, one centre of Sind.

59993. So that you contemplated a series of such schools in Sind?—At least three.

59994. How many masters had you in mind?—Four masters: one head-master with three assistants.

59995. How many boys had you prepared for?—I think about 100.

59996. Did you work out the cost?—No, I did not work out the cost; of course the details have to be worked out, but that was the outline of the scheme.

* The witness subsequently requested that for the words "a low class one so far as its staple is concerned" the words "a medium stapled one, having a staple of $\frac{3}{8}$ " should be substituted (*vide* page 145, lines 13 and 14).

59997. I saw the outline and it occurred to me the cost might have been the difficulty. It would be a very expensive type of school?—It would be about a lakh of rupees; I do not think it would be more than that.

59998. You were with Mr. Fletcher at the beginning, you tell us?—Yes.

59999. How many years did you cultivate Egyptian cotton with him?—We cultivated it for nearly five years.

60000. Why did it fail finally?—There are different opinions about it; some think the right sort of seed was not tried, but I do not think there is much truth in that because at present one or two varieties which were on trial then are now under trial at Sakrand and they seem to be doing comparatively well. But then water supply was the chief difficulty, because this crop, being a superior crop with a long growing period, required water earlier in the season than we could get it. In the beginning we did get it and it did fairly well, except that we had some difficulty with the cultivators, for it was a newly colonised tract and the people did very rough cultivation. But in spite of that it did well; but afterwards, when the Jamrao Canal failed to supply early water, of course this failed.

60001. Was it a failure on the part of the cotton or was it a failure of water; I have always understood it was failure of water?—Yes, that was it, because we could not get an early supply of water in order to have it ready by October before we get any frost or dewfalls.

60002. Do you know what types Mr. Fletcher imported?—Yes, Mettaffii, Abbasi and Ashmouni.

60003. I think you said just now that you still have some of that seed?—Ashmouni we have at present; it is doing better than the others.

60004. Is it a new importation or the old seed?—A new importation.

60005. What is this 27 W. N. cotton?—That is a strain from the ordinary local cotton, which, when it is examined, is found to have four types. We selected this and gave it the name 27 W. N.; it is a white flowered ordinary *neglectum roseum* cotton. This we have selected; we are multiplying it and it is very popular.

60006. From your account I gather that the cattle of Sind are poor?—No, they are not; we have the best breeds here.

60007. I was not thinking of the Karachi and Thar Parkar breeds, but the ordinary cattle?—Yes, very poor.

60008. The number of these selected breeds which you refer to, the Karachi and Thar Parkar, is small, is it not?—Karachi cattle are small in size, but the Thar Parkar is of medium size.

60009. I mean, the total number in the country is not large at present?—The total number is small; it is not very large.

60010. Most of the cattle consist of ordinary draught animals; I think you call them Bhagnari?—Bhagnari are confined to the northern part of the Province; but they have been bred for size and the present size is not suitable for agricultural purposes because they were bred for military transport purposes.

60011. Then they are like the Hissar breed and that sort. Have you seen Kankreji cattle?—Yes.

60012. Are they like the Kankreji in size?—No, they are bigger than that, very bulky and heavily made.

60013. If you go to the district in which the Thar Parkar are bred, do you find in that district only pure Thar Parkar or are they mixed?—The cattle are mixed; they are non descript cattle at present.

60014. Do any of the zamindars maintain herds of pure Thar Parkar?—No, not pure.

60015. Are the only pure herds to be found on Government farms?—No, we have no farm except the farm for the Karachi cattle here; but we do come across a bullock here and there which may correspond to pure type.

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60016. But that you can only guess at by its appearance?—Yes.

60017. So that the Karachi cattle are the only pure types in Sind that you can be sure of?—Yes.

60018. The Thar Parkar cattle are all mixed?—Yes.

60019. What is the usual age of castration for draught bullocks in Sind?—As a rule they do not do castration, but the age limit is about a year or two.

60020. I ask what the common practice is. Take the big breed that you referred to, the Bhagnari, what do you say the age is?—The same.

60021. Are you sure?—I am not quite sure, but that is my impression.

60022. *Sir James MacKenna*: What was your appointment before you took over the Acting Deputy Directorship?—I was first a fieldman; after four years I was appointed Inspector, and after four or five years Divisional Superintendent. I held that appointment for about ten years, and then I was appointed Acting Deputy Director.

60023. Have you ever done any crop selection and research work yourself?—Not myself independently, but I have worked in a committee.

60024. And you are to see that the work approved by the committee is carried out properly?—Yes.

60025. You do not live on the farm?—No. As Deputy Director of Agriculture, I live at Karachi; the headquarters are at Karachi.

60026. The Superintendent is on the farm?—Yes.

60027. *Professor Gangulee*: Who draws up the plan of experiments?—It is at present done by a committee consisting of the Director of Agriculture, the Botanist or Cotton Breeder, and myself.

60028. Do you find that such plans require to be revised occasionally?—An experiment, when once laid down, is carried on for a number of years, till we get definite results, and those results are repeated till we get final results.

60029. Are you familiar with the Sakrand station?—Yes, I know Sakrand.

60030. Do you think that the schemes which you now have for that station require to be revised in the light of new experience that you have gained?—I do not think so, because they have only recently been laid down, and they will have to be proceeded with for a number of years.

60031. Do you think that the Baker-Lane scheme requires revision?—If it is suggested by the experiments, then it might require revision. The scheme that has been laid down is not considered to be unsound, but the cropping is such as to need a considerable amount of farmyard manure, and to replace that, perhaps some leguminous crops will be needed to come between the other crops.

60032. Can you tell the Commission a little more about the reasons for the failure of the Mirpurkhas school?—The reason was that we did not get the right kind of boys.

60033. And the right method of teaching?—It was elementary teaching, and that was done by a graduate of the Agricultural College. So, there was no defect in the teaching; there was defect in the recruitment.

60034. What was the qualification for admittance?—A boy who had passed the vernacular fourth or fifth standard was admitted.

60035. If you had to start that school again, would you change the qualification for admittance?—In order to induce the boys to come, we might keep the same qualification as I have suggested for the school which has been proposed by me.

60036. What steps would you take to reduce the risks of failure?—We might provide English education as an attraction for boys of the zamindari class to come and join. That is the chief attraction that we shall have to provide there.

60037. It will be definitely zamindari?—That is what I have suggested, and that has been approved of by the committee also.

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60038. In the memorandum that was submitted to us by the Bombay Government, I find that in Karachi there is a distinct decrease in the net cropped area. The net cropped area of Karachi has receded recently quite conspicuously, and there is a fall in production to the extent of twenty-three per cent. Can you tell the Commission why it should be so?—I cannot tell you with certainty, but probably water supply may be at the bottom of it.

60039. A fall in production to the extent of twenty-three per cent is a big fall?—It is a big fall, no doubt.

60040. You consider water supply is one of the reasons?—That is what I think. It cannot be over-cropping because the water is not sufficient for even one-third of the holdings at present.

60041. You have explained to us why experiments with Egyptian cotton failed. Do I understand that you have abandoned the experiments with Egyptian cotton?—Yes, till we get stable conditions, a steady and perennial supply of water.

60042. When the Barrage and canals are completed, perhaps you will continue the experiments?—Yes, certainly. In fact, experiments have been begun even now at Sakrand. With the perennial supply which is now available there, the experiments have been begun again.

60043. With Egyptian cotton?—Yes, even with Egyptian cotton from this year.

60044. With fresh seed from Egypt?—Yes.

60045. You told us that you were carrying on experiments with the new variety of Egyptian cotton known as Ashmouni?—That is being done at Sakrand.

60046. Are you trying any other variety?—Sakel, Pilion and Zagora are the three varieties that are being tried.

60047. To what extent is Pusa 12 wheat being grown?—To the extent of fifty thousand acres. It is mostly confined to North Sind, in Sukkur, the Upper Sind Frontier, and Larkana districts.

60048. Do you think the area could be still further extended?—It is being extended.

60049. The difficulty is perhaps a steady supply of water?—Yes.

60050. The cultivator is quite convinced of the benefit?—He is very much convinced.

60051. With regard to the question of seed supply, do you find the taluka development association of help in your district?—It is of very great help, because it is through the medium of these associations that we are able to find a ready response from cultivators, and we are able to distribute our seeds and implements through them.

60052. The seed is grown on the farm under your supervision?—Yes.

60053. Will you take the Commission through the process?—We grow a certain quantity in our farm, then we give it out to private seed growers, then we collect it and give it out further. We handle it to, say, about twenty-five to thirty thousand acres. Further, it multiplies itself, and we cannot follow it because it becomes too unwieldy for the department to follow.

60054. The private seed growers grow under your supervision?—Yes; we supervise their crop.

60055. Do you renew the strain?—Every year we are renewing; that process is continued.

60056. What prospect do you hold out for *berseem*?—At present there are no prospects for it, but when we can have a cold weather supply of water, there will be much scope for it.

60057. The extension of *berseem* cultivation would solve, to a great extent, the fodder problem?—Certainly, it must.

60058. Talking about the fodder question, do you think cattle-breeding pays in Sind?—My information is that it does not pay.

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60059. You have a certain amount of export demand from Karachi?—Yes; there is any amount of demand.

60060. In spite of the high prices that you get from the export market, cattle-breeding does not pay?—In what sense?

60061. I am referring to cattle-breeding as is conducted by private persons?—To those who are near towns it pays very well, because they can find ready sale for their milk and other produce, especially milk; whereas, those who are far away from towns do not get any ready sale for their milk, and consequently it does not pay them as well as it perhaps does in other countries.

60062. Do you think the Government of Bombay have paid adequate attention to cattle-breeding?—They have, in so far as one station has recently been established near Karachi, and they have three or four stations in the Presidency proper.

60063. What are the chief difficulties in the way of cattle improvement?—The chief difficulties are that the ordinary breeder does not understand the principles of breeding; that is because he has no knowledge. That is the chief difficulty.

60064. Has he convenient access to good stud bulls?—Wherever Government institutions have been established, they have free access to them.

60065. In the experiments that are being conducted by you, are you doing anything with regard to rotation of crops?—We did carry it out in the beginning, when the Jamrao Canal worked well. That was designed to be a perennial canal, and in the beginning, for a few years we did carry it out, but before our results were out and could be called definite, the water supply failed, and so we discontinued it.

60066. Are you working out any other scheme?—Not at present, but it is being worked out at Sakrand, where the Barrage conditions have been reproduced.

60067. About water supply in Sind, what, do you think, would be the state of affairs in non-barrage tracts? Do you think they will have enough water for agricultural purposes?—I do not see any reason why they should not have enough water. Of course, they will have water for a certain season, for about four or five months in the year in the hot weather, but I do not think it will be a steady supply.

60068. What about well irrigation? Is there any possibility for well irrigation in any tracts?—Certainly, it is possible, and there are wells on which cultivation is being done. It is mostly confined to the north of Hyderabad.

60069. You think that non-official agencies would be more effective in the spread of the co-operative movement?—Yes, because private individuals command more confidence.

60070. Do you see signs of such bodies coming forward?—I do.

60071. *Mr. Kamat*: Has there been mooted in this Province an idea to have an Agricultural College for Sind?—Yes, there has been some such movement.

60072. A first grade Agricultural College?—Of the type of Lyallpur or Poona, a full-fledged college.

60073. Is the demand for it universal?—There is a demand from certain sections of the people, but I do not think it is universal. So far as the land-owning community is concerned, I do not think they understand it, or that there is any demand for it from them. There is a demand from certain sections of the people.

60074. If it is not from the zamindars, from whom is it?—From certain sections of the people; probably the townspeople and a few zamindars; there is no demand from the large majority of zamindars.

60075. What is your own view?—I do not think it is necessary to have a college for Sind, because those who are turned out by the college generally seek jobs. We can give them jobs only to a very limited extent; so far as the department is concerned, they could employ a few. I am for schools

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of the type that I have suggested, so that the agricultural community as a whole may be benefited by it.

60076. What is the type you have suggested?—I have suggested a middle school in my note.

60077. A prominent feature of agriculture in this Province is that land, some thousands of acres in extent, is accumulated in the hands of some zamindars, whereas the large bulk of the *haris* are landless. That is the situation?—Yes.

60078. Do you think that is desirable?—It is not very desirable.

60079. Would you like to have a change in favour of the *haris*?—If you take away the *haris* and give them lands individually, then perhaps there will be no *haris* available to cultivate the zamindars' lands.

60080. You are not in favour of it?—To some extent, but not as a whole. To some extent you could give out lands to some intelligent *haris*, or to those who show signs of progress, but not as a whole.

60081. Have you thought of any scheme to improve the position of the *haris*, by giving them land under the new Barrage area?—No, I have not. But I think the old plan of giving out the land to Punjab colonists as peasant proprietors of the Jamrao, about thirty-two acres to each man, has worked well and has given good results. But I do not know how far such a holding will be handled by Sindhi *haris* as peasant proprietors. If such lands are given out at all, I think they should be given out under that tenure.

60082. If two blocks of sixteen acres each are given out to the Sindhi *haris*, what difficulties do you foresee? They will not have the capital?—They will not have the capital; they have quite a different mentality. The Sindhi *haris* as a whole are indolent people; that is my personal opinion about them; whereas, the Punjabis have made it a success. They have not only made a decent living out of it, but they have also accumulated sufficient money to buy land from their neighbours, especially from Sindhis.

60083. You cannot depend on the Punjabi to colonise the whole of Sind?—I think the Sindhis have, to some extent, copied them, and probably, under the present economic pressure, things might improve, but not at once.

60084. You think an attempt to improve the *hari* in that direction would not be successful. Is it worth making a beginning at all?—We might select a few *haris* and start an experiment on the lines of the Jamrao, and see how it succeeds, and then we could extend it.

60085. Some such attempt is worth making?—Certainly; I think so.

60086. Are you conversant with the conditions of wheat export from Karachi?—No.

60087. You have not studied the problem of wheat export from Karachi itself?—I know the marketing system which is being carried out in the *mofussil* and elsewhere.

60088. I think you have said something about the marketing conditions?—Yes.

60089. What are the defects, apart from the question of having middlemen?—The defects are that we have at present a very defective road and railway service. We should have many roads and many feeder lines, so that the agricultural commodities could be brought to some central market very easily.

60090. These are the administrative conveniences which you want?—Yes.

60091. Speaking from the agricultural point of view, is there any adulteration either on the part of the producer, or the middlemen, or the Indian firms, or the English firms which export wheat?—I think there is adulteration.

60092. Have you any idea how to prevent the adulteration of wheat?—Wheat is marketed on the basis of a certain quantity of pure wheat and a certain quantity of other foreign grain mixed together. In the case of those who make an attempt to grow a pure crop, their quantity being very small, the trade does not compensate them for the purity of their produce; but if

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some legislation is passed fixing the grade of crop, then perhaps adulteration might disappear.

60093. Short of legislation, have you any other method to suggest how to improve conditions? Cannot the department, by propaganda or any other means, do something in the matter?—Yes. For instance, we distribute seeds of Pusa 12, which is quite pure. The produce from that of course is pure, but apart from the quality for which that particular wheat fetches some premium, no consideration is paid by the trade for that commodity being pure. That is the state of affairs; but if a certain standard is fixed, if it is laid down that the zamindars should produce that standard and the trade should pay a certain price for that particular standard, then I think there will be a universal increase in price, and both the zamindar class and the trade will be profited.

60094. If grading or standardisation were to be introduced, do you think the producer would understand it?—I think there are some who do understand it. For instance, in the case of cotton, there are people who mix dry leaves of the cotton plant, or the dry bolls with their cotton deliberately, in order to increase the weight. There are some such dishonest people. They even water their cotton, so as to make it bulky. But there are others who produce it in quite a clean state, but the quantity being small the trade does not pay enough for it; on the other hand, the trade mixes something with it. So that, ultimately, when it goes to its final destination, the thing is very much adulterated through several agencies.

60095. Do you mean to suggest that the exporting firms are not conscious that in the long run that is to their detriment?—That is what I have noticed. I am not talking of big exporting firms, but of village *banias* and such men.

60096. You think that there should be propaganda to educate public opinion with reference to the *banias* and the village people?—Propaganda is already in progress, but the *bania* is only concerned with his profit; he does not care what quality he markets he does not understand it. It is mostly with the growers and with the big firms that some such propaganda should be started; in fact, it has already been started.

60097. When you speak of legislation, on what lines should there be legislation?—So as to fix some grades, say of wheat or cotton; anybody bringing produce of a lower grade than that which is laid down should be dealt with in some way.

60098. Is it something like the Cotton Transport Act?—Something of that kind.

60099. *Mr. Jamshed Mehta*: You were talking about the adulteration of wheat. If a resolution were passed by the merchants' chambers in the ports to which the wheat is exported, say Liverpool or other ports, insisting upon a particular quality of wheat being sent to them by their agents or their own firms here, then the merchants who are buying the wheat, the middlemen, and even the growers would have to give that quality of wheat. Do you not think that would be sufficient without having legislation?—I think there is already a demand for a certain standard in European markets, and those who offer lower standards than that are paid less. This has been going on for several years, and yet it has not remedied that defect.

60100. Do you know that because a certain standard which is not quite pure is accepted by the merchants outside India, therefore the export firms here send out that quality of wheat, making it up by adulteration even if it is given to them pure?—I think so.

60101. You were talking of Sindhi *haris* who are indolent. Do you mean the zamindars or the *haris*?—I am talking of the *haris*.

60102. You think that if land in blocks of sixteen acres were given to them, they would make no use of it?—Our past experience of that experiment which has been carried out on the Jamrao shows that there is some scope for it, but we made the experiment with non-Sindhis. So, I say that it is worth

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while making an experiment with Sindhis to begin with. My idea is not to give out all the land at once, but to select a few men, try that experiment with them, and see if they can make a living out of it as the Punjabi men did, with a stable permanent supply of water. If that experiment succeeds, then it is worth while extending it.

60103. Do you think a co-operative society of the *haris* would succeed? Suppose you form a co-operative society, get an area of land, make the *haris* work on it, take payments from them, and within a period of fifteen or twenty years make them the proprietors of that particular block of land, would such a scheme succeed?—It comes to the same thing whether Government or co-operative societies do it.

60104. Do you think that, in such a case, the *haris* would work diligently?—I think it is worth while trying that experiment.

60105. Supposing a choice were given to you between an additional Arts College and an Agricultural College in Sind, which would you prefer? If Government said that they were going to have an Arts College, and if somebody else said that they want an Agricultural College, what would be your opinion?—From the zamindars' point of view, I would not favour any.

60106. If a choice were given to you, what would you do?—If I were a zamindar, I would not favour either of them.

60107. You feel that there will be no jobs available, and therefore you do not want an Agricultural College?—Yes.

60108. In that way, may I just say that the graduates of the Arts College are exactly in the same position? Can we say, therefore, that there should be no Arts College?—It is the wrong kind of education that we are giving them.

60109. You were asked about your experience with tractors. You said there was one at Sakrand and two in your department, and you stated that it costs about seven rupees an acre?—Yes, it costs about seven rupees an acre.

60110. Including depreciation?—Including everything.

60111. How does it compare with the present method?—It does superior work. It goes to a depth of ten inches or so, and it uproots all the weeds. Taking that into consideration, I think it is a good thing.

60112. How does it compare with the present methods in Sind?—With regard to land covered with deep-rooted weeds or dirty land, I think the tractor is cheaper.

60113. What is cheaper?—The tractor, in the case of foul land.

60114. With normal land?—With normal land, our ordinary plough. Our ordinary plough goes only to a depth of four or five inches, but these tractors go to a depth of ten inches. The ordinary plough is not able to work through weeds. Therefore the tractor is the best thing for foul land.

60115. Supposing co-operative societies are formed for the supply of tractors to small holders, the societies could rent them to the members. Would it succeed?—I cannot say until we have completed our experiment.

60116. Has your department tried to rent them?—Yes; recently we rented one to Mr. Madhavdas of Shikarpur who cultivated thirty acres of land.

60117. You speak of attracting capital to land. You have lived all your life in Sind. When the Lloyd Barrage land is free for cultivation, would you be in favour of large syndicates taking up land for cotton, wheat, etcetera?—Yes.

60118. Would you be in favour of granting land to educated young men, either direct or through co-operative societies?—It would be a good thing if we could make them settle on the land and not simply own the land, stay in the towns and depend upon the labourers to cultivate the land.

60119. Do you think educated young men, unlike the *hari*, would put to use modern tractors, etcetera?—It is worth while trying.

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60120. Supposing the leaders of any particular community, the Memon community, the Parsi community or the Khoja community, came to you in the interests of the young men of their community, wanting to colonise the land with their young men, would you give them facilities for purchasing land?—Provided the young men undergo training in some form and make themselves fit for farming.

60121. I come now to the question of subsidiary industries. Your opinion is that the agriculturists are free for at least four to five months?—Yes.

60122. One of the zamindar witnesses told us that the agriculturists are not at all free to work on any subsidiary industries; what is your view?—In the case of Upper Sind Frontier where the *bosi* system of cultivation is going on the cultivators have work for eight to ten months in the year.

60123. *Dr. Hyder*: What does *bosi* mean?—A piece of land is flooded in September and the water is allowed to soak into the land to a depth of one foot or more. When the surface water has evaporated the wheat seed is drilled in and it grows without further irrigation. That is *bosi*.

60124. Who is the *hari* who adopts this *bosi* system?—The same *hari* who takes up *kharij* cultivation.

60125. *Mr. Jamshed Mehta*: Do you think if the Department of Industries demonstrates certain subsidiary industries to the *hari*, the *hari* will take them up?—I have said that there is not as much scope for these industries in this tract as elsewhere, because the *haris* have got plenty of work if they choose to work.

60126. If experiments are made and demonstration given to them?—Experiments with what?

60127. Small industries, such as those mentioned in the Questionnaire, rope making, weaving?—I do not think they will take up weaving, because they have a prejudice against it.

60128. In which tract do you say the *hari* has enough work to do?—Where *bosi* cultivation is taken up. There they have work for eight or nine months in the year. Here, in Lower Sind, they are busy for six months in the year. Conditions vary; wherever there is water and scope for wheat cultivation, there the *haris* remain engaged for eight months; where there is only ordinary *kharij* cultivation they are engaged only for six months in the fields.

60129. Do you expect labour shortage after the Barrage is completed?—Yes.

60130. And you will have to employ labour-saving implements?—Yes.

60131. On the question of fodder, you say that there is scarcity of fodder during certain months. One of the witnesses stated that there was no scarcity of fodder. What is your experience?—There are some tracts in which there is no scarcity, but taking Sind as a whole there is scarcity during certain months.

60132. In the Presidency they have a scheme for preserving large quantities of fodder; would that be suitable to Sind?—I do not think there is scope for any such thing in Sind. We have got irrigation here and although it is not steady, all the same it gives a sufficient quantity of water to enable the cultivator to grow grass if he chooses to grow it.

60133. On page 146 you give some advice regarding the supply of breeding bulls, weeding out and castration. Do you think that if the Veterinary Department were placed under the Agricultural Department it would work better?—I have stated in my note that the Veterinary Department should be under the Director of Agriculture.

60134. On page 143 you say that compulsory primary education would be the best means of freeing the zamindars from debt. So, in your opinion, as they get educated they do not get into debt?—That is what I believe.

60135. On the other hand, some witnesses have stated that if you gave education there would be no *haris* on the land?—I do not mean education up to the seventh standard; I mean compulsory primary education.

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60136. How would you prevent them from going to the upper classes?—The *mulla* schools which have been recently started are the best; they would give them just sufficient knowledge for their own use.

60137. On page 143 you make a statement that *taccavi* rules should be entrusted for administration to more vigilant officers; is there anything wrong at present?—I do not say there is anything wrong; if the officer is vigilant the turn-over will be quicker.

60138. Water distribution is at present in the hands of the irrigation engineers. Some witnesses have stated that it should be entrusted to the zamindars, because they say that the irrigation officers who are mere engineers do not know anything about agriculture and the water requirements of crops and soils. Do the engineers consult the Agricultural Department in any way when they have to give water?—They do not as a rule. They supply a certain quantity of water laid down in the rules. Possibly the difficulty is due to deficiency in the river itself.

60139. It is alleged by the zamindars that they have no knowledge of the requirements of a particular crop or soil; I therefore want to know whether you would wish that the Agricultural Department should be consulted in fixing the quantity of water, or whether you would wish the distribution of water to be entirely entrusted to zamindars?—I think it should be entrusted to a board consisting of the representatives of zamindars, the Agricultural Department and the Irrigation Department.

60140. You state, on page 142, that you have not sufficient staff for carrying on your work in Sind. What staff would you want?—Several more; something like fifty or sixty, and even a hundred when the Barrage is in working condition.

60141. Without that staff Sind would suffer?—It would suffer, because our work requires more men.

60142. On page 141 you speak of agriculturists being entirely dependent on zamindars. What does the agriculturist or *hari* get from the zamindar? Out of the half share of the produce that the *hari* ought to get, what does he actually get?—There are certain deductions on account of expenses in connection with charity.

60143. The zamindar deducts a share for charity out of the *hari*'s share?—Yes, but it is not very appreciable.

60144. Can you give the Commission an idea of what the *hari* makes per month?—He gets his proper share *minus* something deducted for giving charity. What he gets depends upon the nature of the crop; if the crop is good he will get more; if the crop is bad he will get less.

60145. What does he get per acre?—In the case of cotton, if the yield is eight *maunds* per acre, he will get four *maunds*.

60146. There is no deduction?—There is some deduction. The practice differs from place to place; some zamindars give away the whole share; some deduct a small share.

60147. *Professor Gangulee*: Could you give us an idea of the income and expenditure of the average *hari*?—That depends upon the nature of the tract, the water supply and so on. Assuming cotton to be the crop, at the present rate of twelve rupees per *maund* (last year the prices had gone down), allowing ten acres for one *hari*, I think he ought to get about one hundred and fifty to two hundred rupees, assuming conditions to be normal.

60148. Have any attempts been made by your department to take a census of his income?—That is an economic study; we study that.

60149. *Mr. Jamshed Mehta*: On page 141 of your note you make the statement that an agricultural school should be started for zamindars' sons and not for *haris*' sons; why not?—Because the *haris* have not got their own land and therefore they would not be interested in that sort of school, where management and all that sort of thing will be taught. You must remember that the *hari* has no interest in the land and therefore that sort of education will not help him much.

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60150. Is it your idea that, for generations to come, he must remain a *hari*?—If he raises himself, he can take his place among the zamindars; there are *haris* who have become zamindars.

60151. On page 139 you mention the failure of an agricultural school; when was it in existence?—About five years back.

60152. Do you think that if one were started even now it would be a failure?—I am not speaking of that type. Even the agricultural bias schools in existence are not successful because the pupils who study in those schools are not of the agricultural class.

60153. *The Raja of Parlakimedi*: In demonstration, may I know what factors you concentrate upon?—Demonstration of seeds, implements and the other departmental things?

60154. When you go about demonstrating the improvement of crops, what factors do you take into consideration?—As regards the improvement of seed so as to increase the average outturn of the crop, we have taken up cotton, wheat and paddy.

60155. For instance, do you not take into consideration the yield?—Yield as well as quality. We see that the seed we distribute is capable of giving a higher yield and at the same time capable of giving a quality which will command a premium in the market.

60156. To achieve the highest yield, what fertilisers have you been using?—We have not used any fertilisers. In Sind this method is not of a pressing nature, because the lands lie fallow alternately and they get sufficient rest to recoup the lost fertility.

60157. By applying artificial manure, cannot the yield be increased?—It can be, but if you use artificial manure you require facilities for irrigation.

60158. In irrigated tracts are you introducing artificial manures?—We have recently made a start. In co-operation with a private firm we have started distributing these manures.

60159. For what crops have you started giving artificial manures?—Wheat, sugarcane, etcetera.

60160. What fertilisers?—Ammonium sulphate, nitrate of soda; these are the chief.

60161. What steps do you take to make these fertilisers easily accessible to the agriculturists?—A firm in Karachi has organised this; they give easy credits. The department has not given any on its own account. We have induced certain zamindars and other people to go in for these.

60162. Do you take the help of the co-operative societies?—Exactly; we work through the co-operative societies.

60163. On page 142 you mention certain qualifications necessary to make an officer efficient. Do you not think that it will be better to add to those qualifications "disinterested and zealous personal interest"? You say that he must have winning manners and so on. Do you not think that it is very necessary that the officer should be zealous and also interested in the work he is carrying on?—That is the first requirement.

60164. That should be mentioned first before you say "winning manners"?—I have stated that he should understand the needs and requirements of the zamindars. Unless he is interested how can he understand them?

60165. But that might have been clearly stated?—Yes.

60166. As regards animal husbandry, you suggest that the breeding of dual purpose animals should be encouraged. Would it not be better to have a bull of the pure milking strain and another of the dual purpose strain, so that people who want only dual purpose animals may have the service of that particular bull and people who care for the milking strain may have the service of the bull with the pure milking strain?—In my opinion it would be better to kill two birds with one stone.

60167. You may not reach a good standard of efficiency?—We should try to do it as far as possible.

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60168. In parts of Sind, do not the cattle with heavy milk yield thrive?—They do; the Karachi cow here is well known as the best throughout India.

60169. Do they thrive in all climates?—They seem to be thriving; for instance, they have been sent to Japan.

60170. In Sind itself, in desert areas?—In desert areas or in Upper Sind, I cannot tell you; but round about Karachi and even up to Hyderabad they do very well. Some cows and bulls have been purchased by His Highness the Mir of Khairpur, but I have no information as to how they are getting on.

60171. Are the people in these parts accustomed to grow fodder for their cattle? Do they set apart a portion of their fields to grow fodder?—They do. They grow *bajri*.

60172. Are they in the habit of storing fodder?—They do store it, but not in the form of silage. They put it in a heap and that is enough. We have little rain here.

60173. Does that give them sufficient provision during periods when fodder does not grow in the fields?—Yes; they are safer here than in the Presidency.

60174. When they are so much interested in the cattle, I think there should be no difficulty in breeding a variety which will give a heavy yield of milk?—I have stated that we have an excellent breed in Sind, which is known as the best in India. I have also advocated that breeding stations should be started to improve the Thar Parkar and the Bhagnari breeds.

60175. Has the Thar Parkar breed reached a high standard of milk yield by cross breeding?—We have not done any breeding that way. I have suggested that some stations might be started.

60176. *Mr. Jamshed Mehta*: You say something about research stations in your note; do you think they are immediately necessary?—I do not think they are immediately necessary.

60177. At present the food-crop area is eighty-one per cent. of the total, and the non-food-crops area is nineteen per cent of the total. Do you think that after the Lloyd Barrage comes into operation, those percentages will change?—I think under the Baker-Lane scheme a greater area has been provided for food-crops, so the percentage of food-crops area will increase.

60178. And the other will decrease?—Perhaps so.

60179. *Professor Gangulee*: Then, you do not envisage the extension of cotton cultivation?—The Baker-Lane scheme does not provide for much cotton cultivation.

(The witness withdrew.)

KHAN BAHADUR DILMURADKHAN BAHADURKHAN
KHOSO, President, Jacobabad Municipality, and
Zamindar, Jacobabad.

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(a) It should be inquired for what reasons the agricultural state of the Upper Sind Frontier district is backward.

(i) In my opinion, the climate of this district (extremely hot in summer and cold in winter) and the scarcity of rains are responsible for this backward condition. This could be remedied by improving canals and thus allowing more water to zamindars.

(ii) It has been observed by experience that, every day, disease in the cattle is increasing and some precautions and measures may be taken to remedy it.

(b) There is great need for skilful workers and the difficulty of money should be met.

QUESTION 2.—AGRICULTURAL EDUCATION.—(i) No.

(ii) Yes, it is very necessary to extend teaching facilities in this district.

(iii) Yes.

(iv) The number of boys in the schools should be increased. To every school a farm should be attached, a portion of the produce of which may be given to the boys.

(v) To induce lads to study agriculture, some compensation may be made to them after finishing their course either by giving them employment or giving them land for their maintenance.

(vi) Yes.

(vii) Agriculturist students should be given much more practical experience than at present.

(viii) They are all very necessary.

(x) This could be done by giving them handsome scholarships.

(xi) No.

(xii) and (xiii) This could be done through zamindars who may be helped by Government with money.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—Till there is sufficient education and improvement in the people the Government should show consideration to the agriculturists (i.e., zamindars) in giving out small strips of land, by giving them facilities and conferring honours on them.

QUESTION 4.—ADMINISTRATION.—(a) As the climate of every part of the country is different, it will be better to do different work at each place.

(b) In my opinion, the work on agricultural implements that is being done now should be continued. The number of people with scientific knowledge should be increased. There should be a board consisting of officials and non-officials under official control.

(c) (i) and (ii) I am satisfied. The improvements have proved useful to the country. Greater attention in this direction will prove more useful.

(iii) The condition of roads is bad. No improvement can be made in the present financial position unless Government makes a grant.

QUESTION 5.—FINANCE.—(a) It is necessary to give pecuniary help in order to improve cultivation.

(b) *Taccavi* allotments and the period for the return of *taccavi* should be increased.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(a) (i and ii) (1) Heavy expenses, (2) borrowing money at heavy interest, (3) inadequate produce owing to deficiency of water, (4) lack of rainfall and accidents leading to decreased income, (5) the *taccavi* which is given to *haris* is not under proper control

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and there is therefore fear of loss, (6) heavy burden of taxes, (7) heavy expenses of excavation and less payment therefor from Government, and (8) hardness of Government in the grant of remissions.

(b) (ix) The zamindars get less advantage from the purchase and sale of grain than in other countries. The rates of grain vary but zamindars do not know it. There should therefore be fixed rates, for the traders get much profit and the zamindars lose. Action should be taken for the protection of zamindars. By means of Government *taccavi* it should be made easier for co-operative credit societies to obtain loans from the Central Banks.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(a) and (b) It is difficult to effect improvement as the Mahommedan law cannot be amended.

(c) The present law is insufficient. Two members from the zamindar class should be attached to courts to give opinion for the convenience of the court and the public.

QUESTION 8.—IRRIGATION.—There is greater deficiency of water in this district as compared with others. Therefore the period of *abkalani* season should be increased and canals should be improved.

(b) I am satisfied with the present system of rotation of water supply. For further improvements and for preventing complaints I suggest the following:—

1. Improvement of silt clearance.
2. Excavation of branch *karias*.
3. Giving equal share of water to those who draw excessively.
4. Restriction on paddy cultivation.
5. Fixing *mopas* for paddy cultivation.

QUESTION 9.—SOILS.—Arrangement should be made for greater supply of water for improving the land.

QUESTION 10.—FERTILISERS.—I am of opinion that natural manure is more profitable than artificial as there is more natural manure in this district.

Cowdung should not be burnt as fuel. Burning manure should be penalised.

QUESTION 11.—CROPS.—(a) (i) The present ordinary crops are the most useful.

(iv) For protection of crops more gun licenses should be given to zamindars in proportion to the size of their holdings.

(b) The cultivation of *juar* should be increased because it is very useful for cattle.

QUESTION 12.—CULTIVATION.—Improvement of land and income is brought about by the cultivation of a number of kinds of crops.

QUESTION 13.—CROP PROTECTION, INTERNAL AND EXTERNAL.—There is no measure likely to be useful except the natural one for protection of crops against external infection, pests and diseases.

QUESTION 15.—VETERINARY.—(a) It should be under the Director of Agriculture.

QUESTION 16.—ANIMAL HUSBANDRY.—There are two methods for breeding animals:—

- (1) Zamindars should be induced to cultivate grass in their lands and the Government should not impose revenue tax on such lands.
- (2) In every taluka one or two forests may be reserved where bullocks may be allowed to graze.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(a) The *haris* have much work all the year round. They are only free for some period between the two crops and this they should utilise in improving the lands.

(c) These are for those people who have no work. If the Government encourage them it becomes harmful to cultivation. *Haris* are few and insufficient.

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(d) to (h) There is no need of subsidiary employment. People would derive profit but agriculture will suffer.

QUESTION 18.—AGRICULTURAL LABOUR.—The *haris* of Sind are more useful than those from outside. It would be better if they were freed from other labours and forced to do only agricultural work, in which they should be encouraged. A law should be made for this purpose which would be more profitable than the bringing of *haris* from foreign countries. There should also be a law that if any *hari* leaves his zamindar he should pay all his advances before leaving his village. This will be beneficial. If this is not done there will be much loss.

(b) If the above-mentioned suggestions are accepted and the water is increased, there will remain no land uncultivated.

QUESTION 19.—FORESTS.—(a) In the present state of things the forests do not get sufficient water, with the result that the meadows are not sufficient. If water is supplied and the tax for feeding cattle therein decreased, it will be very profitable for cattle and there will be no loss to forests.

(b) Owing to destruction of forests the people have suffered much loss of fuel and grass, the supply of fuel and grass being very small.

(c) There are plots of land belonging to Government near some villages; these can be used for forests.

QUESTION 23.—GENERAL EDUCATION.—The present state of these institutions is good.

Oral Evidence.

(In Sindhi, through an interpreter.)

60180. *The Chairman:* Khan Bahadur Dilmuradkhan Khoso, you are President of the Jacobabad Municipality and a zamindar of Jacobabad?—Yes.

60181. We have your note of evidence. Do you wish to make any statement amplifying that note, or do you wish to answer questions?—You may put any question you want to.

60182. I think your father is alive and is one of the biggest zamindars in Sind; is that so?—Yes.

60183. Have you or your father been able to introduce any improvements in crops or in methods of cultivation on your estates?—Yes.

60184. Would you describe what you regard as your successes?—Clearing land of jungle.

60185. Have you introduced winter ploughing at all?—We use ordinary implements; we level the ground too.

60186. Have you introduced any improvements in varieties of crops, better seed?—We have improved the quality of land by rotation of crops.

60187. What wheats are you sowing now on your and your father's estate?—Pusa No. 12 and "*Desi thori* and *Phandori*."

60188. Was that introduced through the Agricultural Department's wheat farm at Jacobabad, or how did you come by it?—From Jacobabad farm.

60189. Have you had any other service or help from that farm?—We have been purchasing ploughs from them.

60190. Have these ploughs been a success?—Yes, they have been a success.

60191. Can you tell us what type they are?—The Lyallpur type; we have got big iron ploughs which go deeper into the earth and turn it over. We have similar ploughs made here also.

60192. Do you cultivate any of your land by means of labour to which you pay a wage?—No, it is all done by *haris*; we give them a share of the produce.

60193. You have no home farm?—No.

60194. It is all on the *batai* system?—Yes.

60195. How about the Veterinary Service in your district? Have you received any help from that department?—Yes, we get some assistance from them. People are not used to taking assistance from them.

60196. Have any of your animals been inoculated against rinderpest?—Yes.

60197. Do you believe in that method?—Yes, it is beneficial.

60198. Have you or your father taken any part in improving the breed of cattle in the district?—We have imported Bhagnari and Cutchi cattle to improve our cattle breeds.

60199. Has that been a success?—Yes, it has been a success.

60200. Is there a season of fodder shortage in the normal year?—There is always scarcity of fodder, because there are no forests and there is scarcity of rain.

60201. How about fuel? Do you and your father depend upon scrub jungle for that, or do you grow any timber?—Sometimes we purchase it, sometimes we burn cowdung, and sometimes we burn the ordinary bushes from the jungle.

60202. But you never grow any?—We do not grow trees because trees take away the power of the land.

60203. What do you think of the new Barrage?—It will be a success. Jacobabad district will not derive much benefit from it; it will benefit only a part of it, as most of the canals will not be fed from the Barrage canals.

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60204. I hope you are in the fortunate part?—My land will not be benefited.

60205. Does anybody use tractors on their land in your neighbourhood?—We employ our own implements for levelling the ground; we do not use tractors.

60206. No tractors are used for pulling ploughs or cultivating implements or anything of that sort?—No; we have got our own rollers for breaking the earth on land to be cultivated, made similar to the rollers supplied by the Agricultural Department.

60207. Is there any deficiency of labour in your district?—Yes, there is scarcity of labour.

60208. Do you find that your cultivators are liable to leave at short notice?—When there are good rains in Baluchistan territory then most of our *haris* run away.

60209. Do you think the irrigation of this large area is likely to increase that difficulty?—There are many idlers now; if they are encouraged to cultivate the land we shall have no scarcity.

60210. How do you dispose of produce?—We sell it in Jacobabad market.

60211. Do you find yourself tied, at all, to the moneylenders from whom you borrow the funds which you have to give to your cultivators?—We take money from the *sowcars* to give to our cultivators.

60212. Do you find yourself compelled to dispose of your crops through that *sowcar*?—We have to show that regard to them by sending the crop to those persons from whom we borrow but we are not bound to sell our crops to them.

60213. Do you mean you have to do a certain amount of business with them?—As they show favour to me and lend money to me, I have to sell my crops to them; but I cannot be compelled to sell my crops to them. They advance money with that object, that I will sell my crops to them.

60214. Is there a co-operative credit society in your neighbourhood?—There is a society at Kandhkot.

60215. Are you a member?—I am not a member; there used to be a society in my village but that has been abolished for want of proper funds.

60216. What do you think of the movement?—It is a good movement; it saves people from ruin; it ought to be encouraged.

60217. Why did your own local society collapse?—The people who had borrowed money from the society did not return it in time and therefore they closed that society.

60218. *Sir James MacKenna*: Have you much land on the Begari Canal?—Seven or eight thousand acres.

60219. Is that at the top of the canal or at the tail?—In the middle section of the canal.

60220. Have you got adequate water for your land?—There is scarcity of water.

60221. Have you any suggestions as to how the supply could be increased?—There should be silt clearance of canals; and the water should be equally distributed. Government neither does silt clearance nor makes proper arrangements for the distribution of water.

60222. Do you want more outlets or modules or something like that?—Some people take five times as much as their proper share; others do not get as much as one-quarter of their proper share; they should get their proportionate share.

60223. Which they would get if they had modules I suppose?—I have no experience of modules.

60224. Do you cultivate any rice in this land?—A little; I have got forty thousand acres of land, out of which one thousand only is cultivated with rice.

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60225. Does rice take a lot of water?—Yes, a hundred acres of rice cultivation consumes as much water as a thousand acres of dry crop.

60226. You only do a thousand acres of rice yourself?—Yes.

60227. How do you cultivate your wheat? Do you sow by drills?—We first water the land; then we plough it three times and then drill the seed. Sometimes we water land in June also so that we may be able to cultivate wheat in *rabi*.

60228. *Professor Gangulee*: Stating the reasons of agricultural indebtedness, you speak of the heavy burden of taxes. Would you explain to us what are the taxes you are referring to?—That the expenses of cultivation are high, assessment is high, and income is small.

60229. What is the land revenue you pay to the Government?—Six rupees per acre in the case of rice cultivation; for dry crops two rupees or three rupees eight annas per acre.

60230. Do you pay any other tax besides that?—We have to clear our *harias* or water courses and that also is a burden on zamindars.

60231. What are the heads of taxes you pay to the Government? First you say land revenue; is there any other tax you pay to the Government?—No.

60232. So that you pay six rupees per acre for rice cultivation?—Yes.

60233. What is your share out of one acre of land, on the average?—Four *maunds*, that is the zamindar's share provided the yield is first class.

60234. Altogether the yield is eight *maunds* and you get four *maunds*?—Yes.

60235. *Mr. Kamat*: You have about forty thousand acres of your own, you said?—The whole family has; forty thousand acres belong to myself, my three brothers and my father. By myself I own fifteen thousand acres.

60236. What is the total assessment paid to Government, roughly, on this forty thousand acres?—About one lakh of rupees annually.

60237. That is about two rupees eight annas per acre on an average?—The dry crop pays two rupees eight annas per annum.

60238. It is a lakh of rupees assessment for forty thousand acres, which works out at a flat rate of two rupees eight annas?—The whole of our land is not cultivated; we cultivate as much as we can get water for.

60239. The whole of this is cultivated through the *harias*?—Yes.

60240. Will you explain the scheme which you suggest on page 166 of your evidence: "Till there is sufficient education and improvement in the people the Government should show consideration to the agriculturists (i.e., zamindars) in giving them small strips of land, by giving them facilities and conferring honours on them." What do you mean by giving small strips of land; is it in addition to all these thousands of acres?—Those who do good cultivation should be given land to encourage them, so that they may be encouraged to cultivate it better. Land surrounded by their holdings and vacant Government land surrounding their own land should be given to those zamindars who are good cultivators, or adjoining land may be given to them.

60241. That is till they are sufficiently educated? The beginning of the sentence is: "Till there is sufficient education and improvement in the people"?—I suggested that the land should be given to the students of the school; that is, some piece of land should be attached to the school and the produce may be distributed between the students of that school. People are not yet fond of education and unless they are given some encouragement or some prize they will not take to education.

60242. On page 167 I have not been able to follow what you mean by subparagraph (iz): "The rates of grain vary but zamindars do not know it. There should therefore be fixed rates, for the traders get much profit and the zamindars lose"?—We do not know what are the rates prevailing in England or in Europe; the Deputy Commissioner of the district should send

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for those rates and communicate them to the zamindars so that they may produce their own crops and sell accordingly, so that they may not be deceived by the local purchasers.

60243. I have not yet followed this scheme for the protection of zamindars in particular; what is the fixing of rates supposed to be?—The zamindars should know what are the rates obtaining in Europe.

60244. They should be communicated only to the zamindars?—The zamindars should know them so that they may sell their crop keeping those rates in view.

60245. But the Government should communicate this only to the zamindars?—They ought to communicate it to zamindars, and the Government may also communicate it to traders.

60246. *Mr. Jamshed Mehta*: On page 166 you say: "The *taccavi* which is given to *harris* is not under proper control and there is therefore fear of loss." What is the meaning of that?—There was one zamindar who borrowed eighteen thousand rupees and paid it to his *harris*; those *harris* absconded at night time with the money; the zamindar was sued in the civil courts; the creditor obtained a decree against him and his land was sold in execution of that decree.

60247. The statement is that the *taccavi* which is given to *harris* is not under proper control and there is therefore fear of loss. What is the remedy?—Just as there is an Act dealing with workmen's breach of contract, there should be a similar Act to prevent *harris* absconding with the money; there should be some Act to safeguard the interests of the zamindars and that would be to the benefit of all concerned: the zamindars, Government, *harris* and all.

60248. In the next paragraph, you refer to the heavy burden of taxes. What do you mean by that?—The zamindars have not only to pay assessment; they have to spend more on the clearance of *karias* than the assessment they pay. There is scarcity of labour. Formerly, there used to be Pathan labourers available. Government pay very little rebate for clearance of private *karias*, and we have to spend much more on that.

60249. On page 167, you refer to "the present system of rotation of water supply." Do you mean that the system of distribution as carried out at present is defective?—The rotation in the big canals themselves I am quite satisfied with, but I am not satisfied with the rotation in the zamindari *karias*.

60250. Have you got any remedy for that?—The *karias* should be widened and cleared. *Karias* which take more than their proportionate share should not be given that amount of water.

60251. On page 167, with reference to the *harris*, you say "If the Government encourage them it becomes harmful to cultivation". What is the meaning of that?—Those who do not do any work and waste away their time should be compelled by law to work.

60252. You say that if the Government encourage them, it becomes harmful to cultivation. What is the meaning of that? Do you mean that you do not want to introduce any industries such as weaving, rope-making, etcetera, which will keep them engaged during the interval when they have no agricultural labour to do? If the Government encourages such industries for them, is there any objection?—They should not engage in such industries; during the interval they should prepare the land for the next crop.

60253. Your opinion is that they should not engage in such industries?—Yes.

60254. In reply to Question 18 you say "The *harris* of Sind are more useful than those from outside. It would be better if they were freed from other labours and forced to do only agricultural work, in which they should be encouraged. A law should be made for this purpose, which would be more profitable than the bringing of *harris* from foreign countries. There should also be a law that if any *hari* leaves his zamindar he should pay all his advances before leaving his village. This will be more beneficial. If this is

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not done there will be much loss. If the above-mentioned suggestions are accepted and the water is increased, there will remain no land uncultivated." Do you mean that there should be nothing binding on the zamindars, and everything binding on the *haris*? Do you desire that the *haris* should be bound down, and laws should be made to tie them down, that they should do no other work but agriculture?—There should be a law for those *haris* who deceive zamindars.

60255. Are not the ordinary laws sufficient?—It is impossible for the zamindar to have recourse to ordinary civil law. If five rupees are taken away by a *hari*, an additional five rupees will have to be spent in the shape of fees to the pleader, etcetera, to recover that amount. As we say in Persian, only a *divana* will go to *divani*, that is, only those who are mad will go to the civil court. It is awkward for a respectable man to go to court.

60256. What is your idea of the new kind of justice which you want? Beyond the ordinary laws, what powers do you want to hold the *haris*?—The Workmen's Breach of Contract Act.

60257. *Sir Thomas Middleton*: Have you tried the Egyptian ploughs that are now being used in Sind?—Dr. Mann came to visit my land, and he admitted that my land was the best in the whole Province. This was confirmed by Mr. Rieu, when he visited my land as Commissioner in Sind. Even Mr. Muir Mackenzie, when he was Commissioner, confirmed this, that I was the best cultivator. I cultivate all my land, and it is for Government to supply the water, because land is the wife and water is the husband and without the husband the wife cannot go on.

60258. Does all this prove that you do not need the Egyptian plough?—Women and land need a husband; man is husband to a woman and water is husband to land.

60259. *Dr. Hyder*: You complain about the scarcity of water in the Jacobabad district. Is there not a Persian saying, which you probably know, in which a query is addressed to the Almighty "If you made Sibi and Sehwan, what was the need of creating hell"?—The winter is also severe. The heat is so severe that it shrivels up the people. Government should supply more water to Jacobabad.

60260. Is there much scope for extension of irrigation in the Upper Sind Frontier district?—Water courses should be improved, new canals should be dug, and the small branch canals should be widened.

60261. What is the tribe of *haris* which you engage?—There are Sindhi *haris*, Bruhi *haris*, and there are also many Baluchi *haris*.

60262. Have the Baluchi *haris* no hereditary right in the land?—They have got no such right; they shift from place to place; they do not cultivate the same land all the time.

60263. You want more gun licenses. What are the drawbacks from which your crops suffer?—First is scarcity of water; then there are adverse winds.

60264. But you want more gun licenses?—We want first better cultivation, and thereafter we want more licenses.

60265. What do you think is a fair tax for the grazing of camels?—If Government are interested in the welfare of the people, they should reduce the grazing fees by half. Where it is one rupee, it should be reduced to eight annas, and where it is eight annas it should be reduced to four annas.

60266. If that were done, the forests would disappear?—Even now the forests are in such a condition that a she-ass will not care to graze there.

60267. *Sir Chunilal Mehta*: You were talking of the clearance of *karias*, and so on. I think you also mentioned better distribution?—Yes.

60268. You said that some people get five times the water, and some people get a quarter of their requirements. What is that due to?—The level of the canal bed has become high; the water courses which are in the upper reaches of the canals, and the low lands there, draw off more water.

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60269. So that, if the canal is widened, the man who gets five times will get ten times the water he gets now?—Their sluices should be reduced. If I get more than my proportionate share, my *karia* should be reduced.

60270. If there is proper distribution, will the amount of water now available be sufficient?—It will be sufficient only when water is available in sufficient quantity and when rice is restricted.

60271. Is there a taluka development association in your taluka?—So far as I know, there is no such association.

60272. Has not Khan Bahadur Azimkhan been in your taluka?—He has been to my district, but he has not yet succeeded in his endeavour to introduce it in the district.

60273. On page 166 you are speaking of the education of boys. You say that a farm should be attached to every school. Is there any rural school in your taluka, near your place?—There is one in Shahdadkot and one in Kandkot.

60274. Have they got a farm attached to the school?—There are pieces of land attached as farms to these schools.

60275. What do you think of these schools?—They are good. Those pieces of land should be increased. The income of that land does not go to the boys; it should be distributed among the boys.

60276. Do you think education on those lines is sound?—Yes. Manual labour is better.

60277. How many acres did your family possess fifteen years ago?—Fifteen years ago, the land was as much as it is to-day; twenty-five years back it was also as much. In the beginning we had large holdings, then it decreased, and then it has again increased.

(The witness withdrew.)

Mr. P. E. AITCHISON, Conservator of Forests, Sind Circle.

Replies to the Questionnaire.

QUESTION 19.—FORESTS.—(a) The forest lands in Sind are, I think, being put to their fullest use for agricultural purposes. A feature in the management of the forests in Sind is the system whereby many of the felling areas after the trees have been cut are given over to cultivation for a year or even longer before being sown out with *babul*, the object being to have grass-bound or inferior soils well ploughed and aerated before sowing. These in-forest cultivations are eagerly sought after by local cultivators and help to form a bond of union between the department and the people. They also have a very marked educative effect. The cultivator may be compelled under his agreement to sow *babul* together with his crop or to arrange for irrigation and protection of the trees for a year following his occupation, and he soon learns to appreciate the point of view of the forest official who wishes to foster and protect his young trees in exactly the same way as he does his own field crop. They bewail mutually their misfortune if a herd of goats enters the field during the night and the forest point of view gradually comes to be appreciated.

Grazing may be classed under two headings:—(1) grazing by cattle and (2) grazing by goats and camels. Under Sind conditions, grazing by cattle does comparatively little harm; in many places it does positive good and facilities for grazing by cattle are granted freely.

The case of camels and goats is quite different. The entry into a young *babul* plantation of a few camels or a herd of goats is little less disastrous than the visitation of a plague of locusts. Such being the case, goats and camels can only be admitted to mature forest or to scrub jungle where the growth has little or no value. The number of camels and goats which can be admitted to each forest and the particular areas in that forest to be set aside for them have been carefully worked out but their numbers have necessarily to be restricted. If the forests are to be preserved, I am afraid it will never be possible to allow a larger number of these animals the privilege of browsing.

(b) The supply of firewood in rural areas is generally adequate. In regard to fodder, when the Lloyd Barrage canals are in operation the population will increase and the areas of revenue waste and uncultivated scrub lands will be diminished. This may lead to a shortage of browsing grounds available for camels and goats and it is a matter of consideration whether definite areas should not now be earmarked for this purpose.

(c) The force of the river Indus is so strong and the soil so friable that nothing in the way of afforestation could succeed in stemming the floods.

(e) One of the most pleasing features of Sind is the existence of privately owned woods (*kuris*). These *kuris* are formed on fallow lands and worked on a rotation of about seven or eight years. The species is *babul* and the woods are thoroughly fenced and rigidly protected. They are undoubtedly a great asset to the landowner who takes the trouble to maintain them; they provide him with fencing material and small rafters, give shade to cattle and can, towards the end of the rotation, be lopped for fodder for goats and camels. As only a small proportion of the wood is required for domestic purposes, the final crop is sold as firewood or can be converted into charcoal, and when the demand for tannin is good the trees can also be barked for this purpose.

The success of these *kuris* is due to the ease with which *babul* can be grown in Sind provided there is even a limited supply of water available, its rapid development in an excellent soil and the fact that the woods are thoroughly protected and fenced. In some parts, e.g., between Khanote and Shahdadpur railway station, the whole countryside is dotted with these small woods.

Mr. P. E. Aitchison.

The only area of any extent in Sind where the Forest Department obtains an assured supply of water which can be regulated is the forests of Khathar and Khatro on the Fuleli. This area has been afforested during the past fifteen years and has given the most excellent results both in regard to the development of the trees and the financial returns obtained. All methods of regeneration, trenching, mound sowings, etc., have been tried and the woods have been regularly cleaned and thinned. These methods have been largely copied by the owners *kuris* in the neighbourhood and zamindars from long distances have come to inspect this demonstration area with a view to forming similar plantations on their own lands.

The point is whether similar privately owned woods could not be formed elsewhere in India. In many parts they probably could be so formed but the trees would not grow so rapidly, and the wood when mature might not be able to secure a ready market as is the case in Sind, where the system prevails not so much on account of the domestic conveniences it affords as because it is a sound commercial proposition.

The secret of its success in Sind is due to the fact that the owners of these woods protect them against camels and goats just as rigidly as they would protect their agricultural crops.

(f) Until a few years ago, some of the forests in Sind were suffering heavily from excessive grazing or rather from browsing by goats and camels. The damage was caused not only by the animals but by their owners who hacked and lopped the trees to obtain more fodder. These abuses have been abolished and definite and restricted areas set aside for a limited number of browsers. The result has been marked in two ways. Firstly the forests, concerned, which were in a state of stagnation, have filled up with a heavy and valuable growth of young trees and saplings; and, secondly, the owners have realised that Government set a store by the welfare of their forests, but are prepared at the same time to allow browsing wherever it is possible and if not abused. The result is that the majority of the owners of browsers no longer lop and hack the trees and do their best to restrict their animals to the areas set apart for them. On account of this attitude it has been possible in several places to increase the extent of browsing areas and to allow a larger number of animals to enter the forests.

Oral Evidence.

60278. *The Chairman:* Mr. Aitchison, you are Conservator of Forests in the Sind Circle?—Yes.

60279. You have given us a note of your evidence. Would you like to make any statement at this stage, or shall we proceed to question and answer?—I do not wish to make any statement.

60280. Have you many complaints from cultivators about the necessary control over grazing which you exercise?—People having camels and goats of course complain. They want to get more grazing, but we have sometimes to be rather hard-hearted about it.

60281. I shall ask you a question or two about the new Barrage area. Have you any projects at all for the planting of trees on land which would be irrigated by the new scheme?—Yes. They have set aside quite a large area; about seventy thousand acres.

60282. In small blocks?—They vary in size. Some of them are quite big. I should think some of them would be ten thousand acres, possibly eight thousand acres, and others smaller. They are really old forests that did not get water before, and they are going to be supplied with water from the Barrage.

60283. They ought to grow timber?—They are good lands, and will grow excellent timber.

60284. How are they to be managed?—They will just form part of the divisions in which they are at present. They will have to be very carefully started, taking the experience in Changamanga in the Punjab to go upon.

60285. Will it be planted with *babul*?—Some *babul* and some *kandi*, and we might grow *tali*, a timber tree.

60286. *Mr. Calvert:* What is *kandi*?—It is like *babul*, a thorny tree.

60287. We have got *dandi* in the Punjab?—It is possibly the same.

60288. *The Chairman:* You point out that one of the peculiarities is that there a number of privately owned woods?—Yes; they are called *huris*, and they are very successful too.

60289. Is the timber grown in these woods usually used by the owners or sold?—Most of it is sold eventually. They sell it either as firewood or make it into charcoal, or they may bark it and sell the bark for tanning.

60290. Is the ground cropped under any regular system of rotation?—It is grown largely on fallow lands. They grow this crop of trees for six or seven years. It grows very fast. Then they remove the trees and put it under cotton, or some other field crop.

60291. What sort of diameter do you get at the end of seven years in the case of *babul*?—About six inches.

60292. A considerable crop of timber would grow?—Yes, it does very well.

60293. Will any provision be made for irrigating these *huris* under the Barrage scheme?—It will simply be fallow land on which they will pay a lower rate of assessment.

60294. The water will be available?—Yes. Of course, they require very little except just to start.

60295. When you say, as you do in one part of your note, in answer to Question 19 (b), that the supply of firewood in rural areas is generally adequate, do you think it will be adequate when the full increase in the population, in consequence of the Barrage, comes about?—It will, as far as the main valley of the Indus is concerned. I am not so sure about some of those canals towards the Eastern Nara, where there never was any cultivation before.

60296. You point out the futility of attempting to control the movement of the river Indus by any afforestation. Are there other areas in Sind, where erosion is taking place, which may be checked by means of afforestation?—No.

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60297. *Sir Thomas Middleton*: Have you any forest land in Sind on which no grazing is permitted?—There is some small quantity; I think about seventy-two square miles out of a thousand, where no animal is allowed to graze.

60298. What timber is growing in the reserved forest?—Chiefly *babul*, which we try to grow in the best lands, whenever we can.

60299. What is your grazing season? When do you admit cattle?—They begin to come in as soon as the floods have subsided. All the forests are flooded. They come in as the forests are dried up; their greatest activity is in the hot weather, when the *babul* pod crop is available. There is always a great inrush of cattle in April and May.

60300. What are the grazing fees per year?—Buffaloes twelve annas, cows six annas, goats four annas, sheep one anna, and camels three rupees.

60301. You have woods to which you admit buffaloes and cattle, but not sheep and goats and camels?—Yes.

60302. Does the area for sheep and cattle come to about nine hundred and twenty thousand acres?—The area open to cattle is about eight hundred square miles out of one thousand.

60303. How much is open to camels and goats?—It is very little; something like two hundred and fifty square miles, I think.

60304. What is the second choice in these *kuris* after the *babul*? Is there any other tree grown except *babul*?—No, there is not. Of course, people have private lands in which they just allow nature to reproduce *kandi* coppice and so on, but *babul* is the only tree for which they sow seed and make a crop.

60305. When this area of seventy thousand acres comes under afforestation, what species other than *babul* will you put in?—We shall put in *kandi*. In Upper Sind, *babul* is very susceptible to frost. We may find that it will not do all over the area in Upper Sind; we shall put in *tali*; and no doubt try other species too.

60306. In the case of these seventy thousand acres, is it the intention to grow mainly in blocks? Are there considerable tracts which lie along the canals?—These old forest lands are more or less haphazard blocks, but they actually lie parallel to the new canals and the railway.

60307. There is no intention of lining the canals with trees?—Not to my knowledge; I do not know whether the irrigation people intend doing that.

60308. *Mr. Calvert*: Do I gather that in fact there is no hope for broad-leaved trees in this tract?—The *tali* of course is broad-leaved. There are even now a few small areas in which we can control the water. Experiments have been made near Sukkur and the number of species that will grow there is extraordinary.

60309. I am speaking of fodder; are there broad-leaved trees for fodder?—Yes.

60310. There is a tree popularly called *bahan*; is it used for matches?—There is a small hand factory in Sind run by a local doctor who really has no time to look after it properly; but there is a possibility; of course the amount of the tree is limited.

60311. Is there any prospect of increasing that tree?—There is a prospect under the Barrage scheme; it is a difficult tree to grow artificially in river-flooded areas because the seed is so light.

60312. *Sir Chunilal Mehta*: Have you any scheme for increasing *babul* plantation to provide more fuel in view of the Barrage conditions?—This scheme which we were talking about, under which we are going to have seventy thousand acres, will add to our fuel area. These seventy thousand acres received no water owing to the Public Works Department protective *bunds*, but these are now going to get water.

60313. Would that be enough to meet the requirements?—There is another scheme for re-modelling the Begari Canal. I have been discussing this scheme with the Chief Engineer. We have a large area of about thirty

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thousand acres which gets no water at present. The proposal is that we should give up about half of this for agriculture and in return for that get fifteen thousand acres provided with water. So that will add fifteen thousand acres. That is very good land; it will grow very good timber.

60314. Do you think you require more land to secure that fuel will be supplied so as to prevent cowdung being used as fuel?—It is rather peculiar that in Sind they do not use cowdung as fuel; round the forests they use firewood, they do not use cowdung.

60315. Where there are no forests?—They may then use cowdung; when they get water they have the system of growing *huris*, and these provide them with trees.

60316. Is there anything that we can do to encourage *huris*?—Anything to encourage the *huri* system would be very excellent, because it is an excellent system.

60317. Can Government do anything to encourage that?—The only way I could suggest is to keep the assessment very low for the *huris*. They are fallow land, the assessment in any case is reduced, and it might be reduced still further. Of course they pay their way. It is really a matter of educating the people to have these *huris*; they actually give them a good return in cash.

60318. Have you put up any proposal in regard to it?—I have not.

60319. Do you think it worth while doing it?—There is nothing beyond the fact that you should encourage them to keep *huris*. But there is an area on the left bank of the Indus where I think the question of making one or two forest blocks might still be considered.

60320. Will you put up to Government any schemes which you think worth while considering?—I have been discussing this question with Mr. Harrison and other people lately, and we have not yet come to any definite results.

60321. *Professor Gangulee*: Do you find the area under *huris* increasing?—I think it is increasing.

60322. What is the present area?—I do not know the actual area; I think it is about twenty or thirty square miles; that is, *huris* as distinct from natural forests.

60323. You have suggested special concessions to encourage the *huri* system. What concessions do they enjoy now?—They do not enjoy any but it brings them six to seven rupees per acre per annum. The land is fallow and grows nothing else.

60324. There is no special incentive for extending this system?—No. People with good business instincts go in for it; the rest of the people do not.

60325. The fallow land is utilised in this manner?—Yes.

60326. Are you satisfied with the management of the privately owned forests?—They do very well indeed.

60327. So that people are already educated in that direction?—They come and look at the Government forests and copy some of our tricks, such as trenching, clearing the young woods and pruning the stems and so make them grow faster. They do very well; they know all about it.

60328. Is there an annual *panchari*?—Are you talking about grazing fees?

60329. Yes?—Yes; certain rates are fixed for certain animals.

60330. And you think the present arrangement is quite satisfactory?—Yes; I think so.

60331. *Mr. Jamshed Mehta*: Have you at any time made a profit and loss account of the expenses and income of Government in your department?—Our income last year was about seven-and-a-half lakhs, and our net profit was just under four lakhs; that is to say, we spent about three-and-a-half lakhs to get a gross income of seven-and-a-half lakhs.

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60332. Do you cut your forest yourselves or give it to contractors?—Some we cut ourselves; others we give to contractors to cut.

60333. Have you attempted to utilise any labour-saving implements in cutting?—We have tried, but have not been successful.

60334. Do they cost more than manual labour?—We tried one machine, but that was not successful.

60335. The local boards claim that the forests should be given to them for management; are you in favour of that?—I do not think they will be competent to manage the forests.

60336. They are not competent?—I should not think so.

60337. But if they employ efficient forest officers, would you be in favour of it?—No.

60338. Have you attempted to grow other kinds of trees apart from trees for fuel?—Our trouble in Sind up to date has been that all our forests are grown on flood water, the floods of the Indus, so that we cannot control the water, and unless you can control the water you cannot make regular plantations. In the few places where we have been able to control the water the plantations have been successful. Under the Barrage scheme, over the seventy thousand acres the water will be controlled and then we can experiment with all kinds of trees.

60339. Has any experiment been tried with trees which will give timber for furniture making, house-building, etcetera?—The *tali* is such a tree, and it does grow in Sind.

60340. Do you think it will be profitable to grow that tree in Sind?—We have a plantation of that, and it is financially very successful. We get about one hundred rupees for a tree when it matures.

60341. What about blackwood and sandal?—*Tali* is a kind of blackwood; sandal would not thrive.

60342. *Mr. Calvert*: Do you grow mulberry?—It grows in the Punjab, and you can probably grow it in Upper Sind.

60343. *Lac* trees?—Our *lac* trees are *babul* and *ber*.

(The witness withdrew.)

The Commission then adjourned till 10 a.m. on Wednesday, the 26th October, 1927.

Wednesday, October 26th, 1927.

KARACHI.

PRESENT:

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

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

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 Parlaki-
medi.

Professor N. GANGULEE.

Dr. L. K. HYDER.

Mr. B. S. KAMAT.

The Hon'ble Sir CHUNILAL V. MEHTA, KT. } (*Co-opted Members.*)

Mr. JAMSHED N. R. MEHTA.

Mr. J. A. MADAN, I.C.S.

Mr. F. W. H. SMITH.

} (*Joint Secretaries.*)

The Karachi Indian Merchants' Association, Bunder Road, Karachi.

Replies to the Questionnaire.

The following answers to such of the questions as can be somewhat definitely answered out of the long Questionnaire are submitted. Answers have been given throughout in a general way. On several technical and agricultural and allied questions, this association is unable to give precise information or suggestions.

This association, is, however, very vitally interested in, and affected by agriculture. Agricultural prosperity in the vast hinterland is the mainstay of Karachi's import and export trade.

QUESTION 1.—RESEARCH.—There ought to be a permanent research station in Sind with a permanent endowment for the whole or part of its expenditure. Such an endowment is as necessary as the Famine Insurance Fund. The present research station at Sakrand is bound to prove very useful. A veterinary research and dairy farm may also be attached to the research station.

The headquarters of research and propaganda ought to be at the same place. In view of the development under the Barrage, Sind should have a separate Director of Agriculture who should direct research, agricultural education, propaganda and demonstrations which may also be on the zamindars' and *haris'* own farms.

QUESTIONS 2 AND 23.—AGRICULTURAL AND GENERAL EDUCATION.—Some of the primary schools now being started in rural areas may be entirely agricultural schools with afternoon attendance school hours and with farms attached where work in the morning may also be done.

Agricultural bias ought to be given to the entire education in the country from the primary to the collegiate. Sind is almost an entirely agricultural Province; therefore, for Sind's economic improvement agriculture should be an important subject in our education. Primary agricultural schools would

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prevent the exodus of population from the village to the town, which is becoming a feature of Sind's rural life.

An agricultural college at the research station, at least two agricultural high schools, one in Lower Sind and one in Upper Sind, with a four years' course, and at least one primary school at the headquarters of every division of a district or in the centre of a large group of villages, are a great necessity for Sind. All education may be directed from the central organisation, the Director of Agriculture having an advisory board representing the zamindars and agriculturists and other interests from all the districts. Agriculture could be very much popularised among citizens and students in a number of ways. An Agriculture Day should be observed all over India when charts and mottoes might be displayed in every school and lectures delivered on various aspects of agricultural improvement in every town and village. The new agency of wireless should be fully utilised; the broadcasting stations should transmit popular lectures in the simplest language and every official from the Viceroy down to the *Tapedar*, and every non-official public man and member of a local body may witness field demonstrations near his town or village on the All-India Agriculture Day. Charts and advertisements should be hung up at every railway station, Government and local body offices, market, reading room, library, etc., showing the value of improved agriculture and improved milk-supply.

A ceremony of touching and working the plough on the All-India Agriculture Day to vindicate the dignity of manual labour to the youth of the country would be very valuable. With public enthusiasm in urban and rural areas, the peasants would welcome demonstrations on their own farms, and adopt improved methods and implements more readily.

An important factor in connection with all education is the method of imparting it. The present method is too dull to attract students and the hours of attendance would hit the poor parent badly by taking away the young boy in the early hours of the day when he is most useful in working for the family. Village schools can best thrive in the non-crop season with about three hours of attendance in the afternoon, the method of instruction being made more interesting and less taxing to the brain of the young lad in the country side. The poor agriculturist often cannot afford to part with a young son aged seven or eight years because he helps to increase the slender family income.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—Cultivators are quite prepared to adopt improved methods if they find them proved effective. The peasants do not, and indeed cannot, undertake risks of experiments with any probability of failure, their income being so precarious and small. But they are not conservative. They need encouragement from the Agricultural Department, the zamindar or co-operative society. Leaflets in the vernacular written in a popular manner, demonstrations on model farms and on the agriculturists' own farms, taluka agricultural societies, regular lectures on occasions of fairs and other gatherings, in addition to school education, would be effective. On Agriculture Day, the best cultivators and dairymen should receive some encouragement from Government and local bodies in the shape of remission of taxes for the year. The propaganda section of the Agricultural Department should have an itinerary section equipped with cinema and magic lanterns. Success in this respect would depend to a large extent on the selection of the men in charge of demonstration and propaganda and the extent to which non-official help is secured. Great efforts should be made to secure the agriculturist's confidence, by meeting his needs in a sympathetic manner.

To find money for all these—research, education, propaganda, etc.—the Central and Provincial Governments ought to contribute liberally to their agricultural departments. About one per cent of the revenue of the Central Government and every provincial Government and one-half per cent of the revenue of every local body may be reserved for agriculture. These efforts may be administered by the Central Government, the provincial Governments and the divisional boards and strengthened by private contributions from rich landlords and merchant princes. Appeals and collections for funds may

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also be made on the All-India Agriculture Day. At present the agriculturist does not get a fair share of what he contributes in taxes to the State.

QUESTION 4.—ADMINISTRATION.—(c) There ought to be a definite and settled policy among all State concerns and public utility companies that improvement of agriculture and welfare of the rural population is a vital concern of the State and every public organisation. For instance, the Veterinary Department ought to send men to the peasants' farms to give medical aid to cattle and not compel the peasant to leave his home, farm and crop in the busy season to attend to one of his animals by taking it, often for several miles of rough road, to secure medical aid. The stoppage of the pice post card has hit the agriculturist badly. Wireless has great functions to fulfil in the life of our rural population. If every district local board with Government aid, zamindar's contribution and private munificence, set up a loud speaker, to start with at the headquarters of every taluka, they could create a great agency for popular education. The railways ought to have specially low rates of freight for seed, manure, agricultural implements, etc.

At present the rural roads are the most miserable in Sind. The agriculturist pays heavily for lack of cheaper, quicker and more convenient transport. We want a number of feeder railways and a good many *pucca* roads.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—The agriculturist borrows largely because of (a) the income from his land being insufficient and unsteady owing to scarcity of water or poor yield owing to certain pests or poverty of the soil or other reasons, (b) lack of proper credit facilities and the consequent payment of heavy interest, and (c) lack of education and thrift among the agriculturists generally.

The remedy, therefore, largely consists in (a) making agriculture more steadily remunerative, (b) securing employment to the peasant in the non-crop season by subsidiary industries connected with agriculture, the supply of necessities to the nearest towns, dairying, rearing of cattle, weaving, etc., (c) reducing the drain on his slender income of the heavy interest he pays and the undue profits made by others on his sales and purchases, and (d) by general diffusion of education through the school and through personal talks by the itinerant propaganda section of the Agricultural Department with cinema and magic lantern shows.

Credit facilities for the agriculturist must be improved and extended through the co-operative societies.

Legislative action will not help much in this direction.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—The prevention of subdivision of agricultural holdings into uneconomic units is absolutely essential. This may be done by legislation but as far as possible should be done by co-operative effort.

The law should interfere as little as possible in settlement of disputes. For this the divisional boards, suggested above, may have an Arbitration Section. For success in this direction three things are essential (a) a general advance of education, (b) growth of the spirit of co-operation, and (c) confidence in the persons arbitrating. The last will largely depend on the type of persons who come in.

The area of agricultural land held by an individual may also be fixed to help better development of land. The evil of fragmentary holdings is sometimes as great as that of too big holdings. The latter might also prevent some unemployment.

QUESTION 8.—IRRIGATION.—(a) (iii) **WELLS.**—Tube wells worked by power could be established in the different parts of Sind with very great advantage. They may help to establish steady agriculture in areas which Barrage water cannot reach, as well as to supply healthy drinking water for men and cattle in the countryside. At present there is not sufficient knowledge about tube wells or efficient and cheap working of mechanical power on wells, canals or lakes in Sind. As the average agriculturist in Sind is poor, co-operative working of tube wells will be a necessity. The Agricultural Department should thoroughly study the question and give practical demonstrations and help in this direction. If the tube well as a source of cheap water supply succeeds

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steady agriculture and employment may greatly increase in Sind. The working of the Persian wheel by bullock power is costly for many kinds of cultivation—both *kharif* and *rabi*. If in places, where usually there is brackish water in the ordinary wells and boring a tube well very deep makes sweet water available, it would be a very great advantage to have deep tube wells, provided the cost of pumping is within limits and makes cultivation remunerative.

QUESTION 10.—FERTILISERS.—(f) The Agricultural Department should find out some cultivation which may be useful as a crop, as a hedge to the field and as fuel. Perhaps some quick growing trees can be found which will answer all or some of these requirements. Also, the regular growth of trees on banks of canals and *karias* would help to provide wood for huts and fuel. Regular keeping of *huris* (small forests) may also be encouraged among zamindars to provide a fodder and fuel reserve in the dry months.

QUESTION 13.—CROP PROTECTION, INTERNAL AND EXTERNAL.—Sind suffers heavily almost every year from some form of crop pest. The latest to appear is the locust. With regard to none of these pests is the agriculturist at present armed with sufficient knowledge or the requisite machinery to cope with the onslaught. This requires the most earnest attention of the Agricultural Department. Next to the lack of sufficient and timely water supply, these pests make agriculture precarious in Sind. The locusts alone have practically made destitute thousands of our agriculturists during the last fifteen months. First, the proper remedy must be found out by research and study; then propaganda and demonstration must be carried on. If the remedy is costly, the Agricultural Department must bear it. Expenditure by Government may save that part of the land revenue which is remitted every year.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(f) Yes, this is very important. There ought to be a standing board with a paid officer to deal with industrial subjects, collect data, disseminate information and study the needs of each rural and urban industry. Such a board or committee ought to be a permanent body visiting particular areas for investigation, if necessary. There are a number of small industries, such as, the making of leather articles, wooden toys, and articles of daily use in the towns near by, the making of improved implements for agricultural work, for example, Persian wheels, ploughs, etc., utilisation of by-products of several kinds of trees and shrubs growing abundantly in Sind, weaving, etc. Dairying can become a paying part-time or even whole-time industry in Sind in view of the reputed high quality of the Sindhi cow and the possibility of good fodder supply after the Barrage is completed. The increase of raw produce on Barrage lands may call for some industries for manufacturing those raw products to a certain extent; for instance, oil-seeds may be crushed near big towns rather than be exported. All these subjects necessarily need study and careful investigation.

(h) The desire to improve health conditions will come with the advance of education and improvement in economic conditions. Propaganda on modern lines as suggested for agricultural improvement should prove effective. The peasant cannot think of health or cleanliness when the problem of existence perpetually stares him in the face.

QUESTION 20.—MARKETING.—The grower often does not get a fair price. His produce is often practically mortgaged with the zamindar or the village shopkeeper who dictates the price of the produce both for sale and purchase. This is now decreasing because of competition between the shopkeepers who often make advances on precarious credit to help to carry on agricultural operations. The best solution is to help the agriculturist to earn enough for his livelihood so as not to stand in need of borrowing, to raise the standard of his education and intelligence and to help the growth of co-operative societies.

(d) Increasing competition between merchants, middlemen and buyers is by itself now having the effect of conveying information to the agriculturist, who is getting more and more into touch with the rates of raw produce in the nearest town.

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QUESTION 25.—WELFARE OF THE RURAL POPULATION.—There ought to be regular malarial and health surveys of talukas. Through school books, the written and the spoken word, the value of health and vitality as an asset for the economic and agricultural efficiency of the worker should be emphasised. India's workman is ignorant, underfed and largely without a friend by his side. There may be a society to serve the agriculturist. Such a society must be largely non-official, but may work in close co-operation with the taluka development society and the co-operative society. Economic and social surveys are essential as without an exact knowledge of facts no proper remedy can be found. But such surveys should be carried out by non-official agency with the help of revenue officials, the taluka development societies, the Agricultural and Public Works departmental authorities and local board staff as the need may be. A non-official survey by trained economists who secure the confidence of the agriculturist will produce more thorough data and be more trusted by the general public. Such a survey would show exactly the conditions of life under which the people in rural areas live. The knowledge itself may inspire some to serve the India that lives in the village.

Oral Evidence.

60344. *The Chairman* : Mr. Jeswani, you are here on behalf of the Indian Merchants' Association, Karachi?—Yes.

60345. Would you describe to the Commission exactly what are the objects of your association?—They are generally to advance the interests of trade, to help united action and co-operation among the Indian mercantile community and generally to bring about co-operative effort in trade among Indian business men.

60346. Have you a large membership?—We have about 180 members.

60347. I notice that your association favours the creation of a permanent research station in Sind?—Yes.

60348. Has your association considered, at all, how such a station might be endowed with the necessary funds?—The suggestion is that the Central Government might contribute about one per cent of their revenue, that the provincial Government might contribute about one per cent of their revenue, and the municipalities and the district boards might contribute about one-half per cent of their revenues; this fund might be administered by the Central Government, the provincial Government and the divisional boards. These funds are to be divided between research, propaganda, education, demonstration and other work in connection with agricultural improvement.

60349. So that you might term the fund a development fund?—Yes, you might call them agricultural development funds.

60350. Where would you like the station to be?—At present Sakrand seems quite suitable, but if for the purposes of research any other station is more suitable, I would not object to the station being moved to that place; but according to Dr. Mann and the research workers at Sakrand, it seems that Sakrand, representing a large area of the new lands coming under the Barrage, is more suitable.

60351. Are you thinking of research in connection with agriculture on the area to be newly irrigated, or are you thinking of research in general?—Research in general, both in regard to new areas as well as the present cultivation.

60352. I have read with interest your association's views about education. To what extent do you desire primary education to be agricultural in its nature? Have you thought that out?—Yes, it is often noticed that ordinary elementary primary education drives the village boy, the agriculturist's son, from the village to the town. We wish to see that tendency checked, and that might be checked as is done in Italy or Denmark by providing an entirely agricultural education. We might proceed to an entirely agricultural education through an agricultural bias school, but it would be desirable, even at present, to have some schools entirely agricultural schools.

60353. Take a primary agricultural school; the boys are going to that school at the age of about five in Sind?—In the villages they would go at about six.

60354. Now a boy goes to the primary agricultural school, as you describe it, at six; what are you going to teach him?—Some elementary nature study, some elementary lessons in hoeing or watering, etcetera.

60355. He is six years old, remember?—Yes; even at present these children do that work on their parents' farms.

60356. Is not the primary purpose of education to impart literacy, the capacity to read and write?—Yes, but, I take it, even in the agricultural school reading and writing and arithmetic will be taught.

60357. What proportion of boys who go to the primary school, as things are to-day, emerge literate? Do you know at all?—Most of them again relapse into illiteracy in the villages.

60358. And yet you are suggesting that a system which you call elementary agriculture, including lessons in sowing and watering and so on, should be superimposed on the present system?—Yes.

60359. Surely that would have the effect of reducing still further the proportion of successes in imparting literacy, would it not?—No, it would have the contrary result, because if education is imparted in the vocation of the child

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then he pursues that sort of education even as an adult, because that is closely related to his life's profession.

60360. By all means use the things with which he is familiar in his village home in teaching him literacy, but that is something quite different from teaching him agriculture, is it not? You distinguish between the two things, do you not?—I think if you give him vocational education then he is very much more interested in keeping his literacy up, and the propaganda of the department by means of the cinema or by leaflets will teach the child to maintain his adult education.

60361. What is your own profession?—I am now Secretary of the Indian Merchants' Association; I was a journalist for ten years, and I am a zamindar's son.

60362. If you had a son aged six years, would you teach him the profession of Secretary to the Merchants' Association at the age of six, or would you give him a general education founded on literacy first?—The point is, we have to train the sons of agriculturists so as to keep them on the land. As a zamindar myself I would send my son to the agricultural bias school.

60363. It is easier to keep sons of secretaries in the office than sons of agriculturists on the land?—At present there is a tendency to gravitate to the towns, and we ought to try to keep rural men in the rural areas for agricultural development.

60364. In answer to Question 8, you say: "Tube wells worked by power could be established in the different parts of Sind with very great advantage. They may help to establish steady agriculture in areas where Barrage water cannot reach" and so on. Has your association any experience of the economics of irrigation by tube well?—No.

60365. Will you please turn to your answer to Question 20, on marketing. Your association is of course very familiar with the business which is carried on in the export and import of produce through Karachi?—Yes.

60366. To what extent has your association interested itself in the details of marketing in the *mofussil*?—As an association they have not interested themselves, but several of our merchants are interested in such marketing.

60367. You mean they are buyers in the country?—Yes.

60368. Do you yourself understand the system of marketing in villages?—A little of what I have experience in.

60369. Do you think that is a direction in which, as these matters develop, merchants might take a more active interest? For instance, let me put this to you: have you ever considered the extreme importance of assuring to the cultivator a fair share of the extra value consequent upon improvement in quality of his crop, in order to encourage him to improve the quality?—At present the peasant has had no such encouragement generally.

60370. And you think it is important that he should have, if possible?—It is very important.

60371. If a cultivator is not going to get a share of the premium, the result of quality, he is not going to worry about quality?—That is so.

60372. Is that a direction in which, as things develop, your association might be persuaded to take an interest?—I think so.

60373. *Professor Gangulee*: On the question of a permanent research station, you do not tell us what is your view with regard to the administration of such a station?—I have said that it should be in charge of the Director of Agriculture; it should be directed by him.

60374. With the help of an advisory body?—An advisory body generally I want for other purposes, but the research station would be entirely under his charge.

60375. I see you propose to have an agricultural college at the research station?—Yes.

60376. Is there a demand for an agricultural college in Sind?—I think it would soon arise in connection with the Barrage.

60377. Do you know the student community here at all?—Yes.

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60378. Are they likely to be interested in agricultural education?—There seems now to be a very great awakening of interest among the student community with regard to agriculture.

60379. Are you familiar with the Mirpurkhas school?—I have heard of it; I have not seen it myself.

60380. Do you know why it failed?—So far as I know, it was carried on under artificial conditions. It had no natural appeal to the son of the agriculturist or of the zamindar. Some scholarships were given and there were some other inducements. The son of the zamindar thought he was being sought by the Government and was doing something for the Government by going to the school; he did not understand that it was for his own economic benefit that he was being provided with a school; and at that time the agriculturist also did not understand that he was going to benefit very much by the school, as he does to-day partly.

60381. You think times have changed?—I think so.

60382. With regard to the marketing question, are you familiar with the Marketing Bill now before the Council?—The Cotton Markets Bill, yes.

60383. Will that in any way help to improve the marketing conditions of Karachi?—My association think it will not.

60384. Could you explain to us why you think so?—The association thought that the grower of cotton, particularly, is very much scattered in Sind; there is not much contiguous area. The peasant at present sells the produce to the village shopkeeper, and in any case if produce is brought to the market it will be bought by the shopkeeper, so that it will not change the conditions for the grower or the peasant in so far as the selling of cotton is concerned: he will sell to the *bania* and the *bania* will bring it to the market. The *bania* realises quite a good price in the town even to-day.

60385. You suggest that non-official agencies with the help of revenue officials, taluka development associations and others, must carry on the work. Do you know of any non-official agency now existing in Sind which might join hands with the Government organisations?—I am afraid at present there is no such agency.

60386. Do you see any indication of such non-official agencies coming forward?—Yes, there is some awakening among the people at present for the revival of agriculture and for helping the agricultural movement, among the agricultural section particularly.

60387. Mr. Kamat: How is the membership of your association composed?—They are dealers in all sorts of things, mostly in grain and cotton.

60388. What is the number of members?—About 180.

60389. Are they chiefly importers or exporters?—Largely exporters.

60390. What is the principal article of export?—Grain, oil seeds, cotton.

60391. Do your members in Karachi come into touch with the producer?—Several of them do through their agents in the villages or in the towns.

60392. Yes, of course, that is through the agents; but do they ever directly come in touch with the grower? Do they go out of Karachi to seek him?—Most of them do not.

60393. Their knowledge of the produce, the quality and all these things, is based on the knowledge conveyed by the middleman?—Not necessarily, because some of them are drawn from those very villages; they have got their agencies and some of them when they go to their villages come in contact with the producers; some of them own their own lands.

60394. On the question of adulteration of raw materials sent to foreign countries, have you any views?—If some method could be devised for securing purity of produce from the countryside, I think the members of my association would be glad.

60395. Where does the adulteration come in exactly?—It usually comes in in the countryside itself where the produce is grown.

60396. Adulteration takes place, not at the port where the produce is exported, but you think in the countryside?—Yes.

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60397. Who is responsible for it in the first place?—I know of very few instances myself, but I suppose if there is adulteration it would start with the shopkeeper in the village.

60398. When you say, "if there is"; do you mean to say there is some doubt about it in your mind?—There is some sort of adulteration which takes place without anybody wishing it or without anybody deliberately doing it; for instance, there is a mixture in the seed of wheat and barley, and there is sometimes a mixture in the seed of *juari* and *bajri*; so the mixed seed comes to the town and also to Karachi, and there is an analysis department where we find that out. But I know very few cases of deliberate mixture in Sind; if there is such a case it might start with the shopkeepers. For instance, in some cases, I learnt that some water was being put on seed cotton; that was done at a shopkeeper's.

60399. To whose interest is it to make this deliberate adulteration: the large exporters here?—No, the large exporter practically cannot do it. He cannot do it sufficiently secretly to escape detection. It cannot be done in Karachi, but it may be done in the town to which the produce first comes, or on the farm itself.

60400. Have your members, as large exporters, ever considered what steps should be taken to prevent this deliberate adulteration, wherever it takes place?—Not so far as I know.

60401. That is to say, the association has never bothered itself with going into this question of stopping this adulteration?—I can say that for the last year they have not done it; they might have done it earlier; I do not know.

60402. Are they conscious of the fact that this adulteration is spoiling the reputation of Indian produce in foreign markets?—I think they themselves are interested in seeing that the produce is pure.

60403. How do you mean? They get reports from their agents in England?—No, because when the produce is adulterated there are a lot of disputes between the buyers and the sellers; they like to have as few disputes as possible, because it hits them in their own business.

60404. If that is so, how is it that they have not taken any serious steps, so far, to prevent this adulteration and save the name and reputation of Indian produce?—At present there is lack of contact with agriculture; the exporter here is not in direct contact very largely with the producer.

60405. That is the question I first asked you. He knows the producer only through the middleman?—Yes.

60406. He never knows conditions in the countryside directly?—Quite.

60407. How could that be remedied? Have you any suggestions to make?—That could be remedied by placing the merchant exporter in Karachi in contact with the Agricultural Department, if the department interests itself in improving the quality of the produce.

60408. If the Agricultural Department does this?—Yes.

60409. Do you hear from foreign countries about certain standards, and are the exporters willing to adopt standardisation, to your knowledge?—As a matter of fact, they have adopted standards. Our association and the Chamber of Commerce have got a joint cotton committee now where types and standards of cotton are determined.

60410. That is with reference to cotton?—Yes, and also so far as wheat is concerned there is a certain specification by which the sale has to be made, and the merchant is very much interested in having a good specification of his own produce because he gets a better price for it.

60411. Do they conform to these specifications very honestly when they export?—The merchant here is largely a commission agent; he sells on account of the exporter from the town or from the countryside. He, of course, should try in his own interest to tell the exporter from the countryside that the produce coming from there should conform to a particular specification in order to secure a better price.

60412. Is there anything which your association can really do, apart from the department, to improve grading and to prevent adulteration?—As I said,

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that could be very much more effectively done by the Department of Agriculture co-ordinating their activities with those of the association; they should by propaganda make the producer realise, in view of the reports coming from the foreign countries to which the produce of India is exported, that it is in the interests of the producer himself not to adulterate, and to send better produce.

60413. This is the marketing side of the problem; it is not the production side, and I do not know why the Agricultural Department should have to take the initiative; it is more to your advantage; you want to market your produce to the best advantage and you ought to take the initiative. Why is your association apathetic with regard to this problem?—The merchant here is more or less a commission agent; he is not interested so much in getting a better price for the produce as the producer himself is; the Agricultural Department might look at the problem from the point of view of the country as a whole and present the matter both to the producer and the exporter.

60414. Your merchants are not exporters in the real sense of the term: they do not send consignments on their own account?—They are commission agents.

60415. That is exactly what is brought out by your replies?—Yes.

60416. Most of your 180 members are commission agents?—Yes.

60417. And they do not care at all whether the consignment is sold to the best advantage or otherwise, because they are only commission agents?—They are interested because the exporting houses here would not have the produce below a certain specification; they deduct arbitrarily, according to the terms of the contract, a certain amount for produce which is a certain standard specification.

60418. Of these 180 members, about how many export on their own account and are not commission agents?—I could not give you the figures off hand, but I suppose very few are such merchants.

60419. A very small section is composed of members who have really anything at stake except their commission?—Some of them also own factories, rice factories, ginning factories and so on; so that probably they must be interested beyond their commission also.

60420. You need not say "probably"; you are the secretary, so that you know, I hope, what proportion out of your 180 members export on their own account; is it one-quarter or one-third or one-half?—I think, less than one-fifth.

60421. Was this memorandum approved by your Managing Committee before being submitted to the Commission?—By a sub-committee appointed by the Managing Committee.

60422. They voice a desire to have an agricultural college or an agricultural high school?—Yes.

60423. Were they quite sure that there was a demand behind this desire?—It seems there is likely to arise a great demand for agricultural education in Sind.

60424. Would the sons of zamindars care to attend an agricultural college or a high school in Sind?—I think a good number of the parents sending their children for education would now prefer agricultural education to be given to them, in view of the opportunities they might get in the new lands under the Barrage.

60425 *Mr. Jamsheh Mehta*: You must have read the contracts which the exporting firms from Karachi make with the commission agents who, you say, are members of your association?—Yes.

60426. I am not talking of cotton; I am talking about wheat and other seeds?—Yes, I have read some.

60427. In those contract forms, in certain specifications, you know that certain percentages of dirt or other foreign materials are specified?—Yes.

60428. Therefore the exporting firms see that the commission agents deliver to them the goods, the wheat or other seeds, according to those percentages?—

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Yes. If there is more or less of foreign material, or dust, or barley, or wheat, they get allowances.

60429. Or they give allowances accordingly?—Yes.

60430. It will be to the interest of the merchants, if they find that it pays them to deliver more barley, to adulterate it with barley, or, if the allowances are such as go in their favour, to mix foreign materials with wheat, in order to get the best possible rate out of the exporters. Supposing an allowance of five annas per ton is made if barley is found above a certain percentage, and if they find that the market rate of barley is such that it will pay them to add more barley, they will do so?—The contract form is such that the merchant loses if the material is below specification.

60431. If the market value of the foreign materials is such that it goes in their favour to adulterate wheat with those materials, then they will take advantage of such opportunities. It may not be the commission agents who do it, but it may be done by the men who send it. Is that to your knowledge?—Not to my knowledge.

60432. You suggested the remedy that the Agricultural Department should insist on purity of seed. Instead of this, supposing the merchants on the other side insisted on a certain grade of purity, do you not think that that would compel the producers and the middlemen to deliver the pure stuff?—That is being done through exporting houses. They give a certain quality a certain price.

60433. I am talking of the pure stuff. Supposing the foreign firms insisted on their branches or agents in Karachi supplying them with pure stuff, and those branches insisted upon the commission agents, the commission agents upon the other middlemen and the middlemen upon the producers doing the same, do you not think that that would be a surer and more certain method of speedy improvement in this matter?—It would be, but it is doubtful if the exporting houses will do it.

60434. You are talking of an agricultural college. Given the choice between an arts college and an agricultural college, which would you prefer?—I would not have an arts college, but I would have an agricultural college.

60435. You would be for agricultural training right up from the beginning, that is, from the primary school stage?—Yes.

60436. I think you have suggested in your note that for some hours children should be given agricultural education in primary schools?—Yes.

60437. Apart from your being the Secretary of the Karachi Indian Merchants' Association, you are a zamindar?—My father owns land.

60438. You have also an interest in forest contracts?—My father had.

60439. What do you think about the connection between the zamindar and the *hari* in Sind? We are told that the *hari* is a partner with the zamindar, and he gets half or two-thirds of the crop as the case may be. What is your actual experience? Does the *hari* really get his full half share, or is it merely on paper? How much extra does the zamindar take away from the *hari*? Can you make it clear in the light of your experience?—In lift land the *hari* gets two-thirds, in flow land the *hari* gets half. That is his nominal fixed share. But the *hari* loses out of his share what he pays in high interest.

60440. What interest does he pay?—It varies from eighteen to thirty-six per cent.

60441. Does he pay to the zamindar?—He pays to the zamindar or the shopkeeper or whoever advances him money.

60442. Is it to your knowledge that the zamindars also lend money to the *haris* and take eighteen to thirty-six per cent interest?—Yes.

60443. Do most of the zamindars do so?—I should say that at least some of them do so.

60444. *The Chairman:* Do Mahomedan zamindars charge interest?—Some of them charge interest in produce; they do not take cash. I know of two or three zamindars on the Nawabshah side who take interest on the moneys advanced to the peasants, but in produce. Suppose their share of

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the produce is one *maund*, they take from the peasants one-and-a-quarter *maunds*. They do not take cash as interest.

60445. *Mr. Jamshed Mehta*: To your knowledge, the *kari* gets much less than the share which it is stated is being given to him?—Yes.

60446. What is your actual experience about the distribution of water? Three different opinions were given before the Commission. One was that it should be handed over to the zamindars; the second was that it should be left entirely to the engineers, and the third was that it should be left to a committee of zamindars, the Agricultural Department, the Revenue Department and the Engineering Department. Which would you prefer?—I would certainly like a joint committee to distribute the water. I would have half the strength of that committee made up of zamindars, because they are the most interested in the distribution of water.

60447. Is it your opinion that the Engineering Department make mistakes in the distribution of water, because they have no agricultural experience?—Sometimes they do.

60448. Your father was a forest contractor, and you have also some experience in that line?—Yes.

60449. Can you tell the Commission, briefly, about your experience of forests in Sind? Would you like to improve them? What faults do you find in the Forest Department?—I think the maximum is not taken out of them for the benefit of the people. There is too much of undue restriction on grazing. The charges are heavy and the restrictions are too many. Much more than these restrictions is the corruption in the lower ranks of the department, which reacts very badly on cattle-rearing near the forest areas, which would otherwise thrive well. The forest areas are not economically exploited, for lack of transport facilities. I feel that if there were some light railways running through these forests, carrying the fuel products to the towns, the price of firewood in the towns, and therefore the cost of living, would go down considerably, and that would also help the development of the countryside.

60450. You do not think that the grazing facilities are enough at present?—They are badly restricted.

60451. What is your idea about the Lloyd Barrage lands? Do you think farming societies for educated young men would succeed?—I think they would succeed very well, if the young man who undertakes to join such a society promises to do manual work himself.

60452. Do you think that the time has now come when the educated young man would necessarily do it?—He must do it, I think.

60453. What suggestions would you make for the improvement of the villager or peasant, either by self-help, or by Government aid, or by co-operative societies?—There is very great room for self-help left to the peasant, but unfortunately he has no friend to tide him over small difficulties. For instance, when there is a good crop and he is free from debt, he has nobody to advise him how to invest his little saving in grain or in other produce. Even when he is but a little in debt, there is nobody to advise him how to use his spare time, or how to improve his land which can give him sometimes thirty to forty per cent more in yield, and also to protect him from small vexations and interferences from, say, the police, or the Revenue Department or the *zabardast* zamindar himself. If he had some one to look after his needs, I think his position, even as it is, could be considerably improved.

60454. I think you make a statement that some shortage in labour would occur owing to the Lloyd Barrage?—I rather feel that there will not be so much shortage as is apprehended because of two or three reasons. Firstly, the system of cultivation is to change according to the Baker-Lane scheme. We should then have cultivation in *rabi*. At present, during the non-crop season in Sind, most of the peasantry are idle. The new cultivation under the Barrage is to be about fifty-four per cent on *rabi* and about twenty-seven per cent on *kharij*. So that, all the peasantry kept idle at present in the non-barrage areas will be available under the Barrage in the *rabi* season. Secondly, we must take note of the difference in the method of water supply. We will have largely flow lands instead of lift lands, and on flow lands the labour you

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need is about half or one-third of what you need on lift lands. Thirdly, the greatest cause at present leading to agricultural precariousness is the lack of a regular water supply. If the Barrage works to plan, and you get a sufficient and regular quantity of water and the agricultural industry becomes more steady, we are likely to attract a good deal of labour from the hilly tracts, from Rajputana, and from Cutch; it will be automatically coming to Sind. Of course, the Barrage is not going to operate all of a sudden; it will take some years to develop the Sind lands, so I do not think there will be difficulty of labour.

60455. Have you any ideas about the size of the holdings in Sind? Have you any suggestions to make?—I have suggested that at present we are suffering in some places from too big holdings also. We have been trying to fix the lowest economic unit for an agricultural holding. I think the upper limit is also very important, because so many people having 20,000 or 30,000 acres are not exploiting their land to the best economic advantage of the country; and if it is desirable to hit the poor man at the bottom by restricting his right of subdivision, which is very necessary in the interest of agricultural development and of society, it is also very necessary to restrict the right of the man at the top to hold land beyond a certain maximum. I think there is such a law in New Zealand.

60456. *Professor Gangulee*: What is the lowest economic holding you have decided upon?—I would suggest about twenty-five acres.

60457. *Mr. Jamshed Mehta*: Supposing a man has 40,000 acres of land, as one fortunate man has, would you deprive him of it?—At present, those who are holding that land cannot perhaps be interfered with; their lands have got to be left to natural sub-division hereafter. I would have that provision strictly made in the distribution of the Barrage lands.

60458. I want to know something about cotton. As you know, forward sales are made in cotton, by the zamindars to the middlemen, or to the ginning factories, because they want money?—Yes.

60459. In your own opinion, the Cotton Markets Bill will have practically no effect as regards increasing the income of the zamindar himself?—The opinion of the association is that it will not help the grower; my opinion is that it will help the grower.

60460. In what way?—I personally think that better marketing and organised marketing will help the grower, because the grower will after all know what is the best price to get in the market, what is the best weight in an organised market, what quality fetches the best price, and so on. Ultimately, it must affect on the grower. That is my personal opinion.

60461. *Sir Thomas Middleton*: You have just told us that, in the districts which you know personally, the zamindar never advances to the *hari* without receiving either money interest or interest in kind?—I have never said that the zamindar does not advance to the *hari*. The zamindar also advances to the *hari*, as does the shopkeeper and also the moneylender. But in some cases, the zamindar, particularly a Mussalman zamindar, does not take the interest in cash; he takes the interest in kind, because he has some religious objection to taking interest in cash.

60462. That is what I stated. So far as is known to you, the zamindars in your district are willing to advance to the *haris*?—Yes, they do advance.

60463. And they never advance without receiving interest either in money or in kind?—That is so.

60464. The interest in kind will be received if they advance for seed purposes, for example?—For anything.

60465. Supposing a zamindar advances money to help the *hari* to buy bullocks, how does he get the return?—At the crop time.

60466. He takes the value of the advance in crop?—Yes.

60467. So far as you know, is there any district in Sind where the zamindar advances money without any kind of interest, because he receives fifty per cent of the produce?—There is a *taccavi* given to the *hari* by the zamindar, which is usually without interest.

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60468. That is for wells or for long-term improvement?—No. At the beginning of the season, there is an annual advance made by the zamindar to the *hari*, and that does not fetch interest. It is about Rs. 100 per holding.

60469. That is the common custom?—So far as I know, that is the common custom.

60470. Rs. 100 for what area of land?—For ten to twelve acres of lift land.

60471. Is it calculated per acre, or is it a personal arrangement between the zamindar and the *hari*?—A *nar* or wheel works about ten acres. The *hari* comes and says "I want to cultivate ten acres on one *nar*", and he gets, Rs. 100 as *taccavi* without interest.

60472. You have made a suggestion for the creation of a fund. Have you made any estimate of the size of that fund when created?—It would be about four crores or so, all over India, for the central agricultural board, for all the provincial boards and for all the divisional boards. In the Bombay Presidency, I would say eighteen lakhs would be for the provincial board; the divisional boards in India might have about half a crore or so.

60473. You have already made a detailed estimate? You have taken the incomes you mention and calculated the yield?—Roughly, it will be about that.

60474. On the question of vocational training, a boy goes to school at the age of six. How long do you suppose he stays at the primary school?—I would put him for three years in the primary school.

60475. No more?—No more. I would shorten the period. I would not make the examination annual, but half-yearly.

60476. In three years most boys would never get beyond the second standard. They would not pass from the first into the second class at the end of the first year?—I would supplement that by adult education, by oral instruction, by a more interesting method of personal lectures and personal teaching.

60477. I am thinking now of the age at which you propose to give vocational instruction to the boy in the primary school. Presumably, it would be between the ages of seven and nine?—It would be between the ages of seven and ten.

60478. Mr. Calvert: Does your association normally use the compulsory arbitration clause in all contracts?—Yes, so far as dealings between the members of the association are concerned.

60479. But there is no compulsory arbitration clause in dealing with the up-country dealers?—No. They mostly send to the merchants here without such compulsion.

60480. Any disputes between you and the up-country dealer will have to go to court?—I have not known any such instances.

60481. Does not the compulsory arbitration clause work smoothly?—As between the members of the association, I think it has worked quite well.

60482. There is no trouble from the courts?—No. In fact, it compels the parties to settle out of court.

60483. Either party can go to court to upset the award?—I do not think the court is then empowered to interfere.

60484. The point I was driving at is: how far do you think compulsory arbitration can be used to diminish litigation in villages?—I think it can be used with very great advantage.

60485. Your experience is that, on the whole, compulsory arbitration works well and fairly?—Yes.

60486. Generally the small holder gets his seed from the village shopkeeper?—From the zamindar.

60487. The small holder?—Yes.

60488. Is it to the interest of your association that the amount of produce to be handled should be as great as possible?—Yes.

60489. And it is to your interest that the seed sown should be as pure as possible?—Yes.

60490. Do you think there is any hope of bringing organised public opinion to bear on the up-country shopkeeper to sell only pure seed?—If the shop-

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keeper is made to understand that it is in his interest to do it, and if the members of my association make up their mind to deal only with those who follow these instructions as to seed, then I think some advance can be made.

60491. We have been told, practically throughout India, that if you want to get pure seed to the cultivator, you must have a special official pure-seed depôt, and that the ordinary petty shopkeeper will not supply pure seed. But if the private shopkeepers throughout India could somehow or other be induced to supply only pure seed, your association for instance would have a much larger volume of commerce to deal with?—Yes.

60492. How, in your opinion, can the small shopkeeper be induced to give only pure seed?—I think, at present, the shopkeeper is not educated enough to understand the value of pure seed. I would not trust him with distributing pure seed.

60493. You do not think your association could launch out on a propaganda programme to educate the small shopkeeper?—I could not say that, because this proposition has never been put to them.

60494. It is to their advantage?—I think so.

60495. *Sir Chunilal Mehta*: Have you any agricultural experience?—My father holds land in the Nawabshah district.

60496. Has land been in your family for many years?—For about twenty-three years.

60497. Have you yourself any experience of agriculture?—Yes, I have been on my land several times, and stayed there for some months sometimes.

60498. Have you worked on the land yourself?—Yes, for some time.

60499. Can you tell us whether there is now any desire on the part of your association to send the young men rather for agricultural training than for the arts courses?—They have not concerned themselves much with educational programmes in the country so far.

60500. In view of the Barrage, would they like to take any interest now in agricultural education?—I think they would.

60501. Are they considering any scheme whereby they could turn the minds of educated young men to taking up land under the Barrage and working it themselves?—Several of them seem very much interested in the Barrage, but they have not considered this question separately.

60502. Do they propose to consider it?—There has been no such proposal yet. We might consider it hereafter.

60503. Do you think that you yourself, as secretary of the association and as having had agricultural experience, and with the views that you have placed before us about agricultural education, could put before your association any scheme?—I will try, and I will certainly give them the views which I have embodied in this note.

60504. Would you make it a condition that the young men should get some kind of training before they purchase land, or before they form themselves into a society?—Yes; that is very essential.

60505. Where do you think they can get the training now?—At present there is no adequate arrangement in Sind. There are only some farms, the Mirpurkhas farm, or the Sakrand research station, where grown-up educated men could be directed, but to a beginner it would be of no use.

60506. A certain number of boys have been going to the Poona Agricultural College from Sind?—Yes; very few.

60507. Would they go in for the short courses at Poona?—So far, the distance has had a very discouraging effect on the minds of parents and students. Besides, the Poona course has been regarded as too theoretical; some of the graduates who come out from that college have not proved very successful.

60508. You have not had any experience of the short courses in Poona?—No.

60509. You said, in answer to a question, that the cultivator and the *hari* have got no friend to guide them. What sort of friend have you got in mind?—I mean a worker in a co-operative society, a taluka development association,

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or in any other society for rural improvement. There is no such society to befriend the peasant when he is in difficulty. There is nobody just there on the spot in the village, when he wants to improve his land to guide him, when he wants a little loan to show him that he can go to a co-operative society and get cheaper credit there, that he can get superior seed from the Agricultural Department, or that he can market his produce in a better way by carting it to another village, and so on.

60510. Would you favour the formation of such an organisation?—I would strongly favour it.

60511. Do you think you can get non-official men to work on such an organisation?—To start with, we will get very few, but I think such a society would gather strength in course of time.

60512. Do you consider that the members of such a society should live in the villages?—It is very necessary that at least some of them should be there.

60513. Would you be prepared to find men who would like to go and live in the villages?—Yes.

60514. Such a scheme would be possible?—I think it would be possible in the near future.

60515. Are you speaking of officials or non-officials?—Non-officials entirely.

60516. Have you seen the Sakrand farm?—Yes; I visited it two months ago.

60517. What is the nature of the work being done there?—They are experimenting on different methods of watering; they are trying to evolve different kinds of seed; they are trying to deal with the problem of *kallar*, rotation of crops, and several other scientific problems.

60518. Have you any suggestions to make?—I have one to make, and that is the necessity of evolving some hedge plant which can provide against cattle trespass and also provide some useful crop and fuel. In the Nawabshah district (of which I have some experience) the problem of cattle trespass is very acute. Sometimes the agriculturist loses ten to twenty per cent of his crop by the cattle of other people trespassing into his fields and eating away the standing crop. If the Agricultural Department could evolve a kind of quick-growing hedge plant which the cultivator can grow on his land, which would supply him with some crop and give him some fuel, it would be very useful. Then, there is also a very great need of finding out remedies for dealing with several kinds of pests which attack food and non-food crops. At present when a disease attacks the *juar* the agriculturist does not know what to do. The Agricultural Department may have a remedy, but the zamindar does not know it. Fifty to seventy-five per cent of his crop may be lost, but the agriculturist has no remedy. The latest enemy of the countryside is the locust; in fifteen minutes miles and miles of the finest crops may be destroyed, without their being able to do anything against it, and all expenditure therefore goes to waste.

60519. You spoke about this hedge. It is perfectly true that the damage done to the crops is very great. Yet the cattle must have some kind of food. Is there sufficient fodder?—No; and that is why the *haris* leave their cattle at night in their neighbours' fields.

60520. Have you sufficient fodder?—The supply is not very adequate.

60521. Have you any suggestions to make in regard to that?—I have suggested that there should be small forests in every village. I would also suggest that there should be some grazing ground attached to every village, for which water should be supplied free and land should be supplied free.

60522. But the grazing grounds are practically bare in Sind?—But I suggest that the grazing ground should get water throughout the year and should be well kept. Along with that there will be the *huri* which will afford shelter to the cattle at noon and during the hot hours of the day.

60523. Have you any suggestions to encourage the formation of *huris*?—Yes; I would suggest that the zamindar who has got a *huri* might be given some little reduction in land revenue. Supposing a zamindar maintains about sixteen acres of *huri*, then those sixteen acres should be revenue free. That

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would affect only big landlords, not small landlords, because they will hardly have more than twenty-five acres.

60524. You speak of wells?—Tube wells.

60525. Only tube wells, not ordinary wells?—I have seen ordinary wells, but I have suggested tube wells because they will enable cultivation to be carried on on a large scale.

60526. *Dr. Hyder*: Speaking about hedges, have you not got cactus growing here?—Is it prickly-pear?

60527. It is *thur*?—I do not know that. We have got prickly-pear at Malir. It is a leguminous plant and does not hurt any crop; it grows quickly and maintains itself without water; but it gives no crop or fuel.

60528. That is suitable to the soil of Sind; why is it not adopted?—I do not know why.

60529. *The Chairman*: Have you any land yourself?—My father has.

60530. Can you yoke a pair of oxen or bullocks?—No.

60531. *The Raja of Parlakimedi*: You say that a certain class of zamindars collect interest by kind. May I know what rate of interest is charged?—It probably comes to eighteen to thirty-six per cent.

(The witness withdrew.)

**Mr. S. C. SHAHANI, M.A., Zamindar, Jamrao, Sind, Principal,
D. J. Sind College and Secretary, Sind Collegiate Board.**

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(a) My suggestions in this connection are that higher research, both agricultural and veterinary, should remain centralised and should be in the hands of the most competent men. The number of scholarships offered by the Government of India for higher research should be greater. At least two of these scholarships should be intended for each Province in India. Decentralisation or provincialisation of this research will tend to lower the requisite standards of research. For the requisite research in the matter of local agricultural problems in different Provinces, *e.g.*, in the matter of selecting the best variety of Sindhi cotton or rice, or of determining the best form of drainage in Sind needed for preventing water-logging of the culturable lands after the Barrage, the Agricultural Departments of the different Provinces should be better financed; and the Local Governments should offer at least two scholarships for the promotion of local research in their own Provinces.

(c) Rural economics is, in my opinion, a particular subject for research, which is not at present being investigated, and to which attention might usefully be turned.

QUESTION 2.—AGRICULTURAL EDUCATION.—(i) The supply of agricultural institutions is altogether insufficient. In Sind for instance, which is essentially an agricultural Province, there is no agricultural educational institution, college or school.

(ii) There is an urgent need for extension of teaching facilities in Sind.

(iii) Teachers in rural areas should preferably be drawn from the agricultural classes, for they will have lived in an agricultural atmosphere and their agricultural training will have been on that account better realised.

(iv) The attendance at most of the existing institutions is not so numerous as one would expect in present circumstances. The reasons in my opinion are these:—(a) The students have jobs in different services as their goal, and become disappointed if at the end of their careers they do not secure suitable jobs; (b) the number of institutions being insufficient, if the only college, (like the Agricultural College in Poona, in the Bombay Presidency) happens to be situated at a distance from some parts of the Presidency, *e.g.*, Sind, the attendance becomes thinner still on that account; (c) the training in the existing institutions is not practical in proportion to its scientific nature; (d) the people are comparatively poor and the number of scholarships and free studentships is not so great as it should be; and (e) agricultural education is not properly graded. If at present there are colleges, there are no schools, secondary or primary, and *vice versa*.

The measures likely to stimulate the demand for instruction are:—

(a) Demonstrations that scientific agriculture is more paying.

(b) Revision of the ideal of agricultural education: not merely securing jobs but acquiring agricultural knowledge and power. Reservation of one class of jobs, *viz.*, the *mukhtiarkaris*, otherwise called *tahsildarships*, for agriculturally trained people, the present judicial functions of the *Mukhtiarkars* being assigned to separate officers, and the *Mukhtiarkars* being confined to the collection of revenue and the organisation of at least one agricultural farm in each of their talukas. This will be a great stimulus, as will be the creation of educated agricultural communities by grants or leases on easy terms of agricultural lands to members, on condition that they live on their lands and cultivate them.

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- (c) Institutions of the right type brought to the doors of the people.
- (d) Provision of training of the right type, suitable for varied genius.
- (e) Scholarships and free studentships.
- (v) The main incentives which induce lads to study agriculture (I take it incentives operating now are intended) chiefly are jobs and scholarships.
- (vi) Pupils are not solely drawn from the agricultural classes, who are doing cultivation merely according to the indigenous theory of agriculture.

(vii) The modifications from the point of view of agriculture of existing courses of study which appear to me to be called for are the inclusion in the arts and science courses of the study of agriculture as an optional subject in Intermediate Science, B. Sc., and B.A.; the modifications in existing agricultural courses of study will be those arising from the necessity of greater stress being laid on agricultural practice in agricultural cultivation and crafts.

(viii) My views on: (a) nature study, are that natural manifestations, earth, sky, light, grasses, grains, fruits, flowers, birds and animals, should be made generally intelligible to all students, and their powers of observation and interpretation exercised and sharpened; on (b) school plots, that the plots should be numerous, representative, and worked as far as possible by students only under the guidance of teachers, and on (c) school farms, that they should be devoted to experiments with the staple products of the locality, and to small dairies and their products.

(ix) The careers of the majority of students who have studied agriculture are:—(a) Agricultural Service, (b) Forest Service, (c) Revenue Service, and (d) management or cultivation, or both, of one's own or other lands. In Sind (d) is rare. As the agriculture of Sind develops, especially after the Lloyd Barrage is completed, (d) can absorb a progressively larger number of our agriculturally trained men. As it is, pathetic sights such as that presented here by a B. Ag., selling shoes and boots as a shop assistant are not uncommon.

(x) Agriculture can be made attractive to middle class youths (a) by restricting appointments to the Agricultural, Forest and Revenue services mainly to agriculturally trained middle class youths, (b) by granting to such youths holdings or leases on easy terms on condition that they live there and do the cultivation themselves, and (c) by demonstrating that agriculture can be made as paying as any other industry.

(xi) There are, to my knowledge, very few movements for improving the technical knowledge of students who have studied agriculture. Industrial chemistry or other sciences can be included in the agricultural, arts and science curricula. Agriculture can be industrialised by the teaching of, e.g., the processes of making molasses, pressing oil-seeds, ginning and pressing, or milling grains, while cultivation can be industrialised by the teaching of the methods of using tractors or other mechanical devices.

(xii) Adult education in rural tracts can be popularised by (a) making it free, and (b) demonstrating that agriculture can be made a paying proposition. As in America and Germany, the cinema with its graphic representation of the success of certain agricultural methods may, I think, be employed with effect.

(xiii) Free education and demonstration in rural areas can be done best for the present by the Agricultural Departments, which should be better financed by their Local Governments, with earmarked revenue from, if need be, certain special educational cesses levied from comparatively large landholders.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(a) The measures which, in my view, have been successful in influencing and improving the practice of cultivators are the following:—

- (1) The existence in the midst of cultivators of a superior cultivator whose practice of cultivation is really an improvement in one

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or more respect upon the general practice. In Sind nothing has done so much good as the devotion of the Punjabi cultivator to the method of breaking several times the land that he puts under cultivation and thus aerating it. The necessity of manures has thus been a great deal reduced, and the economical use of water inculcated.

- (2) The selection of seed and then its distribution by the Agricultural Departments on their seed-farms, through ginning factories or by imports.
- (3) Demonstration on the cultivators' own lands.
- (4) The bulletins issued by the Agricultural Departments, to a certain extent, whenever they are translated into vernaculars, which are known to a few of the cultivators.
- (5) The exhibitions and shows that are occasionally organised by the Agricultural Departments.

(b) My suggestions for increasing the effectiveness of field demonstrations are as follows:—

- (1) Conduct them on the cultivators' own lands.
- (2) In this way show the cultivators that in their own conditions scientific methods of agriculture can be more paying.
- (3) Cinema shows with their spectacular effect can be a material help in securing the cultivators' faith in scientific methods of agriculture.
- (4) The demonstrators to restrain their autocratic or snobbish tendencies of behaviour and make the cultivators feel quite at home in their midst, so that the tradition of knowledge may, through sympathetic contact, prove adequate and effective.
- (5) Those of the cultivators who would be ready and willing to adopt improved methods to be discriminated, and then interested and utilised for field-demonstrations and propaganda work, by means of subsidies or otherwise.

(c) The methods whereby cultivators may be induced to adopt expert advice should in my opinion be preferably the following:—

- (1) Select the most advanced of the cultivators, and get them to adopt expert advice in their practice by affording them facilities to make their practice a real object lesson to the cultivators round about.
- (2) Bring within easy reach of them the means of right agricultural training.

(d) I am aware of one striking instance of the success of demonstration work, and of one striking instance of the failure of it.

My recent visit to Repala in the Punjab showed me that Sir Ganga Ram, with requisite facilities afforded him by Government, has by generating electricity for lifting water for irrigation, and then by irrigating thousands of acres by flow, organised some most valuable demonstration work.

I have also known signal failure attending the reclamation from alkali attempted on a comparatively large farm on the Dowlatpur Minor from the Jamrao in Sind. The selection of soil for reclamation purposes, the methods employed, and the officers appointed to do the demonstration work, were all wrong.

QUESTION 4.—ADMINISTRATION.—The means I would suggest for the better co-ordination of the activities of the Government in India are periodic inter-provincial conferences and a more careful interchange of bulletins.

The directions in which the Government of India may usefully supplement the activities of the local Governments may be indicated thus:—

The work of the central and provincial research institutes may be confined to the consideration of All-India and local problems, respectively,

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so that there may be no unnecessary duplication; and the research institutes may in the conduct of their work carefully note, and then indicate to one another, the local or central nature and character of the various collateral problems that appear to them to be pressing for solution.

(b) It is my opinion that by increasing the scientific staff of the Government of India, and Indianising it as far and as early as possible, the varied 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.

The types of work which would benefit by pooling the services of experts are various, e.g., sericulture, production of lac and other resins, tanning materials, growth of useful trees, etc. The control here should be central. Decentralisation would promote development of different Provinces while not preventing their participation in the life of the Central Government.

(c) I am fairly satisfied from the agricultural standpoint with the services afforded in the whole of India by the Agricultural Service, railways and steamers, posts and telegraphs excluding wireless, but not at all by the Veterinary Service, Meteorological Department, roads or wireless telegraphy. The fairly satisfactory services should be made more satisfactory. The Agricultural Service should be better organised in its personnel, demonstrations and propaganda, as has been in substance indicated above. Railways and steamers should so regulate their freights as to help in the cheapening of the cost of agricultural produce, and in the industrialisation of agriculture, as should posts and telegraphs by reducing their charges. The Veterinary Service at any rate in Sind, the Meteorological Department, roads and wireless telegraphy are yet in their incipient stages of existence and need considerable development. Trunk roads in Sind must soon be metalled. The agriculturist must know whether or not he is to expect rain in any season. A metalled road within two miles of every village and a railway within eight miles of it can and should soon be secured for the success of agriculture in every Province.

QUESTION 5.—FINANCE.—My 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 are as follows:—

(1) So develop the co-operative credit societies that the provision of short-term credit for the cultivators for all their operations may be found sufficient, so that the cultivators may not need to apply to the *sowcar* (moneylender) for any help; and so organise agricultural education that the cultivators may view the co-operative credit societies as living institutions well able to finance all their operations.

(2) Establish land mortgage banks, also called land banks or agricultural banks, at least one in each district, which should give cultivators long-term credit, wherever necessary and deserved, information regarding which should be made available for them by the co-operative credit societies.

The moneylender may thus be made to disappear or he may then find it to his benefit to invest some of his money in the co-operative credit societies and the land mortgage banks.

(3) Government *taccavi*, which should supplement the work done by the co-operative credit societies and the land mortgage banks, should be worked less rigidly, nay, more easily, in the matter of its distribution and collection. Not the revenue officers but the village panchayats, and much easier instalments fixed by the panchayats themselves, may make this source of financial help to cultivators really useful.

QUESTION 6.—AGRICULTURAL INDEBTEDNESS.—(i) In my opinion, borrowings are to be distinguished between those needed for ordinary operations and those needed for improvements. Borrowings for improvements may reasonably have to be made by the cultivator, who as a rule finds it difficult

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under existing conditions to command a surplus for the adjustment of his receipts and expenditure. Borrowings for ordinary operations are caused by external and internal causes. The external causes are mainly inadequacy of water in a Province like Sind, wrong methods of cultivation, high assessment and exactions of revenue and P. W. D. subordinates, comparatively high marriage and other social expenses, laws like the Deccan Agriculturists' Relief Act, which lead cultivators to think that they may evade repayment of loans by running away from one holding to another and *patharis*, who, helped by influential zamindars and police owing to shares received from them, lead cultivators to think that their main income may be derived from cattle-lifting and other thefts, and not from cultivation. The internal causes are the cultivators' improvidence due to no education, intellectual, moral or spiritual, i.e., no mosques, no schools, and the cultivators' physical inefficiency, due to no *pucca* houses and no hospitals. Cultivators thus come to be involved in heavy indebtedness, and show no ambition to rise out of their economic bondage.

(ii) The sources of credit in my opinion are the zamindar, the *sowcar*, the Government and the co-operative credit societies.

(iii) The reasons preventing repayment are inadequate yield and dishonesty. The causes of inadequate yield are unprepared condition of land from want of money and indisposition to work owing to bad agricultural training; the causes of dishonesty are bad moral and spiritual training, and bad laws like the Deccan Agriculturists' Relief Act.

(b) The measures in my opinion necessary for lightening the agriculturist's burden of debt are: improvement of water supply, better intellectual, moral and spiritual and agricultural training, better laws calling for exact accounts from the moneylender but not interfering with collection of legitimate debts, and short-term and long-term credit on easy terms.

Special measures to deal with rural insolvency, to enforce the application of the Usurious Loans Act, or to facilitate the redemption of mortgages should be so designed as not to shake the cultivators' credit, or to undo the good relations subsisting between them and others of the society to which they belong, which will, however, be very difficult of achievement. Special protective measures should therefore, on the whole, be avoided.

(c) Measures taken to restrict or control the credit of cultivators, such as limiting the right of mortgage and sale, like Act III providing for the occupancy of lands on the Jamrao Canal in Sind on restricted tenure and not on capitalists' terms, operate, in my opinion, against the occupants by reducing their credit, and against the interests of society by letting those hold land who are least fitted to cultivate it. But non-terminable mortgages may be ended in order to give the mortgagor a chance of re-establishing himself. As far as possible, hereditary cultivators should be enabled to remain as cultivators.

QUESTION 7.—FRAGMENTATION OF HOLDINGS.—(a) The means for reducing the loss in agricultural efficiency attendant upon the excessive subdivision of holdings in my opinion are: (i) co-operative farming, (ii) prevention of excessive subdivision by Government fixing the standard unit of holdings, and (iii) by the occupants of extremely small holdings finding it necessary to sell their holdings to their neighbours who, by joining the newly acquired holdings to those already held by them, make their holdings larger and therefore capable of being profitably cultivated. (i) is the best means; (ii) is the next best means; and (iii) next to (ii). Government agency may, however, be considerably refined by its seeking co-operation with village communities.

(b) The obstacles in the way of consolidation by co-operative farming will, in my opinion, be overcome by education of cultivators and by their actually experiencing the benefits of co-operation in farming; the obstacles in the way of consolidation through Government agency may be overcome by Government reducing the cultivators' dislike to interference by seeking co-operation with village communities; and those in the way of consolidation by natural sales, such as prestige attaching to agricultural ownership, may

be overcome by (a) development by education of the cultivators' disposition to mind the business side of agriculture, and by (b) provision of industrial occupation for holders of extremely small holdings, when they will be ready to forego considerations of prestige for the sake of earning a livelihood.

(c) Disputes with reference to fragmentation of holdings should be kept out of the courts as far as possible, and referred to panchayats and communities. At present, litigation has become very costly and judicial decisions have in addition a tendency to be dilatory. But certain laws will become necessary to deal with the interests of minors, widows with life interest, legally incapable persons, etc., as affected by the newer measures necessitated by the inconveniences arising from fragmentation. The execution of such laws should be done as far as possible through panchayats and communities.

QUESTION 8.—IRRIGATION.—(a) Sind has already been instanced as a Province in which irrigation schemes should be adopted; and the Lloyd Barrage Project, including canalisation, has been begun.

(i) The Jamrao, designed to be perennial, should be properly regulated in its upper reaches too; its head should be improved, and if necessary changed. Non-perennial canals will be improved if another weir is constructed at Kotri, and a third in the lowest reaches of the River Indus.

(ii) Tanks and ponds will not ordinarily be of much use in Sind, where the rainfall is small. Tanks and ponds for the storage of water to be used for winter crops can, however, be very useful. During the inundation season water is run to waste in escapes, etc., because there are no tanks in which to store it.

(iii) Tube wells should be introduced in areas where the subsoil water is sweet.

(b) The existing methods of distributing canal water to cultivators should be made uniform. If moduled outlets have been found satisfactory, they should be made uniform and should be provided all over a distributary or a minor, and in all distributaries and minors, whether inundation or perennial. Internal distribution in holdings of canal water should be left to the holders, the P. W. D. having nothing to do with it except where there are more holders than one on a watercourse, and that too only to the extent of fixing the rotation for the different holders.

No methods have, to my knowledge, been employed to prevent wastage of water by evaporation and by absorption in the soil. A somewhat larger moduled outlet should be deemed due to the holders at the tail. But on the Jamrao, outlets in the upper reaches are made narrower than they should be, with the result that the holders there are starved, and water at the tail becomes superabundant, so that a larger area is irrigated than should be, or water is let into escapes or otherwise wasted.

QUESTION 9.—SOILS.—(a) (i) Improvement of soils by drainage is essential, and should be carefully considered. The Barrage Scheme in Sind may lead to deterioration of soils from waterlogging, if at the same time careful drainage is not introduced.

(ii) Alkali land, as it is known to me, is reclaimed by profuse waterings duly drained away, by certain crops, like rice, and by certain fertilisers.

(iii) I do not know how to prevent erosion of the surface soil by flood-water, except by controlling the flood-water.

(b) I can give instances of lands which within my recollection have undergone improvement by constant breaking up and aeration, as also of soils that have become alkaline from overwatering.

(c) Lands gone out of cultivation may be distributed free of cost, to those willing to take them, so that there may be a chance of their improvement. Certain kinds of alkali, known as *reh* and *kallar*, are very difficult to reclaim, so far as I know.

QUESTION 10.—FERTILISERS.—(a) In my opinion, greater use can profitably be made of natural manures, dry and green, than of artificial fertilisers. Mixed manures, however, are desirable. Bones and oil-cakes should be preserved, and an impetus given to the manufacture of phosphates, nitrates, sulphate of ammonia and potash manures.

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(b) To prevent the fraudulent adulteration of fertilisers, sellers may be made to sell under guaranteed analysis conducted in Government test houses and by chemical analysts.

(c) New and improved fertilisers can be popularised by the Agricultural Department by making experiments with them on the lands of cultivators, by cheapening their cost by reducing freights charged by railways and steamers and by special concession rates, and even by making special grants to makers of manures.

(d) Bombay Presidency, excluding Sind, is using sulphate of ammonia, while southern India uses phosphates, to a large extent.

(e) The effect of manuring with phosphates, nitrates, sulphate of ammonia, and potash manures has not been sufficiently investigated in Sind.

(f) If the Forest Rules are relaxed to some extent and fuel cheapened, cowdung may not be used as fuel. A law preventing the practice of using cowdung as fuel is not desirable.

QUESTION 11.—CROPS.—(a) My views on the topics enumerated under (a) are as follows:—

(i) and (ii) Existing crops in Sind may be enumerated mainly as—(1) cereals (*bajra*, *juari*, wheat, rice); (2) legumes (*mung*, *mah*, *matar*, gram, *urid*, *tur*); (3) cotton (*desi*, American); and oil-seeds (*til*, *sarah*, *jambho*, *castor*). These crops would be improved by—(1) selection of seeds of selected varieties; (2) hybridisation; (3) perennial supply of water, water-supply in March or at the end of February being necessary for successful cultivation of America, Egyptian and other varieties of longer-stapled cotton, which take comparatively long to ripen.

The one new fodder crop which I would wish largely introduced is *berseem* or Egyptian clover, which serves as an excellent green manure.

(iii) Seeds should be most carefully selected, preferably at seed farms worked by the Agricultural Departments, and then distributed to cultivators.

(iv) Pigs should be shot down. A suitable rat-bane still needs careful research.

(b) I do not know of any heavy yielding food crops in replacement of the present crops.

(c) Fruit culture in Quetta, etc., culture of longer-stapled cotton in Sind at one time, and sericulture in Bangalore may be mentioned as some of the crops more profitable than the existing ones which have come under my observation.

QUESTION 12.—CULTIVATION.—I can suggest improvements (i) in the existing systems of tillage by early and repeated ploughings and aeration, and by ploughs improved by adaptation, and (ii) in the customary rotations by the introduction of *berseem* when intensive cultivation becomes possible.

QUESTION 14.—IMPLEMENTS.—(a) Tractor ploughs, etc., should be introduced.

(b) The steps which could usefully be taken to hasten the adoption by the cultivator of improved implements are the provision of an efficient system of roads, cheap transport and co-operation.

(c) The chief difficulty in the distribution for sale throughout the country of agricultural implements is freight.

QUESTION 16.—ANIMAL HUSBANDRY.—(b) (i) Common pastures in villages are disappearing owing to encroachments for cultivation purposes. They should be restored.

(c) Fodder shortage in Sind where there is no adequate rainfall is most marked between October and July.

(d) Better water supply will improve the supply of fodder in Sind.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(a) The agricultural operations on a holding cultivated with cotton (fixing unit of culturable area at 8 acres per cultivator) will be: clearance of jungle and removal of stumps (1st to 24th May), sowing and ploughing (24th May to 10th June), 8—10

waterings (July to November), pickings (October to January). An ideal cultivator breaks the soil and aerates it from February to May. The operations are done mostly by labourers. Even the best cultivator of cotton is engaged only half his time.

The grower of cereals is free about three months more every year. His operations end in December and begin about a month later.

On a perennial canal a cultivator also grows wheat and devotes to agricultural operations about two months more. His leisure may be reckoned at four months a year.

(b) New subsidiary industries to occupy the spare time of an agricultural family, which could be established with Government aid, are: spinning and weaving, poultry rearing, rope-making, basket-making, oil pressing, sugar-making, cotton-ginning, rice-hulling, etc.

(c) The obstacles in the way of the expansion of such industries are chiefly those arising from want of agricultural education, of adequate funds, of developed transport, etc.

(d) Government should do more to establish industries connected with agriculture.

QUESTION 20.—MARKETING.—(a) I do not consider existing market facilities to be satisfactory. I refer especially to market facilities for cotton, which I grow. I sell my cotton chiefly to Messrs. Ralli Brothers, and to Messrs. Volkart Brothers. I find I cannot realise more for the longer-stapled varieties of cotton than for the short-stapled varieties. This year I have realised less. I attribute this to inadequate market facilities. I sent consignments of Egyptian cotton, some time ago, but lost over them, and discontinued them. I would suggest co-operative ginning and marketing as an improvement of marketing facilities. Larger consignments could then be made, which, if good, will come to be sought, making possible the maintenance of agents in centres where our products are fancied.

(b) I am not satisfied with the existing system of marketing and distribution. I refer chiefly to cotton, the channels of marketing and distributing of which from the producer to the exporter are myself and my *haris* who produce, certain *banias* who buy and sell to firms like Messrs. Ralli or Volkart, and Messrs. Ralli or Volkart who ultimately buy, gin and export to Europe or to Japan, as merchants and not as commission agents. The services of firms like Messrs. Ralli or Volkart are very efficient; but the margin upon which such intermediaries operate are very large. Each transaction of mine is financed by Ralli or Volkart or the *banias* who buy from me to sell to firms like Ralli or Volkart.

(c) The steps I would suggest, whereby the quality, purity, grading or packing of agricultural produce may be improved, are those that will give those engaged in distribution themselves a name, in which case they will see that produce (e.g., cotton, of which I am speaking) of the right sort is pressed and packed. When I was a member of the Indian Central Cotton Committee I had occasion to see the very worst samples of pressed cotton, sent by the British Association for inspection, which might have yielded some profit to the intermediaries but which must have earned a low reputation for the new varieties grown in India.

(d) I think effective steps should 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. I sold all my cotton this year early because everybody told me cotton prices would go down, whereas I now see that I would have gained at least Rs. 3 per maund of *phuttis*, if I had waited.

Oral Evidence.

60532. *The Chairman:* Mr. Shahani, you are Principal, Dayaram Jethmal Sind College, and Secretary, Sind Collegiate Board?—Yes.

60533. You are, I think, a large zamindar in Sind?—I am a comparatively large zamindar.

60534. Is your time spent mainly on the arts college or do you find enough time to attend to your responsibilities as a zamindar?—I spend my vacations, holidays and week-ends mainly in looking after my estate, so that I may be said to be doing agriculture myself, attending to the two things as best I can.

60535. Could you give the Commission some indication of the extent of your holdings?—It will be three to four thousand acres.

60536. Have you yourself succeeded in introducing any improved crops?—I was the first to try experiments with Egyptian cotton; I have tried experiments with American cotton on a large scale; I have tried also to improve the *desi* strain; I tried about six varieties of wheat, when water was available for such experiments.

60537. Have you been successful?—I succeeded very well with Egyptian and American cotton and wheat. I have succeeded in all things; only I cannot command the requisite water supply.

60538. Will you enjoy perennial irrigation as a result of the new Barrage?—Yes. I am on the Jamrao Canal, which is designed as a perennial canal. It worked very well for some time, and then become a failure, and I find it has not yet been improved. A layman like myself feels that the thing could be put right in about three years' time. I really cannot understand why so much time has been taken to improve it.

60539. Have you interested yourself in the schemes for research which are being developed in order to cope with conditions as they will exist after the new Barrage is in working order?—I think I have.

60540. If there is anything in your mind outside your note, perhaps you will say it now?—I would like to emphasise the importance of research in connection with irrigation first. The condition of the Jamrao is to be studied and also the condition of the other canals. Some of the inundation canals are working better than the Jamrao Canal. If there were a body of researchers bent on finding out why these canals have succeeded, I have no doubt that they would find the remedy to be applied in the case of the other canals. If some canals are working well then the conditions which are responsible for their success ought to be studied and the result of the study utilised in improving the condition of the other canals. Some research should also be done with regard to the utilisation of subsoil water. Water-logging would then be reduced; and water would then be made available at those places where it is now most urgently needed. The construction of tube wells presents great difficulty in Sind, but I understand that the difficulty has been much reduced in other places. We want a body of researchers who will make the requisite research regarding tube wells and then do some propaganda work to let the agriculturists know where and how they can avail themselves of tube wells.

60541. You have a good many factors to consider in tube wells, the initial cost of boring, the cost of raising the water, the potential value of the land, and the facilities for marketing the crop which will be raised as a result of that irrigation?—The market should in Sind be considered a secondary factor, the primary factor being water. Ordinarily, all produce is easily disposed of. With the improvement of the condition of the village life the consideration of all factors necessary for the success of tube wells will become easy. I have got a scheme to put before you which is this: Village life must be carefully organised. I feel very thankful to Sir Chunilal Mehta for introducing the taluka development associations. But to make these associations duly successful, there should be, connected with these, village committees or associations, and then inter-village committees or associations (six villages may be grouped together for this purpose); then the taluka

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associations should be combined into divisional associations, and those into district associations, and those again into a provincial association. I want all these to be non-official organisations; and it should be obligatory on the part of the Mukhtiarkar, the Deputy Collector, the Collector and the Commissioner periodically to consult these organisations. When this is done, requisite information for generalisation and practice will become available for researchers, organisers, administrators and financiers, and the agricultural condition of the country will improve. To give but one instance: we have tried lately two varieties of American cotton—4F and 285. Now the Agricultural Department here have been led to believe that 4F is better than 285. I have had a different experience, and I told the Director of Agriculture that 285 was better than 4F, but he got slightly upset. He thought the information given him by his own men was reliable. I was a member of the Indian Central Cotton Committee and brought the matter up before the committee. Some of the members gave it as their opinion in very definite terms that 285 was better. Yet what is being done now? 285 is given up, and 4F is continued. See the inconvenience which thus arises to the cultivator. Now, if there had been information available, the reason and imagination of the researcher would have been properly exercised.

60542. Is there any agricultural teaching in the college with which you are associated?—None. I would have been able to provide agricultural training on the 2nd June 1927; my scheme was complete, but an adverse opinion was given by the Director of Agriculture to the Commissioner in Sind. This opinion was sent on to me and I was asked not to move in the matter any further, although the standing committee has passed my scheme, I have thus not been able to start the college; I am retiring on the 10th November, partly on this account. This scheme is to be referred to you and your opinion must be given before any attempt at starting a college is made. I have brought these copies* of my scheme, and I would request that they be distributed to the members of the Commission for their consideration. This is a scheme for an intermediate college. I feel that we want intermediate colleges and continuation schools more than colleges themselves. I have succeeded in introducing some missionary spirit into the working of my college. I feel that the Principal and Professors of the college between them should be able so to organise an intermediate college as to make it least expensive and at the same time most efficient.

60543. *Dr. Hyder*: You mean an intermediate college as established in the United Provinces, or an intermediate agricultural college?—The latter. I do not know that the United Provinces have special intermediate college. In the main, my idea is that university teaching should be separated from the lower teaching. University teaching properly is more theoretical, and serves as a basis for post-graduate research. Now, I want in the first instance that the pupils should know the elements of agriculture and should be in a position to apply their knowledge to agricultural practice. I have always conceived two factors to be necessary in the organisation of agriculture: expert advice and practical experience. Those that are practically engaged in the work of agriculture also possess imagination.

60544. You have not understood my point. It has been recognised by the University Commission that university teaching should be separated from the lower teaching. Do you want to combine practical instruction with theoretical instruction? Do you want to teach other subjects also?—I have differed from the Bombay University in this matter. The University think that every intermediate college that is brought into being should become first grade. That is a wrong idea. That would mean duplication of laboratories and libraries, and consequent lowering of the standard of university teaching.

60545. My point is: Are you going to teach only agriculture at this intermediate college, or are you going to teach other subjects like economics?—Agriculture, and allied subjects such as rural economics and agricultural chemistry.

* Not printed.

60546. *The Chairman:* In answer to Question 20 (c) you say: "The steps I would suggest whereby the quality, grading or packing of agricultural produce may be improved, are those that will give those engaged in distribution themselves a name, in which case they will see that produce (e.g., cotton of which I am speaking) of the right sort is pressed and packed. When I was a member of the Indian Central Cotton Committee I had occasion to see the very worst samples of pressed cotton, sent by the British Association for inspection, which might have yielded some profit to the intermediaries but which must have earned a low reputation for the new varieties grown in India." Will you tell the Commission what body you refer to by the title "British Association"?—That association which concerns itself with the growth of cotton in the whole Empire.

60547. *The Cotton Growers' Association?*—Yes.

60548. You say: "I had occasion to see the very worst samples of pressed cotton, sent by the British Association for inspection": Sent where?—Sent to the Indian Central Cotton Committee.

60549. As a warning: is that it?—Yes, as a warning.

60550. Is it your suggestion that that cotton is not in fact exported from India?—No. But I have never seen such cotton ginned and pressed here.

60551. Would you go so far as to say that it was not exported in that condition from anywhere in India?—I think it was; only the ginning and packing have been extremely badly done.

60552. To that extent the association in question were serving a good purpose in bringing to the notice of the Indian Central Cotton Committee exactly what is required to improve the reputation of Indian cotton?—Quite true.

60553. Are you satisfied, on the whole, with the working of the Indian Central Cotton Committee?—No.

60554. Why not?—For this reason, that proper men are not included on the committee. The idea evidently is that there should be no criticism, whereas criticism and information are essential for the formulation of right ideas.

60555. Could you develop that a little? What type of men are you thinking of?—If there is a man who does enquire as to what is being done in Sind he is excluded, by reason of the fact that he has enquired; and similarly some of the best men here, those who know agriculture, are excluded from the divisional board.

60556. *Sir Thomas Middleton:* You told us that you tried two American cottons, 285 and 4F. How do those compare with the Egyptian cotton that you have tried some years ago?—We tried two kinds of Egyptian, the Metaffifi and Abbasi, both better than 285 and 4F. The Metaffifi commanded the market better than Abbasi; but these varieties have now been given up in favour of other varieties.

60557. That happened in Egypt?—Yes; and therefore we too have had to fall back upon the variety experimentally found to be the best, namely, Ashmouni; but the point is that all Egyptian varieties take about seven to eight months to ripen and we must, if we want to succeed, necessarily begin with them about the end of February or March. It is no use exposing them, before they have yielded, to dews that set in in the month of October; we have therefore given up cultivating Egyptian cotton. At an average rate, on a plot of eighty-five acres, I have succeeded in securing sixteen *maunds* an acre.

60558. Then it is the shortage of water which has made you give it up?—Yes.

60559. If you could get enough water to enable you to plant early, you would still grow Ashmouni?—I would grow Ashmouni most willingly. There is a minor inconvenience too: we do not know how to send our consignments to Europe and other places; but that is, as I have said, a small matter. Marketing could be organised comparatively easily if the cotton were available.

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60560. You express yourself dissatisfied with your marketing facilities; I should have thought you were in a very good position to market?—We have to depend upon Messrs. Ralli Brothers and Volkart Brothers mostly.

60561. You have two competing merchants?—Somehow or other I have never been able to get more than three annas more per *marund* for American *phuttis*, and any profit that accrues to them is not, I know for a fact, shared by us.

60562. I suppose the reason is that the total quantity of American cotton which you can offer to merchants is so small that it does not justify a big increase?—A somewhat bigger increase is justified even now. For smallness of the quality offered there are two reasons: one is that the area which is put under American cotton is small for want of water; another is that the right variety is not selected. These two varieties, 4F and 285, tried here, are the varieties which have been developed in the Punjab; that is to say, crosses with some of the best American varieties. I do not believe in those at all. Acala seems to be far and away the best variety and that should be introduced in Sind; if it is introduced in Sind, I think very good results will be secured. Of course, deficiency of water supply remains a great difficulty.

60563. Where do you get Acala cotton?—It is at present being grown on the Sakrand farm and Dr. Mann promised me some seed.

60564. *Mr. Calvert*: You refer to the enforcing of the Usurious Loans Act; is that Act used freely in Sind?—In the form of the Deccan Agriculturists' Relief Act, which has had very injurious effects; I and Mr. Bhurgri started by charging no interest; but I found that my own outstandings in a decade amounted to more than two-and-a-half lakhs which I could not recover. If it is so risky to advance money one must necessarily charge interest, which is not really interest but a measure intended to reduce the risk, however inadequately. Such laws are bad laws, and should never be enacted; they ruin the credit of the people and make them dishonest.

60565. You say that these restricted tenures operate to reduce credit: is that based on actual experience of the Punjab restricted tenures?—I am not talking of restricted tenures.

60566. Lower down you say: "Measures taken to restrict or control the credit of cultivators, such as limiting the right of mortgage and sale, like Act III providing for the occupancy of lands on the Jamrao Canal in Sind on restricted tenure and not on capitalists' terms, operate, in my opinion, against the occupants by reducing their credit."?—I find that Act III, which has been made applicable, works badly. People then seek favours, and if the authorities are inclined to favour them, they are allowed to let their lands to contractors, but not to mortgage or sell them.

60567. But actually is it your experience that these Acts have reduced credit?—The Restricted Tenure Act too has reduced the credit of agriculturists; but it is to be distinguished from the Usurious Loans Act. The Act against usury has greatly reduced the credit of the agriculturist, and it encourages them to run away with advances.

60568. Are they actually borrowing less now than they were twenty years ago?—They try to borrow as much as they did before, but since they do not pay back, there is a disinclination on the part of the village *sowcar* to lend them money.

60569. But are they borrowing less money?—Their need is even greater since their lot has not improved; when they do not borrow, it is only because they cannot borrow.

60570. Then how do they get into debt if they cannot borrow?—They borrow but not as much as they require. The *sowcar* now charges them more interest, because they are more dishonest. The zamindar has necessarily got to do some cultivation and therefore he pays in the hope of getting his advances back. I think the Mahomedan zamindars are beginning to find that they are great losers in their advances to *haris*.

60571. *Dr. Hyder*: The cultivators of this Province, you say, run away owing money to the zamindars?—Yes.

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60572. What are the reasons for the cultivators running away?—Desire to evade repayment stimulated by protective laws. I will take one instance. One *hari* with those depending upon him, has run away with four thousand rupees of mine. There were lately abnormal rains and floods in Sind. While my men did not know how to help themselves, this set bolted. Now my men have been after them and have found out where they are, but I do not know how to bring them back.

60573. I quite understand that, but only such a man would run away as possesses no rights whatever in the land; a man who has nothing to lose runs away?—But he had everything to lose; he shared with me the produce of the land cultivated by him.

60574. But he shared no rights in your land: he had neither occupancy right nor restricted right of any kind in the land?—I request that other tenures may be distinguished; I am speaking now of the zamindari tenure.

60575. The peasant proprietors do not run away?—They have been running away now on account of failure of crops. Their holdings being small, they run away to the Punjab. They come from the Punjab and they run away to the Punjab without paying their debts to the Government.

60576. They are Punjabis?—Mostly Punjabis.

60577. But your own Sindhi, a Sindhi who is a peasant proprietor, has something to lose and he does not run away; the *hari* owns nothing?—The Sindhi peasant proprietor will not behave differently. But there are no Sindhi peasant proprietors on my side. If there are any, they are very few. I am talking of the zamindari system.

60578. Under the zamindari system, since the cultivator has nothing to lose and probably something to gain by running away, he runs away?—Running away can do him no real good. If he only sticks to the land he cultivates he gets his share of the produce.

60579. Do you think that if he had had some rights in the land he would have run away?—Small rights in small pieces of land could not prevent his running away. I think we are, as a matter of fact, confounding ideas. It has from confusion even been suggested that the zamindari system should be abolished.

60580. I am not suggesting anything. On page 202, you say: "As far as possible, hereditary cultivators should be enabled to remain as cultivators." I want you to say what is in your mind when you make that statement?—The idea in my mind in making that statement is that they should be helped to retain their holdings as far as possible, and that the *banias*, the Marwaris and other people whose vocation is not agricultural, should not be able easily to replace them. On that account there should be nothing like non-terminable mortgages; a very fair opportunity should be given to those who advance their moneys to recover their moneys, while an equally fair opportunity should be given to the hereditary holders to continue to be hereditary holders.

60581. Let me pass to university teaching. You suggest that agriculture should be included as a course of study for the Intermediate Science and B. A. examinations?—Quite true.

60582. Is it to be as one subject or a body of subjects?—One optional subject.

60583. As one subject?—Agriculture as one subject.

60584. In answer to Question 16, you make the following statement: "Common pastures in villages are disappearing owing to encroachments for cultivation purposes. They should be restored." Supposing your suggestion were accepted, what would happen?—Supposing my suggestion were taken up, then pasture land and the best allied industry, *ghi*-making, would be provided everywhere for the cultivator.

60585. What about the food crops then: corn and other cereals?—There will be other land devoted to the cultivation of cereals; whereas these will be common pasture lands reserved for the animals owned by the cultivators of the village.

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60586. At present, cultivation is encroaching upon these lands?—Yes; that is to say, nothing is being reserved for pasture.

60587. Supposing this tendency were checked, you would no doubt have pasture and grazing for your cattle, but do you not think you would be upsetting the equilibrium the other way?—The equilibrium between cultivation and pasture is now lost.

60588. There must be a reason for the loss of this equilibrium?—The cupidity of the cotton-grower, for instance, leads him to put as great an area under cotton cultivation as possible, oblivious of the requirements of his animal. Some land must be put under *bajri* and *juari* in order to provide fodder for animals.

60589. Have you a greater or a smaller cattle population than this Province can support?—The number of cattle is required, and should be what it is at present and even more, in order that the *hari*, when he is free, should betake himself to producing *ghi* and to breaking and aerating land.

60590. *Sir Chunilal Mehta*: It is very good of you to say a good word about the taluka development associations. I entirely agree with you that the unit should be smaller than the taluka. Do you think we should get the requisite personnel if we were to go lower down than the taluka?—Yes, village communities; the people in the village will be able to appoint their committees and the appointment of committees might be supplemented a little.

60591. How do you mean, supplemented?—By nomination. Some power of nomination should be given to the authorities. There should be likewise inter-village associations and then district and provincial associations.

60592. I am thinking now of a group of villages something smaller than the taluka. You remember you suggested it should be entirely non-official?—Yes.

60593. In the group of villages, do you think you would get the required type of men to form the development committee?—In the initial stages you may not get the required type, but that should not matter. When the system is there, in course of time it will improve.

60594. That is just our difficulty?—Yes.

60595. We wanted to go lower than the taluka; we have tried the taluka and I believe you think they have been fairly successful?—Fairly successful; and I hope there is a bright future before them.

60596. The idea is to go lower down in course of time. You suggested something about the missionary spirit; what do you mean by that?—I and my Professors developed the Civil Engineering College and the Law College; I presided over the Civil Engineering College for one year; we did not have any extra remuneration. Then we promised to do our best for the agricultural college without any additional remuneration.

60597. I see; that is what it means. In that smaller group of villages which you would take as your unit, do you think you would have somebody staying in the villages?—Only those who do stay in villages should be members of such committees.

60598. Do you think it would be necessary to import any people from outside to stay in the villages?—No.

60599. You do not think that would be necessary at all?—I do not think it would be necessary or desirable.

60600. You could find the men from the villages themselves?—Easily.

60601. *The Raja of Parlakimedi*: As a zamindar, what are you interested in for the improvement of indigenous agriculture?—I am most interested in the improvement of indigenous cotton, next to that of indigenous wheat, and next to that of indigenous *bajri* and *juari*; and then of the indigenous leguminous crops too. When I had the water I was very much interested in the cultivation of *berseem*.

60602. As far as you personally are concerned, or for the general improvement of your surroundings?—For both. I believe that there are chiefly two

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things necessary for the prosperity of agriculture in Sind: water and the habit of breaking and aerating the soil.

60603. My point is: have you been interesting yourself in the general improvement of the country?—No, I could not claim that I have exerted myself in the cause of the improvement of the agriculture of the country.

60604. But, as far as the country accessible to you is concerned?—Yes, I have done my best.

60605. In what ways?—In improving my cultivation; people then come, have a look at it and follow the same methods.

60606. Have you been helping them to secure the improved strains of cotton seed or wheat?—Where is the seed available? We have gone without any good seed during the last two or three years. Although there are seed stations, we have had no help from them. We have sown very bad seed even of 285 and 4F, so that when you go to a cotton field you see Sindhi *deshi* cotton growing along with the American. We cannot get good seed anywhere. We want the Agricultural Department to know our needs. Without this knowledge the experimental stations or demonstration farms will not be of much practical utility.

60607. Have you attempted to approach the Agricultural Department to educate them?—I know men in the department fairly well, but still I think some time will be taken to persuade them to utilise the experience of the practical cultivator. It will come in course of time.

60608. You have taken opportunities to discuss important factors with the department?—As a matter of fact, discussion is not courted. At times I have had to inflict my views upon them, but, seeing that useless, I have not for some time past attempted to do so; I have kept my views and my experience to myself.

60609. Then as far as animal husbandry goes, what interest do you take?—There is no veterinary organisation in my tract. For instance, I produce a lot of mares, but good stud-horses are not available, and when pests break out there is no help. There should be an organisation, but there is none.

60610. Have you approached the Government on that point?—I do not think the Government would fancy my approaching them thus. I do not see any desire anywhere to establish a kind of interchange of ideas between the cultivator and the administrator. The Executive Engineer would take it very unkindly if I went frequently to represent matters to him. As I have said, even periodic consultations are rare, and therefore much of the advantage which might accrue to the people from the large outlays of Government on agricultural and other schemes is lost to the country. The establishment of village communities and then interchange of ideas between the village communities and the authorities and research workers is essential; without it much improvement cannot be brought about.

60611. As far as cattle are concerned, what work do you do?—With regard to cattle, I want bulls on the one hand and the services of a Veterinary Surgeon on the other.

60612. Are you interested in creating any special breed of cattle?—We have splendid breeds but we do not make any special arrangement for breeding.

60613. Are you in favour of selecting cattle for perfection in a certain strain, or by hybridising to create a dual purpose animal?—But the refinement of breeds will be a luxury.

60614. You have already got very fine cattle here?—They are owned by those whose business it is to get a living out of milk and by-products of milk. I have yet to see a zamindar or a cultivator in Sind who has gone in for selecting his animals.

60615. With regard to fragmentation, you propose that disputes should be settled by panchayats. Are you satisfied with the work that the panchayats do in other spheres of life?—They are in a very bad state now, but at one time, as a student of history you know, they were well organised.

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We might go in for necessary modifications in them now, having regard to the conditions under which they have to be made to work.

60616. *The Chairman*: They were spontaneously organised in the village; they were not imposed by any authority outside the village, were they?—But the organisation has disappeared under the stress of the democratic ideas which come to the East from the West, so that now a kind of compromise is required.

60617. You do not think the increased communications have had something to do with it?—No, I do not think so; the villages are in a bad condition from other causes.

60618. *Sir James MacKenna*: What is the Acala type of cotton to which you referred?—It is longer stapled, silkier and less amenable to pests.

60619. Is it Egyptian or American?—American.

60620. Where does it come from?—The seed was directly imported from America.

60621. By Mr. Henderson probably?—By Dr. Mann.

60622. So that it is quite recent, is it?—Quite recent.

60623. What sort of staple is it?—It is about one inch and more, and silky and white, and the proportion of lint in it is also greater.

60624. Do you think it is a good type for Sind, or worth following up, anyway?—Of course, some little further experiment must be made but it seems to me to be a good one.

60625. *Professor Gangulee*: Am I to understand that the entire area of 4,000 acres under you is cultivated by *haris*?—No, less than one-tenth; although I own that much land, I am not able to put more than 600 or 700 acres under any crop.

60626. But the area you do cultivate, you cultivate through the *haris*?—And by myself too.

60627. What portion of the total area do you cultivate as your home farm?—In the existing conditions I have cultivated about 150 acres myself.

60628. And that by the employment of labour?—Yes.

60629. Paying them cash for their work?—I have two methods; I pay them a certain amount per month and I also give them a share, such as labourers receive usually from the *mujeris*.

60630. Who are the *mujeris*?—I shall explain. There is the zamindar, then, underneath him, the *mujeri* (managing cultivator); then the *hari* (labouring cultivator), and then the labourer. It is wrong to think that anyone who holds about twenty-five or thirty acres does the cultivation himself; he too will employ labourers. So that the smallest unit is the labourer; then the next unit is the *hari*, the next unit the *mujeris*, and the next the zamindar. I do away with *mujeri* and the *hari*; I employ the labourer and that is doing cultivation on my own account.

60631. Do you grow wheat on your land?—I am not able to grow wheat because water is not available in the month of October. Wheat has to be sown between the 25th October and the 15th November.

60632. But you did grow wheat: you had Pusa wheat, did you not?—I grew Pusa 12 and two Punjab varieties, a beautiful variety of Larkana, a white variety from Delhi and the Sindhi *Kahno* (a long bearded variety), from which preferably the Italian macaroni is made.

60633. These varieties you have obtained from the Agricultural Department, have you not?—No, I got them myself.

60634. Have you appointed any supervisor to supervise the work on your farm?—I have fourteen or fifteen supervisors.

60635. Are they salaried men?—They are salaried men.

60636. What sort of training have they?—My college provides no agricultural training. I am the head cultivator, I am the trainer.

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60637. None of your students are attracted to such training?—No, because those amenities which are sought by the educated people are not available on my land.

60638. You have interested yourself in agricultural education; have you tried to attract any of your students to farming on your own land?—I am sure I could attract youths if adequate opportunities were afforded me.

60639. Could you not give them a piece of land and say: "Come and farm here"?—No; in the first place, my conditions are so imperfect that I could not attract them without some special aid from Government and the local bodies.

60640. You have got the land?—Yes.

60641. You want to impart agricultural education for the benefit of your Province?—Yes.

60642. You have control, to a certain extent, over the students here, being the Principal of an important college; what are, then, your difficulties?—My first difficulty is that I do not know how to live in fair ease and comfort, nor do the cultivators, on account of inadequate water supply. Secondly, in my villages there are no *pucca* houses, no dispensaries, no schools and no hospitals. I wanted to go in for mosques and temples but Hindus and Mahomedans have begun to fight; mosques and temples cannot well co-exist.

60643. Without these amenities to which you refer, agricultural education would be of no use?—No, that would be a wrong answer. If agricultural education of the right type were given, and the people realised the value of agricultural industry, then help would be forthcoming from inside and outside in the correction of the defects from which we are suffering.

60644. You have given us a ladder of associations, beginning from the village up to the Province, and you state that these associations are to be managed by non-officials. Do you see any non-official agencies at the present time which are able to undertake this?—If you will excuse my plain speaking, the associations have not been allowed to come into existence, and hence no associations.

60645. What do you mean by "not allowed to come into existence"?—On one occasion, I was appointed vice-president and on another occasion president of an association. The secretary on each occasion was sent for, and enquiries made from him as to whether he was going to continue as secretary. Then he probably apprehended bad results accruing to him from his continuance in office, and he sent in his resignation. We never operated even on one occasion.

60646. But the taluka development association is essentially a non-official organisation which receives assistance from Government?—The association is receiving assistance, and I am requesting the authorities to develop it. With its help research will become real, demonstration will become real, and the financial condition of the *hari* will be bettered.

60647. It is not then true that the Government discourage the formation of non-official organisations?—Hitherto they have discouraged it; there is no doubt about it.

60648. But there are the taluka development associations?—This is the most recent development; I am thankful for its creation, and I shall be thankful for its development also.

60649. What comments have you to make on the organisation and working of the taluka development associations?—Just one, namely, try to get hold of those men who combine intelligence with character. Characterless people will not be able to do much.

60650. That is an utopian idea. I want to know what is the present criticism you can offer with regard to the organisation and working of taluka development associations?—According to me, utopian ideas have occasioned useful realities. I feel that it is on the strength of benevolent utopian ideas that we come to be rightly practical.

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60651. Do you think that the cultivator has found a friend in an organisation like the taluka development association?—The cultivator is finding a friend in the taluka development association and in the co-operative movement.

60652. Are you in touch with both these organisations?—Yes, to a certain extent.

60653. You told us something about the missionary spirit. Do you find that missionary spirit among the students?—I think it could be easily evoked.

60654. It should be evoked. It is not there?—Because it has never been evoked. It is there potentially.

60655. On whom lies the responsibility of evoking that missionary spirit?—I always feel that the responsibility is shared by two, the people to be summoned to co-operate on the one hand and the people who have power to summon them on the other.

60656. In answer to Question 6 (iii) (c), you refer to hereditary cultivators. Are you really referring to *haris*?—*Haris* and zamindars.

60657. When you say hereditary cultivator, the actual cultivator in this Province being the *hari*, you are really referring to the hereditary *hari*?—My view is different. I consider myself a cultivator in the truest sense of the word. Although, here before you, I look highly urban, I feel that I am primarily an agriculturist.

60658. We appreciate that. I wanted to know whether, when you say hereditary cultivator, you are really referring to the zamindar or to the *hari*, the actual cultivator?—I am referring to both.

60659. Do you believe in the magic of property?—I am not a Bolshevik; I do believe in property.

60660. You hazard a statement with regard to the Deccan Agriculturists' Relief Act and say that it is a bad law, but you have not stated your reason?—The reason is quite simple. By such laws you make people dishonest. You give them opportunities to run away and evade payment.

60661. That is your criticism?—That is my criticism.

60662. It makes people dishonest?—Yes, and lowers, therefore, the credit of those who do require money.

60663. In enumerating the causes of dishonesty, you speak of bad moral and spiritual training. Will you please explain what you have in mind?—I have to thank you very much for this question. I feel that no agricultural organisation will be truly beneficial if it does not take care of the morals of the cultivator. It is on that account very desirable, as I have already stated, that there should be, in villages, schools, dispensaries and mosques and temples. Arrangements ensuring physical health, mental health and moral health must be made in each village.

60664. You say that all research should be centralised. Do you mean that it should be financed by the Government of India?—I have divided research into higher and local research. I say that higher research ought to be centralised, for duplication of research in different Presidencies will only lower the standards of research; and then, when we come to adapt the expert advice of the central institutions to local conditions, local organisations for research ought to be carefully developed.

60665. You make a reference to rural economics. Is that subject taught in your college?—No agricultural subject is taught in my college.

60666. Is economics taught?—Economics is undoubtedly taught, but not with special reference to agriculture, just as botany and biology are taught, but without special reference to agriculture.

60667. Even without special reference to the Sind flora?—Even without that, because the laboratory is inadequately equipped, and the Sind flora are not a prescribed subject for any university examination.

60668. Your attention was drawn to what you call the pathetic sight presented by a B.Ag. selling boots and shoes as a shop assistant. Why

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should you consider it pathetic?—Because, if special training has been acquired and if no opportunity is offered for utilising it, it is a pathetic circumstance.

60669. And yet, you are in favour of creating more B.Ag.'s?—I am in favour of creating more B.Ag.'s for research work and for the management of certain farms. What I am most concerned about is the practical training which is required in the case of the cultivator.

60670. You say that a special educational cess should be levied?—Yes.

60671. Do you think public opinion in your Province is in its favour?—I would not content myself with the existing public opinion. I would educate it, whenever necessary. The special cesses for the organisation of villages on the one hand, and for the provision of higher and technical education on the other, should be levied, and the zamindar should be made to pay more than he is paying just now.

60672. Compulsorily?—Yes, compulsorily.

60673. You bring a charge against the agricultural demonstrators, and say that the demonstrators should restrain their autocratic or snobbish tendencies of behaviour. Have you any experience of demonstrators in this Province?—I have some. Very few may have misbehaved towards me, but they do towards my cultivators, and that is not as it should be. I am only indicating that more sympathy is necessary and some more human fellow-feeling is required for making demonstrations truly useful.

60674. Did you talk the matter over with any demonstrator?—If my views are not sought, I do not offer them. My experience has pointed to the fact that one is viewed with disfavour for giving a free expression to one's ideas. I have been out of the Central Cotton Committee simply because I spoke out to help the growth on right lines of the Agricultural Department here, and I am not on the divisional board, because criticism, however just, is not appreciated.

60675. You say that Government should pay more attention to the establishment of industries connected with agriculture. Have you any scheme for the Government?—Yes, I have a scheme. I spoke of the *ghi* that could be produced by each *hari*, worth about Rs. 40 or more a season. I would recommend the production of jaggery and the pressing of oils, and, to a certain extent, weaving too, by the *haris*. I do not seek to attach that importance to hand-weaving which is attached to it by some, because I do not like that the agriculturists should be drawn away from agriculture proper. If they are free for four months in the year, they should take care to plough their land dry, aerate it, and they will thus get more than they ever can by migrating to other places or undertaking other labour.

60676. Is it your suggestion that Government are not aware of the possibilities of such industries as you have just mentioned?—Government are aware of them, but I wish Government would consult the cultivators more and aid them to pursue these industries.

60677. By cultivators, do you mean the men who cultivate the land, or the zamindars?—I have said that I think certain zamindars to be cultivators in the truest sense of the word, and these I include in the term "cultivator."

60678. *Mr. Kamat*: Speaking about the Deccan Agriculturists' Relief Act and its practical working, you told one of my colleagues that it has spoiled the morals of the cultivators, that it is a bad law. I should like you to clear up that point from your practical knowledge?—Protected by the Act, the cultivator avoids repayment of loans, which leads a zamindar like myself not to make advances without interest, which is bad for the cultivator. If I cannot help myself, too, when my money is taken away, and if I have no remedy, then I must secure myself against risks.

60679. Is it not the case that after the passing of this Act, as a rule, the *bania* or the *sowcar* instead of taking a mortgage deed from the cultivator insisted on having a sale deed of the land, no matter what the value of the land, if the cultivator wanted even a small loan?—To a certain extent that is true.

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60680. It is not also a fact that the needy cultivator passes the sale deed, with a promise that he will get back that land on repayment, although that promise is generally a bogus one on the part of the *bania*?—In a few cases, even that does occur.

60681. Have you noticed cases in which, although the cultivator makes a faithful promise of repayment, he knows the transaction is a bogus one from the beginning, and wants to have his revenge on the *bania* and never pays back anything at all?—Quite true.

60682. And he then rushes into court asking equity from the court, although at one time he wanted to have justice?—Quite true.

60683. And this has spoiled the relationship between the cultivators and spoiled the morale of the people to such an extent that no one trusts them?—Perfectly true.

60684. As an experienced Principal in charge of a college, would you tell me if there is a tendency on the part of the students in these days to take to agriculture as a profession, supposing all the necessary facilities, land, etcetera, were afforded them?—They would be eager to take to agriculture.

60685. What difficulties do they at present have?—There is no land available, and no agricultural education.

60686. In this Province, do you think there are avenues for the educated middle class man to make a living by serving as a sort of middleman, by taking up land from the zamindar and cultivating it and making a decent living out of it?—Yes. A middle class man can make a decent living in that way, provided water is available.

60687. The difficulty is not the disinclination on the part of the men, but the actual difficulty of getting sufficient water?—Yes.

60688. If a *hari* can make a living out of the land, why should not a matriculate make a living out of it too?—He can very easily do so.

60689. Where is the difficulty? Is water alone the difficulty?—According to me, that is the only difficulty.

60690. When the Barrage comes in, and water and land are available, it will afford a fair opening for the matriculate youth in this Province to go into land as a profession?—Yes, provided the preliminary requisites are attended to at once. The banks of the different canals must be raised at once; otherwise, water, even if it is available, will not be used. I am very eager to use water in the months of April and May, but because the banks are low I cannot do so, even when the water is available.

60691. You are speaking of existing difficulties, whereas I am envisaging the time when there will be no such difficulties, under the new Barrage system?—I want to point out that there is a danger of these difficulties continuing.

60692. But these difficulties would be common to other professional agriculturists?—Quite true, but to attract educated lads, these difficulties should disappear.

60693. In any case, with these common difficulties, you think there is a distinct opening for the educated middle class young man?—Yes.

60694. On page 202, you say: "As far as possible, hereditary cultivators should be enabled to remain as cultivators." What do you mean by "hereditary"?—According to me, it means one who is engaged in the work of cultivation for some considerable time.

60695. If there is a tenant, he should have some sort of security that he will not be turned out at will; is that what you mean by the word "hereditary"?—I have used that word in connection with non-terminable mortgages. You also referred to some bogus arrangement between the borrowing *hari* and the capitalist. I say, these ought to be stopped. While reasonable facilities for the recovery of his advances should be afforded to the capitalist, any bogus agreements ought to be put an end to, so that those who wish to continue as cultivators may do so.

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60696. On the general question of the relationship between the zamindar and the *hari* in this Province, have you anything to suggest to improve the position of the *hari*?—The relationship existing now between the two is very good; it is unnecessarily sought to be made out that the relationship is bad.

60697. Do you mean to say that the *haris* are getting, in the conduct of their profession, as much good treatment from the zamindar class as they should?—They are treated as children, so far as I see, by some; I do not say by all.

60698. I know, of course, that there must be some good people who treat their tenants well, but as a general rule is that the case?—As a general rule, on the Jamrao (I can speak confidently of things as they obtain in the Jamrao tract) there are many men who treat the *haris* well. Take for instance, Mr. Bhurgri, who was there a zamindar on a large scale. When he was alive I think he attracted *haris*, and he dealt very fairly by them.

60699. I know there are some enlightened zamindars who do conduct their business as landlords precisely in the same enlightened manner as, for instance, a landlord in England of the aristocratic class takes care of his tenants, who has the desire to improve his land, carries on scientific improvements, and gives the fairest possible treatment to his tenants. While that may be quite possible in the case of certain enlightened zamindars in this Province, in the case of those who do not behave in this manner have you any suggestions to make?—I think some restrictions should be imposed upon zamindars who maltreat *haris* and it is only right, in the interests of society, that that should be done.

60700. *Dr. Hyder*: What kind of restrictions have you in mind?—I have not thought out the matter, so that I could not say that I have a programme yet. But I can think it out now and tell you. If a man does not look after his agriculture properly and misbehaves, then the village, the inter-village, the taluka, the district and provincial organisations should sit to consider whether he should not be deprived of his property in the interests of society itself.

60701. That would be a revolutionary change?—Yes, but I have always fancied the principle underlying Bolshevism. Although the details may be objectionable, this much of the principle is, according to me, to be accepted.

60702. *Mr. Kamat*: Would you be in favour of any law as regards tenancy?—I feel that some enactment is necessary in the case of Sind. 80,000 acres, 40,000 acres, 50,000 acres, all gathered together in the hands of one individual will not, I think, be conducive to public welfare; it will lead to disaffection. So, there must be some limit to the size of the holdings, although the holdings should not all be small.

60703. But that sort of condition exists in other countries too, for instance, in England?—I think in the bulk of the property which is not managed personally by the zamindar, the *hari*'s status should be improved. He may be made not quite a tenant at will.

60704. To pass on to another point, are you in favour of the introduction of the Punjab Land Alienation Act into Sind?—I am against it. It will divide the Hindus and Mahommedans, and it will kill the small holder. It will be most uneconomic.

60705. *Mr. Calvert*: Has it killed the small holder in the Punjab?—According to the private information I derived when I attended the Science Congress, it has not proved a good measure, but the official report is that it is a wholesome measure.

60706. Has it divided the Hindus and Mahommedans in the Punjab?—It has, to a certain extent, and it will be dividing them still more. I am definitely of this opinion. Look at the relations subsisting between the Hindus and Mahomedans in the Punjab. One cause of the division is this Act.

60707. *Mr. Kamat*: Did you notice a strong division of opinion as regards this Act in the Punjab?—My friends gave me a very bad account of the working of the Punjab Land Alienation Act.

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60708. *Mr. Jamshed Mehta*: On page 202, you are referring to the restriction of the agriculturists' credit by the Deccan Agriculturists' Relief Act and other Acts. There must have existed certain difficulties when these laws were made. Otherwise, these laws would not have been found necessary?—I am not unmindful of that too. I feel that the village *sowcar* must behave well, and that there should be some method of correcting him. The co-operative movement will be a great corrective, but I do not understand why it should be supplemented by special measures.

60709. Supposing these laws were abolished, what other suggestions would you make for seeing that on the one side the *hari* and on the other side the *sowcar* remains honest?—The agency of the village, inter-village, taluka, district, and divisional associations will be very useful.

60710. Is it your opinion that the village *hari* has become more dishonest since the introduction of these Acts? Or was he dishonest before that too?—It will be improper to make any dogmatic statement, but I feel that he has become more dishonest in consequence of these special measures.

60711. Are a large proportion of the *haris* dishonest, or only a small proportion? Do you find such instances only here and there, or are there many instances?—I think they are general. Everybody is experiencing this trouble, Hindus and Mahommedans, and large and small landholders.

60712. With reference to your answers to my colleague on the question of the Punjab Land Alienation Act, did you only hear of its ill effects, or have you seen with your own eyes that it has done harm to the small holder, or that it has created trouble?—I could not offer any personal testimony.

60713. You do feel that if it were extended to Sind, it would create results similar to those which you have heard exist in the Punjab?—Yes.

60714. Is it from any logical thinking that you have come to that conclusion, or is it simply because you have heard that it has had bad results in the Punjab?—My mind, when brought to bear upon it, makes certain suggestions. If you prevent a man from selling his property to one who will be considered as a non-agriculturist, then he will necessarily be confined in his sales to men of his own class; and he will not get the market price for the land he sells. Once again, land will then accumulate in the hands of a few, and the evils which attach to large holdings will attach to the holdings that will come to be so created.

60715. How would this create trouble between the Hindus and Mahommedans?—An attempt will be made to classify Hindus as non-agriculturists. That is how it has been done in the Punjab.

60716. *Mr. Calvert*: Are not the vast majority of the Hindus in the Punjab classified as agriculturists?—I must say a large section; the Jats especially. I do not know whether the same thing will happen here; if the same thing happens here, the evil of the Alienation Act will be reduced to that extent.

60717. The vast majority of Hindus in the Punjab are classified as agriculturists?—Some.

60718. The vast majority?—That is not my information.

60719. Five-sixths of them are so classified?—I must accept your figure, because you know better. But then what will be the object of the Alienation Act in Sind.

60720. *Mr. Kamat*: Are those outside the five-sixths classed by administrative sanction?—Evidently.

60721. *Mr. Jamshed Mehta*: On page 203, you say: "The existing methods of distributing canal water to cultivators should be made uniform". What do you mean by that?—Take a canal. Not only the first thirty outlets of it should be moduled but the rest too. I say this is a bad system of moduling. How will you possibly secure reliable results if in some cases there are modules and in other cases there are none. If you want to find out whether moduled outlets are really good, then you must have them all over the canal.

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60722. Are you in favour of modules?—I am in favour of them, if they can be properly worked; but if the unequal manner of working these outlets continues, then I think it is best to have open head *karias*.

60723. Do you think a module would be suitable for the rice crop also?—I am a believer in modules, provided, of course, they are properly worked.

60724. On page 203, you make a statement that, in certain instances, water at the tails is superabundant. Have you seen that yourself?—I have seen it myself.

60725. What is the reason for it?—This is the reason: it being an accepted principle with the Public Works Department, now, that water must be provided for the tail the subordinates turn it into a lucrative source of income.

60726. Have you come across any zamindars who improve the housing condition or the educational condition of the *harris* generally?—I have known of none; not even one. The reason is that the zamindar themselves are badly off.

60727. You are in favour of an agricultural college for Sind; why do you want it?—I am in favour of one first grade college and three intermediate colleges, one situated in Karachi, another in Nawabshah, and the third in Sukkur.

60728. With a view to induce educated young men to take to agriculture?—Educated young men are ready; all they want is land.

(The witness withdrew.)

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**Rao Sahib UDHARAM SHEWAKRAM, Zamindar, Guni,
District Hyderabad.**

Replies to the Questionnaire.

QUESTION 1.—RESEARCH.—(c) I suggest that more attention should be paid to research in the direction of indigenous crops like the paddy, *bajri* and *juar* with the object of increasing the outturn per acre of these crops. One reads of the average produce of paddy per acre in Italy or in Spain as being thirty *maunds*, whereas it is only ten to twelve *maunds* in Sind. The favourable conditions that give so much produce elsewhere may if possible be introduced here. The impression is abroad that Government devote more attention to cotton and wheat crops that are exported abroad than to those which are consumed in India.

QUESTION 2.—AGRICULTURAL EDUCATION.—(i) No.

(ii) All districts in Sind require extension of teaching facilities which are absent especially in rural areas where agriculture is universally practised.

(iii) Yes, if possible.

(iv) The attendance in several areas is very thin. The agricultural class especially takes no interest in educating their children. The reason is, first, that no education is imparted in the agricultural subjects which may benefit the boys in their future avocation of agriculture to which they have to turn for their whole life; secondly, the parents are too poor to spare their children for any other engagement than their own domestic or agricultural wants. As soon as a boy is five or six years of age he is turned to attend to the grazing of the family cattle. As soon as he is ten or eleven years old he is turned to attend to the ploughing of his field and doing other jobs connected with the crops his father usually raises. To induce parents to spare their boys for sending them to the village school the hours of attendance must be changed in such a way that the boys may be able to help their parents in the daily avocation of their life as also to gain experience for themselves in their own line of agriculture by practical work in the field. The hours of attendance should be from 2 p.m. to 5 p.m. after return from their morning work in the fields and again from 8 p.m. to 10 p.m. after return from the evening work. Monthly competitive scholarships from three rupees to ten rupees a month should be given to about ten boys in each class to serve as an impetus to the parents to spare their boys until a taste is created in them to recognise the value of education in their children. Education in agricultural subjects should be introduced in each class so as to create a taste for high farming of the crops actually cultivated in the locality. To finance this scheme an additional assessment of one anna in the rupee of land revenue should be levied for the purpose of primary education in rural areas, earmarked for agricultural education.

QUESTION 3.—DEMONSTRATION AND PROPAGANDA.—(a) The measures of demonstration that will succeed effectually in influencing and improving the practice of cultivators will be the conduct of demonstration connected with the actual crops raised in the locality, in the fields of that locality, by the Department of Agriculture, so that the cultivators will see for themselves the results of such demonstration under-existing conditions in their own fields and will very easily see the points of difference between their own practices and those of the demonstration plots. This will be an object lesson which will carry conviction and induce ready adoption. For demonstrations to work effectively and yet economically I should suggest that each taluka Inspector of Agriculture should select a typical field in a zamindari wherein to conduct his demonstration by cultivating the same paddy crop on the improved system side by side with the cultivator's field cultivated on the prevailing system. The zamindar should be given, in return for the use of his land, that proportion of the produce which he would reap from his own cultivated field. This will be economical to the

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department conducting the demonstrations and more effective as an object lesson to all the peasants of the village who can observe all the processes of improved cultivation.

QUESTION 4.—ADMINISTRATION.—(c) (i) No. The departments are not manned by a sufficient number of workers. Each taluka must have sufficient workers to cope with the large area in charge. The members of the staff are in themselves not experts in the crops they have to handle for demonstration and therefore not capable of showing results better than the existing unsatisfactory ones.

(ii) There is great need of feeder lines to penetrate into the interior of agricultural tracts.

(iii) Roads are extremely bad and unfit for traffic. Motors cannot ply on them with safety. The taluka local board funds are too meagre to cope with proper repairs and upkeep of roads. Greater grants from provincial funds should be given to each taluka local board to help in the upkeep of proper roads.

(iv) The reports of the Meteorological Department such as are issued from Simla are not broadcast freely to reach rural areas. Arrangements should be made to post up daily telegrams at each taluka headquarter for diffusion of weather information to all the zamindars.

(v) The Postal Department is run too much on financial and profit considerations. There ought to be free postal delivery in all the rural villages, at least every second day. The post office refuses to make delivery of post even when a village has undertaken to make good any deficit the department may incur in arranging such delivery. The needs of rural people are never cared for by the department. I strongly advocate free postal delivery in almost all the big villages in rural areas.

(vi) The telephone service has been introduced by the Public Works Department in some talukas for their departmental use. I should suggest that this service should be kept open for the use of the agricultural public for two or three fixed hours in the day at a nominal fee of two annas for five minutes talk so that zamindars may be able to make enquiries from headquarters about weather conditions and prevailing rates of grain in the market so as to guide them in their sales of produce and in other affairs, to improve the amenities of rural life. The benefit of this telephone service may be extended to those zamindars who may wish for a connection with their own field quarters and they may be charged the actual cost of such connection with a nominal fee for its regular daily use. This will help in forming a link between rural and city life.

QUESTION 5.—FINANCE.—(a) My views regarding the financing of agricultural operations are that mortgage banks should be started to afford easy and convenient loans to agriculturists at interest of not more than six per cent per annum. The zamindar at present pays twenty to twenty-five per cent. interest to the local *bania* who finances him and the interest charges swallow a large part of his meagre produce. The zamindar should be given enough money to finance all his *haris* who do actual cultivation on the *batai* system, as these *haris* are charged twenty-five to thirty per cent by the *bania* and they find that a large proportion of their produce is absorbed in interest charges. In financing his *haris* the zamindar should be bound to charge his *haris* not more than nine per cent, three per cent being allowed to him to cover the bad debts which will inevitably occur. This will save the vast proportion of the actual tillers of the soil, who need relief most, from starvation.

(b) The Government system of *taccavi* is worked with stingy hands; only nominal amounts are given and those amounts only to a very few zamindars; the rules of recovery are also too stringent. The subordinates in handing over amounts of *taccavi* make exactions so that in the long run the interest swells nearly to what the *bania* charges. *Taccavi* should be given more liberally and free from exactions.

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QUESTION 8.—IRRIGATION.—Foreword.—Irrigation is all-important for cultivation in Sind as the mighty river Indus supplies immense quantities of water for irrigation. Cultivation on rainfall is insignificant, the average annual rainfall being only five or six inches. After forty or fifty years of correspondence Government have at last undertaken the vast scheme of the Lloyd Barrage and canal construction works which are intended to supply a perennial, constant and assured supply of water for irrigation, almost of all of it flow irrigation. These works will remedy the defects of the existing system of irrigation. The defects were those of non-perennial supply, lift irrigation, the level of water always varying, the supply never being assured for the full period required for maturing the crops. Government is to be congratulated upon this vast scheme; but this Barrage scheme does not embrace the whole of Sind; it leaves out of its operation and benefit the southern portion of Sind, comprising the whole of Guni, Badin, the major parts of Tando Bago and Hyderabad taluka in the Hyderabad district and all the seven talukas of the Karachi district, this being the non-barrage zone. The area of fully developed and cultivated land in this zone is nearly one-sixth of the whole of Sind; it consists mostly of natural gravity flow land cultivated annually, mostly under paddy cultivation and yielding annually revenue to Government to the extent of about 20 lakhs. The Commission may enquire what the actual annual cultivated area and the assessments are. The Lloyd Barrage, by cutting off the level of the Indus below it, is surely going to have a very adverse effect upon this non-barrage tract; the natural-flow rice lands will be converted into lift lands and these, being low and swampy, will be unfit for *kharif* lift crops and will therefore go out of cultivation. The non-barrage flow rice areas will not only be converted into lift but the duration of the supply of inundation water to them will be shortened by about forty days, twenty days in the month of June and twenty days in the month of September, both critical months of the season, so that the variety of the crops usually matured would not mature on the short-lived supply. Lower Sind zamindars consider that the Lloyd Barrage will ruin their lands and their crops. The water supply for winter crops from the only existing perennial canal in Sind, the Fuleli, will be cut off by the barrage; this will render the raising of winter crops impossible. The damage to Lower Sind will be immense; Government should realise the magnitude of this and should resort to early measures to remedy this evil. The economic loss to the zamindars will amount to crores when their valuable lands, which have taken ages to be improved and made cultivable, will have been ruined. It is no use waiting and see their ruin and then adopting remedial measures.

(a) (1) For reasons given above I advocate the building of another barrage with canals on both sides below Kotri for the benefit of the non-barrage area, so that a high level of water for flow cultivation may be maintained and the same advantages of perennial, constant and assured supply secured to this area also. Besides this, the waste of water which now occurs from the Indus to the sea will be stopped and water will be utilised to the best advantage.

(2) I also suggest the early construction of the Mehrani Canal for which administrative sanction has been given by the Bombay Government and for which estimates and plans are already before Government. This canal will remove deficiency of supply in the Gaja system and also open out vast areas of rich cultivable lands lying in the south of Guni taluka. Nothing will improve the economic condition of the cultivator more than an adequate supply of irrigation water which should be available throughout the year both for summer and winter crops, should have a constant level throughout the year, should give flow irrigation and should be assured every day of the year in any quantity required for the crops. Given these conditions, all the ills of the cultivator will be removed by one stroke. If the cultivator can grow both summer and winter crops he will have no slack season; he will have enough and abundant crops to live upon, he could cultivate recuperative crops in winter to enrich his soil without manure, so that

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there would be no need for the solution of the problem of his indebtedness; his prosperity would be assured and Government would be spared all anxiety about his welfare. I therefore advocate in Sind especially the opening of new irrigation works with barrages, regulators and other engineering devices, because the capabilities of the Indus are very great and it only requires to be harnessed. The question of the poverty of the agriculturist will then be solved. The difficulties in the way of the extension of irrigation facilities in this Province are want of a bold policy of Government and the lack of funds for such works, though Government even now do it very well. Almost all Government irrigation works are paying adequate interest to Government and should be extended and carried into every nook and corner of the Province.

(b) Before I offer my remarks regarding the existing methods of distribution of canal water to cultivators, I would beg permission to press upon the attention of this Commission the widespread complaint of zamindars of Sind, concerning the inefficient way in which the Government canals are maintained by the Irrigation Department. The river Indus carries a large amount of silt which gets deposited in the beds of canals and which has to be removed before the inundation season to enable the canals to draw a sufficient depth of water. Even when the inundation is the lowest, the deeper the cleared bed the more efficiently will the canal draw a discharge of water to cope with the requirements of cultivation. In discussing this subject of clearance of canals I cannot do better than quote, verbatim, the following paragraphs of a petition dated the 30th September 1925, submitted to the Collector of Hyderabad, by the Zamindar Association, Tando Division, on the subject of clearance of canals:—

“ I will take this opportunity of drawing your attention as forcibly as I can to the obligations under under which Government lies, for spending a certain definite percentage of the land revenue of the Province of Sind on the clearance and the improvement of the Government canals. These obligations have been utterly forgotten and because they have been forgotten for a good long time, I venture to think that the more reminders my association addresses to Government, the more effective they will be in procuring sufficient funds for canal clearance. I am, therefore, taking up the old history to remind Government of the obligations they incurred in the long past, which have been buried in oblivion, but which they have to observe faithfully now.

Colonel Merewether, the Commissioner in Sind, wrote in his Report No. 1260, dated the 8th April 1874 as follows:—

‘ The management of canals will best be left to the irrigational establishment in communication and co-operation with the revenue officers. Irrigation is now being better arranged for, than was ever intended before, and in a few years with sufficient funds put at the disposal of officers, the main feeders should only be cleared by Government. In the time of the Amirs this was done by statute forced labour. We abolished that system as most vexatious, which it was, and in place of labour, we took a certain amount per acre of cultivation under the name of *hakabo* or water rate, such as was reckoned to be necessary and sufficient to keep the Government canals in efficient order. To prevent the zamindars being harassed by a number of rates this *hakabo* was merged in one sum taken as land revenue and was included in the terms of settlement.

The *hakabo* with a revenue of nearly thirty lakhs derived solely from canals amounted to a little over five lakhs per annum and this sum ought to have been expended yearly on the canals, but since 1867 only 3½ lakhs could be allotted out of the funds at the disposal of the Bombay Government. Occasionally extra sums have been given, but as often as not, they came

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too late to be of use, or from the previous neglect of the canals these additions were still very insufficient.

I have lately urged that five lakhs should be the annual grant in future. This is only just; it is less than what is really taken from the people, still, expressly for this purpose, though no longer shown into account. If it be regularly granted, the cry of deficient canal clearance will soon cease.

I beg to be excused for reproducing verbatim the three paragraphs from the letter of the Commissioner in Sind. The importance of the subject, however, necessitated this long quotation. It proves three things: first, that the special *hakabo* was levied from zamindars for clearance of canals; secondly, that it was merged into the general assessment for the sake of convenience of recovery; and thirdly, that the amount so levied is not being spent upon clearance but is being diverted to other purposes with the result that there is complaint of deficient clearance.

Colonel Lambert, Collector of Karachi, wrote as follows:—

‘Our settlements in Sind are only half settlements. We settle what shall be paid to us for the use of land and water, but we entirely leave our own part of the bargain. I look upon it as utterly useless to expect any settlements to do permanent good, unless, at the time of fixing assessment for the land and water, we also bind ourselves to spend a fixed proportion of the income in supplying the water. In conclusion I would again urge the advisability, nay the absolute necessity, of setting apart at the time of settlements, as one of the conditions of it, a fixed proportion of the income for expenditure on canals.’

I shall now quote from the letter of Colonel Haig, the Settlement Officer, who wrote under his No. 258, dated the 9th August 1873, as follows:

‘Turning to the question of the Government management of canals, I quite concur in the opinion that grievous injustice is done under our settlements by the inadequate expenditure on clearing and maintenance. The settlement is made on the supposition that all Government canals will be maintained during the whole term of the lease in thorough efficiency and when this is not done a breach of faith is committed.

The obligation of Government to keep up thorough efficiency is lost sight of, when set against the exigencies of Imperial administration.

No policy could be more short-sighted than that of grasping at every rupee of revenue and stinting outlay on works, which are the essential conditions of obtaining any revenue at all.’

Colonel Haig is very outspoken, and the complaint against Government of breach of faith has become much stronger and louder to-day than it was in 1873. Out of a revenue of thirty lakhs, the *hakabo* amounted to five lakhs or sixteen per cent. on the estimate of Colonel Merewether, and he complained that only 3½ lakhs were spent on clearance only. That was in 1873. To-day, the land revenue of Sind amounts to more than a crore of rupees and the *hakabo* at the above rate would amount to over sixteen lakhs of rupees. How much does the Government spend out of the sixteen lakhs on clearance? I have not got the figure, but if I put it at three lakhs I do not think I am very much outside the mark. The balance of thirteen lakhs is diverted and swallowed up for other objects and thus misappropriated from the view point of the zamindars. I have got the figures for Guni taluka for twenty-eight years from 1893 to 1920, which I am attaching as an appendix to this letter. It shows that instead of spending sixteen per cent (the old *hakabo*) Government is spending only 3·5 to 4 per cent, on clearance. What is true of Guni taluka, is true of the other talukas of the Province. This growing misap-

plication of the zamindars' money has put most of the canals in a state of through disorder. The clearance is done most imperfectly. The tails are never cleared, and there the silt deposits are six to seven feet deep or more. No water can therefore reach the tails. Instead of clearing the canals, the engineers have begun to set about reducing *karia* heads. This is like treating the eyes, when the seat of the disease is in the stomach. The ocular demonstration held under the orders of the Hon'ble Mr. Cowasji Jehangir should serve as an eye opener to the engineers; they should now transfer their affections from reduction of *karia* heads to thorough and systematic clearance of canals, to raising embankments and otherwise widening the basins so as to bring more water into the canals. They should give no peace to Government until they get more money from Government for clearance; the more the engineers clear the canals, the more satisfactory will their condition be. The late Mr. (afterwards Sir) H. E. M. James who was Commissioner in Sind for a long number of years, bore testimony to the necessity of clearance of canals. He wrote:—

'I need not say that nearly everything depends on canals being properly cleared every year. The Indus water carries with it a much larger amount of silt in solution than any other river known in India. Led off from slowly flowing canals, this silt is deposited in their beds and if not carefully removed every year, the canal becomes choked up. A district with canals in order means a district where there is a certainty of cultivation, and every incentive to extend it, a district where the cultivators must be, if they wish it, happy and prosperous. If the canals are out of order and not looked after, as they ought to be, the reverse will surely be the case.'

In pressing this demand of the zamindars, viz., to spend the *hakabo* or sixteen per cent of the land revenue on canals, to the attention of Government I have to rely upon your support. My association has asked me to seek your good offices in this matter. You are the head of the district you have been in Sind for a sufficiently long time to be in touch with the requirements of the zamindars. You know where the shoe pinches and if you will lend to the complaints of the zamindars your powerful support in the same way as did Colonel Haig and Colonel Merewether in olden days, Government will know that we have a just claim. We want you to strengthen our hands, to get Government to listen to us. Our request to Government, in one word, is to keep to their word of spending sixteen per cent of the revenue upon canal clearance, to earmark that amount in the budget every year and to insist that it should be spent; so as to bring the Sind canals to the highest pitch of efficiency.

This will not only benefit the zamindars whether at the head or tail, but will also increase the revenue of Government. Of late the land revenue from Sind instead of increasing, has been decreasing. Please ponder over the following figures for the whole of Sind.

Average of 5 years ending.	Total area cultivated.	Authorised rice cultivation.
917-18	5,822,576	1,105,185
922-23	5,504,640	1,049,660

This table discloses a sad tale. Government is not thriving. Why? because it does not spend sufficient money upon its canals. Government is like an unwise zamindar whose demands upon his income are so great that he does not spend enough money on clearing his water course. The result is that there is not enough water to irrigate

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his fields and he is getting poorer and poorer every day. You will thus not only be obliging the zamindars, but will be serving the interests of Government, if you support our demand. My association will owe you a deep debt of gratitude if, before leaving the district, you will get Government to faithfully sanction our funds (levied from us for specified purposes of clearance) for the needs of the canals".

Now it will be seen that clearance of canals has been neglected by the Irrigation Department for the simple reason that they allege that any clearance made is filled up with silt immediately within a month of the canal's flowing and therefore all expenditure incurred is wasted. But I beg to point out that the deeper bed of a canal is required only for the one month of June, when the inundation is lowest because it is indispensable that the sowings of crops like paddy should be started at the earliest in June, and finished at the latest by the end of July before the rains set in to give the best outturn. The deeper bed of a canal is not required when inundation is high in the months of July and August. If a good and early start is given to sowings the success of the crop is assured and if this success is attained all costs on deep clearance are made to the best advantage. The engineer does not realise that timely and early sowings if started well mean all in all to the cultivator. I therefore advocate that thorough clearance of canals, both deep and wide, should be made by the Irrigation Department. But I must admit that deep clearance can be dispensed with when the level of inundation can be artificially raised and kept constant throughout the season of cultivation in the canal length from the months of April, May or June in the same way as is proposed to be done by means of the Lloyd Barrage under construction; and all the annual cost on clearance can be saved to Government. But until this is done all economy on clearance will be at the cost of successful cultivation and the good outturn of crops. If another barrage is constructed below Kotri for Lower Sind, expenditure on clearance could well be diminished; but until this is accomplished it is positively injurious to minimise expenditure on clearance. But before the Kotri barrage comes, it will be of advantage to have many more regulators in big Government canals at short distances to give a constant level of water, and then too deep clearance can be avoided. Within 80 miles of the Fuleli canal there is only one Alipur regulator, whereas there is need for three or four more such regulators. Regulators must precede abandonment of deep clearance. But these regulators should not be used for rotations but for supplying constant levels throughout the season.

Coming now to the question of the distribution of canal water to cultivators, I beg to state that the present methods of distributing waters to the tail ends of the canals is fraught with a great many difficulties. If distribution could be effected in a manner which would not curtail the existing supply enjoyed by cultivators for ages, or if it could be accomplished without cutting off the area of a holding usually cultivated, no zamindar at the head of a canal has cause for complaint; but when on an old pre-British canal like the Fuleli the existing outlets are reduced in dimensions and consequently the usual area under cultivation is diminished and many cultivators' lands thrown out of cultivation, a hue and cry is naturally raised. All measures for reduction of outlets, commencing with open masonry heads and then the Punjab pattern or other patterns, have failed to restrict the water to the extent desired by the Public Works Department. Lastly, the module system of outlets is being introduced with success from the point of view of the engineers; but the zamindars condemn them strongly, as these sluices have successfully served to diminish not only the discharge of their original outlets, but have reduced the level of the waters which the zamindars require for their lands. This process has merely robbed the outlets of the head portions of the canals and transferred water to the tails, i.e., the tail portion of the canal has become the head portion and the head portion the tail. The zamindars at the head look upon this policy as "robbing Peter to pay Paul." The zamindars

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prefer wide, deep and open outlets of masonry, for this reason, that with the lowest inundation and the smallest discharge, their supply should be enough to meet the requirements of their cultivation. A rice cultivator is anxious to finish his transplantation before the end of July, as after that the rains set in and make paddy cultivation unprofitable. With reduced heads and reduced levels, cultivation is retarded and prolonged, the chances of good crops are lost to the zamindar and he has good cause for complaint. The zamindar urges therefore that before any modules are introduced in the openings of their water-courses, the Irrigation Officer must secure constant level and constant discharge of the Government canal such as to defy the vagaries of the Indus, by means of regulators in main as well as feeder Government canals like the Fuleli and its branches. Not only this, but they desire that by means of another barrage like the Lloyd Barrage, the non-barrage area also should come under the command of a barrage below Kotri so that the frequent falls of the Indus level may be avoided. Modules have been introduced in hot haste in canals with fluctuating levels and they have failed to make equitable distribution. What the zamindars suggest is that the Irrigation Department should not adopt half-measures which put the cart before the horse. First, constant supply should be secured by barrages and regulators, and then modules introduced, as without constant and assured supply modules are doomed to failure. It is therefore imperative that the Kotri barrage should first be undertaken.

QUESTION 9.—SOILS.—(a) (i) In my part of the country, i.e., Lower Sind, most of the land is under flow by natural gravitation and is therefore used for paddy cultivation. Continuous annual cultivation of rice has made the soil water logged, especially when it consists of deep *dhoro*s (depressions) which lodge water from two to six feet in depth and where water accumulates and remains even for three or four months after the paddy crop is removed. In such tracts all the surrounding higher uncultivated lands which flow irrigation cannot reach have become converted into large areas of *usar* land unfit for the growth of any crop. This condition of water-logging has been the result of want of drainage in the country. There are many irrigation channels cutting across the country which fill all the low lying areas with water but there is no channel to drain away the excess water. The Irrigation Department has never paid any serious attention to providing drainage channels to every tract under cultivation. The result has been that all uncultivated lands above the reach of water have been rendered *kallar* (*usar*) and therefore quite unproductive. The drainage of a country should be held to be as important as its irrigation and the two must go hand in hand. The following are the evils which want of drainage works has caused in Lower Sind:—

- (1) All the available uncultivated land adjacent to paddy lands has been made unfit for the growth of any crop.
- (2) The soils under cultivation of paddy have become too water-logged and full of noxious weeds that overcrowd the actual crops.
- (3) The water in the field becomes stagnant by long accumulation and does not lend that vigour to the crop which fresh silted water can give.
- (4) The outturn of the crop per acre is much reduced on this account.
- (5) Paddy is subjected to various crop diseases under the condition of excessive moisture.
- (6) The whole country under flood produces malaria of the worst type which is dangerous both to human beings and the cattle

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that live in the locality. Malarial fever attacks all the inhabitants of the village, and the cultivator with all his family lies low in his hut, fever-stricken for days together, while his paddy crop is shedding grain on the ground because there is nobody to reap the over-ripe field.

- (7) If there is any accidental breach in a canal or a heavy shower of rain, the cultivated land gets overflowed, the paddy crop overtopped by water, and there is no way to drain this water away to save the crop. Thus, immense loss of crop occurs to hundreds and thousands of acres by the lodgment of water. The rains of 1927 in Lower Sind have wrought havoc in the country, destroying crops and cattle of the value of several lakhs of rupees. Because there was no drainage, continuous rainfall for five or six days with a fall of fifteen to twenty-five inches made a swamp of the whole country, water rushing into the dwelling-houses of the people at midnight. The mud houses crashed, the belongings of the people were washed away. They made rafts of their cots and saved their own lives and the lives of their womenfolk and children with great hardship, suffering numerous privations, being without food, clothing or shelter. The crops were of course ruined by the lodgment of water for several days after the rains. Even the fall of eight inches or so of rain in 1926 caused great damage to crops and low lying villages.

It is essential that the Public Works Department should realise the gravity of this situation and made a bold effort to provide effective drainage channels for all the fields and villages. If Government is beset with difficulty regarding finance for drainage works, I am sure all cultivators will be glad to contribute an additional revenue of four annas per acre for every acre of land under cultivation which can be provided with proper drainage. The proceeds of this cess may be ear-marked for drainage works and utilised to cover the interest charges of the capital invested in drainage works. The Public Works Department should undertake this work at once and save the people from disaster which occurs almost every year to a small or large extent.

(ii) Much alkali land is lying waste in Lower Sind which could easily be improved and rendered cultivable if abundant canal silted water were to flow on to it, and the soil were brought under rice cultivation. In the first two years of its cultivation it gives meagre crops, but from the third year the salts disappear and normal crops of paddy can be reaped from it. Most of the alkali or *kallar* lands, as they are called in Sind, are above the level of flow water, but wherever by means of regulators the level of water has been raised to them for flow, they have successfully been made cultivable. If the new barrage below Kotri is built it could provide a higher level of water in the river, canals and streams and a very large area under *kallar* could then be reclaimed, with great advantage to the State. Similarly other uncultivable lands now lying waste, whether half sandy or half *kallar*, could be brought under rice cultivation as well, and thus improved in texture because the silt of the Indus has renovating power, and rice can adapt itself to any texture of the soil. Rice though a favourite with the Sind cultivator is not looked upon with favour by the Irrigation Department for the reason that it consumes nearly twice as much water as the dry crops, *bari* and *juar*, though it pays nearly twice the assessment of dry crops. It has earned this disfavour from the engineers and revenue officers for this reason also, that it causes malaria in the tracts where it is grown. But my experience as a cultivator of thirty-three years standing (under the existing conditions of water supply) gives the first place to it in point

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of net profit, on account of the ease with which it is planted and comparatively smaller expenditure its cultivation requires. I think the prejudice with which it is looked upon by the authorities is undeserved, and the restriction upon its further cultivation which the authorities have imposed is uncalled for and detrimental to the real interests of the cultivator. The advantages which rice cultivation afford may be enumerated below.

Rice can be cultivated for twenty to thirty years successively, every year, on the same soil after the soil is newly broken under the plough, without incurring any cost of manuring. It gives as net profit more than any other cereal crop. If the soil is old and has been cropped many years successively, then it is left fallow during one *kharij* and sown with *rabi* the same year, rice being repeated next *kharij* with a nice yield. In fact it renovates its vitality at once and the silted water of the Indus is sufficient to maintain its vigour from year to year. Other dry crops like *bajri*, *juar*, cotton and tobacco cannot be cultivated on the same land repeatedly from year to year without manuring, which process costs about ten rupees to twenty rupees an acre if the soil is manured with farm-yard manure. This, however, is so scarce that it cannot be applied to extensive areas of annual cultivation, so that practically, where a zamindar or *hari* cannot invest much money on manure and where manure is scarce or unavailable, it is natural that the cultivator should show his preferences for rice cultivation. In fact it is essentially a crop for a poor man with little capital, the only thing needed for its successful growth being a plentiful supply of uninterrupted water throughout the season. The only thing that decreases its yield is want of drainage of the soil. If at intervals the soil could be drained of its stagnant supply, and then again refilled with fresh silted water from the canal, it could double its produce. But at present Government policy has been to starve it out, and to discourage its further extension. This is a mistaken policy. Instead of building drainage works to drain off excess water and thus avoid malarial conditions in the locality, they have discarded the crop, which has found so much favour with the ryot. Again, rice is grown in low-lying marsh, ditches and depressions, in which no other crop can be grown. Rice, being an aquatic plant, can stand much water, whereas other crops will wither and die if water is lodged long at their roots. Further, under favourable conditions, the same rice soil, after the rice is harvested, can be ploughed on the same moisture and sown with winter pulse crops in the same year, yielding additional profit, besides providing valuable green fodder for cattle in winter when such fodder is scarce throughout the country. Such second pulse crops are universally grown in Upper Sind, renovating the soil with nitrogen from the air through the nodules in their rootlets. But in Lower Sind, on account of want of drainage, the soil cannot get dry enough in time to be sown with a pulse crop and hence the soil is denied the advantages of enrichment by the growth of pulse crops after one, two or three years' cultivation has made it necessary. Given a plentiful supply of water and efficient drainage in Lower Sind, rice soils could produce bumper rice crops and rich second crops of pulses as well, with all the benefit of green fodder for winter from year to year.

(b) (ii) In my experience as zamindar, I have observed that my lands, (in *dehs* Moya and Sethiari-Guni, district Hyderabad) were mostly lift lands from the year 1894 to 1905, cultivated under *bajri*, as the water supply was scanty and unreliable, and the net revenue to Government out of cultivation varied from Rs. 600 to Rs. 1,000 at the most. All the lift land was pure rich clay-loam perfectly sweet, with only a few patches of alkali *kallar* soil. Sweet water could be had in wells at a depth of 30 feet from the sub-soil sandy layer. In the year 1906 Government cut a new canal called the Karyowah, the supply of water on that account improved, and lift lands could be commanded by flow water. Lands situated in the *dhoros*, i.e., depressions, which were formerly cultivated under rice with partial success, got a more steady supply of water and bore better rice crops. Some of the former lift lands, now commanded by flow water

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also, were brought under rice cultivation. After a few years' cultivation under rice, the area under rice cultivation expanded and the same *dehs* which yielded a revenue not exceeding Rs. 1,000 began to yield a revenue of Rs. 4,000 a year. But unfortunately, during the rains the lands used to be overflooded from the Government extensive waste lands lying to the north, the crops being entirely destroyed with immense loss to the cultivators, and gradually they became water-logged. The cultivated land being surrounded by high land all round, there was no way to drain out the excess water which lodged for several months. Some sweet lands that were above the reach of flow water and were cultivated under lift crops, became *kallar* infected, and are now quite uncultivable. Alkali salts were deposited on the top in a thick layer of about a foot deep. This can only be cultivated under rice if the water in the Government canal attains a higher level by means of regulators in the Fuleli or a barrage over the Indus at Kotri. Rice is the only crop that can improve such lands. With regard to the sub-soil water, it is now found that its level has risen by about twenty feet so that a well dug now gives water at a depth of ten to twelve feet instead of thirty feet as before. All the surrounding lands, formerly sweet and above the reach of flow water, have turned *kallar*. This marked deterioration in the soil has come about within my own observation within the last twenty years.

(c) The measures which Government should take to reclaim areas which have gone out of cultivation on account of *kallar* are:—

1. Raising of water level in Government canals by means of regulators to command such lands with flow water.
2. To allow rice to be grown in such lands, as silted water from the canals is bound to neutralise the salts in the soil and render the soil cultivable.
3. To provide drainage channels in every tract to carry the salts away from the soil and render it sweet.

QUESTION 16.—ANIMAL HUSBANDRY.—(a) (i) For the improvement of breeds of livestock I would suggest that Government supply bulls of the best breed free of cost to zamindars who take interest in breeding, so that the existing breeds may improve and supply strong plough or draught cattle.

(ii) Betterment of dairying industry:—Qualified men in agriculture and dairying may be encouraged to open private dairies by means of subsidies, grant of pasture lands for dairy milch cattle and other necessary facilities.

(b) (i) and (ii) *Over-stocking of common pastures and absence of enclosed pastures*.—Sind being a rainless country and having canals which afford irrigation for three or four months in the year, pasture is very scarce. For nearly six months in the year all the cattle have to live on dry fodder which is not available in sufficient quantities and does not provide nourishment either for the plough or the milch cattle. Besides that, even in the season when canal water is available, there is hardly any pasture land in the village, much less necessary water supply for the irrigation of pastures, as the greed of zamindars has utilised for cultivation all the available land and the cattle have to roam about in a semi-starving condition. I would suggest that every village should compulsorily be supplied with twenty to fifty acres of pasture land for the free grazing of the village cattle, and the Irrigation Department should supply water for this area free of charge. If suitable Government land is not available for this purpose near the village site, land should even be acquired and reserved for pastures. Further, zamindars may be encouraged to maintain pasture lands by remission of the present assessment. But construction of the barrage below Kotri by supplying perennial water would remedy this want.

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(c) The months in which the cattle experience shortage of fodder most are the months of May and June when the dry stored fodder has been consumed and the green fodder has not yet sprung up. It is from the month of August, and after the rains, that green fodder is made available, when the condition of the cattle improves somewhat. But in rice growing tracts it is not possible to keep the cattle for a long while after transplantation when the tract becomes infested with mosquitoes on account of the water-logged condition of the soil. Most of the cattle migrate to high lands where, too, if there is no abundant rainfall, the green fodder is scarce and the cattle are famished.

QUESTION 17.—AGRICULTURAL INDUSTRIES.—(e) Yes, there is much scope for work by Government; for instance, in Lower Sind where the staple crop is rice and rice straw is to be had in abundance, and is simply thrown away and burnt, some machinery for manufacturing paper from rice straw should be a very useful supplementary industry for providing employment for the poor peasantry.

QUESTION 24.—ATTRACTING CAPITAL.—(a) The necessary steps to induce a larger number of men of capital and enterprise to take to agriculture are:—

1. To throw open, to men of capital or to registered agricultural companies with capital in hand, formed with the object of carrying on agriculture, large areas of Government waste land with facilities from the Irrigation Department to cut new canals for the cultivation of such tracts, because Government cannot cope with so much expenditure and capital required for such a vast area still lying uncultivated. Waste lands should be given to such companies on nominal value or full value to be recovered gradually in ten or twenty instalments.
2. To grant all facilities to such individuals or companies in the matter of acquiring lands for the passage of canals or embankments if these are necessary.

At present men of capital and enterprise are literally kept out of the domain of agriculture by Government and no encouragement is forthcoming. The original occupants or their descendants have been granted special privileges and these men stick to their ancestral traditions and have no ambition for any improvements on the old system of cultivation. These men are very conservative and worshippers of the past only. They are in fact only parasites. The present policy of Government is retrograde and it should be entirely changed to improve agriculture.

Men of education and experience in agriculture, if interspersed in all talukas, will serve as an object lesson to all the uneducated mass of zamindars, and I am strongly of opinion that reform in agricultural practices can come only by ocular demonstrations, which such men of enterprise and capital will provide.

(b) The factors tending to discourage owners of agricultural land from carrying out improvements are:—

- (a) want of education, (b) ignorance of the existence of any better methods on account of their narrow outlook, (c) conservative habits, (d) want of enterprise, (e) deep-rooted belief that no

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effort will avail them except what God has destined for them, (f) want of capital which they cannot raise even for their barest wants without heavy interest, and (g) patronising policy towards the so-called hereditary class of cultivators.

APPENDIX (vide para. 12).

Statement, submitted by witness, showing collection of revenue, cost of clearance and percentage of the latter to the former, in the year 1871-72 and from 1893-94 to 1921-22.

IN TALUKA GUNI.

Year. 1	Collection of land revenue. 2	Cost of clearance. 3	Percentage of Col. 3 to Col. 2. 4
	Rs.	Rs.	
1871-72 . . . . .	...	21,534	...
1893-94	1,55,178	27,059	17
1894-95	1,65,136	21,744	13
1895-96	1,52,325	31,662	20
1896-97	1,83,106	26,760	14
1897-98	1,94,453	23,828	12
1898-99	1,69,629	22,505	13
1899-1900	1,54,591	29,708	19
1900-01	2,00,399	30,163	15
1901-02	1,48,762	23,310	15
1902-03	1,02,319	36,421	35
1903-04	1,66,891	19,204	11
1904-05	1,43,345	33,991	23
1905-06	2,11,184	47,304	22
1906-07	1,95,630	21,247	10
1907-08	1,48,941	Not available.	...
1908-09	1,76,918	Do.	...
1909-10	1,91,593	16,538	8
1910-11	1,90,204	19,030	10
1911-12	2,22,305	14,794	6
1912-13	2,44,050	19,050	8
1913-14	2,19,993	17,457	8
1914-15	2,67,453	17,457	6
1915-16	3,22,763	18,628	6
1916-17	3,50,093	12,664	4
1917-18	3,15,414	12,465	4
1918-19	2,46,705	14,499	6
1919-20	2,99,137	10,234	3.5
1920-21	2,85,117	10,603	4
1921-22	2,86,761

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Oral Evidence.

60729. *The Chairman:* Rao Sahib Udham Shewakram, you are of the district of Hyderabad?—Yes.

60730. What has been your occupation?—My occupation is agriculture; I am a zamindar agriculturist cultivating my own lands.

60731. Cultivating yourself?—I myself through my *haris*; I give personal attention.

60732. Have you any home farms at all?—No.

60733. You are anxious, I see, that the agricultural research organisation should pay more attention to food crops which are consumed in India?—Yes, to indigenous crops.

60734. That is, *bajri* and *juari*. Has the department succeeded in introducing any agricultural improvements which have been successful in your own neighbourhood?—None that I know of.

60735. I see that on page 221 you suggest that the value to the parents of the boy's services in various directions makes them disinclined to send him to school?—That is true.

60736. You suggest that arrangements should be made to allow the boy to work on the farm and go to school as well?—Yes.

60737. What sort of a day's work is a boy of seven expected to do?—He is sent to graze the cattle.

60738. At what time does he start out in the morning?—Early in the morning, at seven or eight.

60739. At what time does he get back?—At eleven or twelve.

60740. Does he again go out?—He again goes out at four or five.

60741. When do you suggest that he should go to school?—I have suggested that he should attend the school from two to five. Then again he would go to the fields and return, and after that attend the school at night.

Rao Sahib, you were no doubt a very industrious boy, but do you think that, if you had been out in the morning to attend to the cattle and had returned at noon, and then sat down in a somewhat stuffy school room and had had levelled at your head some of those extremely dull lessons from which we have all of us suffered, you would have remained awake? I, at least, could not have done so.

60742. Would you attach any importance to the improvement of communications in Sind?—I attach great importance to it. In fact it is a very important factor in the growth of trade and commerce; there should be communications between rural areas and urban areas.

60743. In your answer to Question 8, you attach great importance to silt clearance?—Yes.

60744. I suppose there is a limit to the advantage of silt clearance. Is it any good going deeper and deeper below the gradient?—What I say is that clearance should be made at a point where the lowest inundation can reach it. We have to safeguard the crops and enable them to mature; for this, water is required at a particular time and should be stopped at a particular time. If the canal is dug deep, even in low inundation we can get enough water to start cultivation. If the bed of the canal is high, then the canal will not flow and we cannot get any water to cultivate. It must be borne in mind that the duration of the inundation is short and we have to ripen our crops within that time: unless we start quite early there is a danger that inundation may end early and our crops may not mature. We have to clear our own *karias* also; we clear so as to catch the lowest inundation; we take this prudent measure for meeting the vagaries of our river. When we have spent three to four thousand rupees on our clearance, we have a right to expect Government to clear their own canals in sufficient depth to give us water.

60745. After all, it is no use clearing a little here and there, regardless of the gradient: water cannot run uphill?—Every canal has low and high lands. There are some lands which will not be reached even in the highest floods, but there are other lands which are reached by the lowest inundation.

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60746. I observe that in answer to Question 9 you suspect that the Irrigation Department is viewing with disfavour any cultivation of rice although, according to you, rice pays twice the assessment that *bajri* pays, the water charge being twice as much. What makes you think that the Irrigation Department does not like rice?—There is the Commissioner's circular which places a general restriction on the cultivation of rice. For instance, adjacent to my own lands there are lands suitable for rice, but they would not be granted at all.

60747. But the Commissioner has no natural prejudice against rice; why has he imposed this restriction?—He has imposed it because he thinks it takes more water and makes the climate more damp and more unhealthy. But we feel that with regard to certain lands we have no choice but to cultivate rice; rice will grow there better than any other crop; the very first rain will swamp any other crop; only rice can resist the onslaughts of water.

60748. On page 223 you express great concern about the effect, in certain districts of Lower Sind, which may result from the building of the Barrage. Are you competent to give an opinion in this matter?—My experience tells me that if water is held up at Sukkur by three, four or five feet, it is certain that the level at Kotri will fall by two or three feet. Every man can understand that.

60749. Do you wish to controvert any particular statement made by or on behalf of Government as to the effect which the building of the Barrage will have on the agricultural interests of Lower Sind?—Mr. Shoubridge did make a statement that the water at Kotri is sure to fall by one or two feet.

60750. Do you agree with that?—I do.

60751. Do you wish to disagree with any statement? Do you challenge any of the statements that have been made?—Yes; Mr. Shoubridge said that Lower Sind would not suffer very much by the fall in the water level; I do not agree with him there.

60752. On what do you base your views?—I base my views on the common understanding that if water is held up at any particular place by about five or six feet, it is bound to lower the level at a place situated below it. Even now when the Lloyd Barrage does not exist and water is freely admitted, we experience shortage of water level at Kotri; if water is held up by the Barrage, we shall experience greater shortage.

60753. From your own knowledge of the Province, do you think that the dangers which you foresee to Lower Sind are such as to lead you to wish that the Barrage had not been constructed? I ask you Yes or No?—We never wish that there should be no barrage, but we want a new barrage below Kotri.

60754. So, you do not quarrel with the policy?—No. Barrages are essential for the success of cultivation in Sind.

60755. Do you, as a practical man, think it is possible to construct more than one barrage at a time?—But then, efforts ought to be made to provide against hardships ahead rather than wait until we are ruined and then construct. That will be a bad policy. Here we have been carrying on our cultivation all right, but if the flow water is stopped we will suffer greatly. We feel that there will be ruin to our lands.

60756. To go into a matter of detail, you do not like the module system; is that so?—We do not, because in practical working every zamindar is complaining that the introduction of modules has shortened his supplies.

60757. The tail portion of the canal is becoming the head portion and the head portion the tail?—That has been the result.

60758. That is in terms of receiving water. It is now an advantage to live at the tail?—Yes.

60759. Where do you live?—I live both at the head and the tail.

60760. You have seen a great deal of deterioration consequent upon irrigation and waterlogging?—That is because there is no proper drainage. I attribute all that waterlogging to want of drainage; in fact drainage has been practically neglected.

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60761. On the one hand you want drainage; on the other hand you want the land to be charged with silt?—Drainage is the natural cure for water-logging.

60762. Do the inundation canals lay down a rich deposit of silt on your lands?—Yes; they do in regard to flow lands.

60763. Any in lift areas?—Not in lift areas, because in lift areas the silt settles down in the canal, and when water is raised it does not bring much silt to the soil. In flow land the silt flows with the water and is deposited.

60764. Have you had any experience of reclaiming land that has been infected with *kallar*?—Yes; if there is silted flow water, after two or three years' cultivation with rice the *kallar* land becomes quite sweet. High lands cannot be reclaimed.

60765. Do you think red rice is more effective in improving *kallars*?—Yes.

60766. *The Raja of Parlakimedi*: You complain of the bad state of the roads?—Yes.

60767. May I know what allotment is made per mile?—About ten rupees a mile is the allotment we receive from the taluka board. I think five thousand rupees is spent upon roads which have a length of about two hundred miles. The repairs are inadequate.

60768. Has there been any difference in the allotment within the last few years?—No difference at all.

60769. To what extent should the allotment be increased in order to keep the roads in efficient repair?—You mean the Government allotment?

60770. I mean the total amount?—It should be quadrupled before we can do anything. If that is done, we can take up blocks of forty to fifty miles every year and improve them by turns.

60771. As communications are very necessary for special agricultural districts, should not the local bodies economise under some other heads to meet this charge?—I am afraid there is no head from which we can take any amount. There is very little available with the district local board itself; there is a great length of roads under its control, and what is provided for other purposes is hardly enough for those purposes.

60772. Can you not levy a cess for improvements?—I am afraid not; our levy has already been increased from four pice to five pice in the rupee of assessment.

60773. That is not very much?—Not very much, but I am afraid the profits from agriculture are not such as will permit the agriculturist to part with more money; already the agriculturist is crying that there is little profit from agriculture, and therefore he would not pay more.

60774. Under village sanitation and education how much is allotted? Which takes most of the revenue?—Education takes most; that is what I believe.

60775. What arrangements have local bodies made for the maintenance of village sanitation?—The only step that the local board takes in the case of sanitation is to grant a contribution to the village sanitary boards; there are not many boards, only six or seven in a taluka. A sanitary board is formed in each village when the panchayat of the village contributes about half the amount; the other half is contributed by the local board and the Government; five by the panchayat, four by the taluka board and three by Government.

60776. Does your village receive any grants for improvement of drinking water supply?—None whatever.

60777. Have you applied?—No.

60778. How many schools has your village?—My village has got one school.

60779. How many schools does the taluka board maintain?—It has got about sixty or seventy schools in the whole of the taluka.

60780. Up to what standard?—Up to the fourth standard; that is, the fourth vernacular.

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60781. Is any attempt being made to give preliminary agricultural instruction?—None whatever; in fact the teachers themselves do not know anything of agriculture.

60782. Would you like to have some instruction of that kind given?—I would, very much. From the very start the boys who are agriculturists should get some teaching in the principles of agriculture in their school, so that it may serve them in after life in improving agriculture. There must be some text book on agriculture.

60783. Are you making any attempt towards it yourself?—No; I have not made any attempt.

60784. You complain about postal arrangements in villages. In what way would you meet the difficulty?—Every big village ought to be served with a free postal delivery, if not once a day at least once in two days.

60785. *Professor Gangulee*: What do you mean by free postal delivery?—I do not mean that there should not be the usual payment of stamps, but that no additional levy should be made.

60786. Under such deliveries, do you include the money order system also?—Yes; the delivery should be made on the ordinary terms. The delivery should be made in the village itself; there should be some postal official to deliver as well as receive letters and money orders.

60787. Is not the real reason for this state of affairs the dearth of proper and reliable persons to take up such work?—In every village you can get the headmaster of the school to do that work very nicely at a small charge.

60788. The headmaster of which school?—The headmaster of the local fund school; he can take charge of that work.

60789. Do you think people will be available to stand security for him?—Yes; I think so. At any rate I could supply one. I have several times made the request that a post office should be established in my village, which contains seven or eight hundred souls, and every time that request has been rejected; though I undertook to make good any deficit, they would not open one.

60790. Did you undertake to make good any leakage that there might be?—Which leakage?

60791. The postman might run away with the money orders; that is rather common?—I meant any deficiency in the expenditure that will be incurred in employing a postman for delivery.

60792. *Mr. Jamshed Mehta*: How many letters do the people in a rural village send or receive on an average per day?—When I got tired of requesting the authorities, three or four of us, zamindars, combined and appointed a man to send and take delivery of our letters. We received six or seven a day.

60793. That is about the zamindars; what about the other people? How many letters do they send in the course of a day?—They are receiving, after this convenience has been given, about fifteen or twenty a month.

60794. For the whole village?—Yes.

60795. I am not quite clear about this suggested free postal delivery in the rural villages. Are there any charges made beyond the ordinary postage charges?—Sometimes the peons who come and deliver the letters exact two or three pies for each letter they deliver.

60796. *The Chairman*: Is that a recognised and sanctioned charge?—No, it is not.

60797. That is an impost?—Yes.

60798. *Sir James MacKenna*: And do you zamindars give it?—Some do and some do not.

60799. *Professor Gangulee*: What happens if you do not?—Then you will find that your letters are stolen.

60800. *Sir James MacKenna*: On page 221, you say the impression is abroad that Government devote more attention to cotton and wheat crops that are exported abroad than to crops that are consumed in India?—Yes, it is the general impression.

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60801. Is it not the case that the crops which are most extensively exported are also the crops which are most extensively consumed in the country?—No. For instance, I have in view the crops of *bajri*, rice and *juari*. Those are the crops which are not exported but they are the crops which are most extensively consumed and locally used.

60802. *The Raja of Parlakimedi*: But is not the country made prosperous by the export of those crops?—Certainly, it is; but at the same time I said that attention should be paid to both; I do not mean that the export crops should be neglected, but I say equal attention might be paid to both.

60803. *Sir James MacKenna*: What about the favourable conditions that prevail in Spain and Italy?—I read some reports that paddy there gives about thirty or forty *maunds* per acre. Now, enquiries might be made as to what are the conditions which lead to the production of such crops, whereas we cannot get more than nine or twelve *maunds*.

60804. It is comparing the salubrious climate of Italy with the inferno of Sind?—No, I said enquiry might be made as to how our conditions here might be improved.

60805. Yes, you are quite right?—It is worth enquiring into.

60806. *Professor Gangulee*: Have you interested yourself in the taluka development associations?—No, I have not.

60807. Do you know anything about this organisation?—Yes, I have heard of it.

60808. You are familiar with the working of the organisation?—No.

60809. Would you like to see it started in each taluka?—Yes, I would like to see it, certainly.

60810. Would you make a move in that direction?—I have not yet made any.

60811. Do you find any appreciable decrease in the yield of crops in Sind?—Yes, I have been feeling that there is a decrease.

60812. Of rice?—Of rice; I have much experience of rice cultivation.

60813. Do you find the rice yield is decreasing?—Yes, because the soil is deteriorating on account of there not being any drainage at all. I find that lands that are not provided with drainage cannot give us good crops.

60814. On the question of drainage, you suggest that your zamindars would be prepared to pay a cess of four annas per acre?—Yes, if the amount is earmarked for that purpose.

60815. Do you make that suggestion yourself, or have you consulted other zamindars?—I have consulted some friends who also agree that they will be prepared to pay four annas more if effective drainage could be constructed for the drainage of excess water from their areas.

60816. Have you approached the Government with that offer?—No, we have never approached them.

60817. You make another proposal of an additional cess of one anna in the rupee for compulsory education; is that right?—Yes.

60818. Do you think the zamindars would be prepared to accept that proposal?—I do not know whether they would be prepared or not; that is my proposal.

60819. That is your view?—Yes, it is my view that for the encouragement of education that should be done. We cannot get it without sacrifice.

60820. In answering a question of one of my colleagues, you said something about the water supply for drinking purposes. It is not clear in my mind what is the actual position?—I feel that in the rural areas water for drinking is very defective. In fact, when the canals are dry, and the canals remain dry for about seven or eight months in the year, then our source of supply for drinking purposes is by means of wells. In some places wells give us very brackish water, and in other places you cannot tap a good well. During the whole of that season of seven or eight months good water cannot be had for drinking purposes. In fact, that is one of the reasons why people in urban areas do not care to go and live in rural areas. In certain places good

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drinking water cannot be had. When the canals flow, which is only for a period of four or five months, we get good drinking water.

60821. Do you think that during those seven or eight months wells can supply drinking water?—We dig wells; we have to live upon wells. Whether it is brackish water or not, we have to drink it.

60822. Have you sunk wells for your *haris*?—I have sunk seven or eight wells.

60823. On page 232, you say that at present men of capital and enterprise are literally kept out of the domain of agriculture by Government, and no encouragement is forthcoming?—Yes, I find the policy in Sind has always been to encourage the hereditary owners and any new-comer is literally kept out of agriculture. If there is a man of capital who goes and applies for land, Government will either make too heavy a charge or will not allow him land because it always adjoins some neighbouring zamindar's land.

60824. Again, I am not clear what you really mean when you say no encouragement is forthcoming. What encouragement do you expect from the Government?—Supposing there are some educated men who want to pursue agriculture, then they will apply for certain Government waste land somewhere. If that land could be obtained on easy terms with facilities for irrigation, many people would go in for it; but I am sure, if they make such application, it will not be entertained.

60825. Do you know of any application that has been refused on that account?—I cannot give you particular instances but the general policy is known, and therefore nobody ever applies for it.

60826. *Mr. Calvert*: Has any educated man ever applied to you for land as your tenant, as your *hari*?—As my *hari*, no; I do not think that would suit him.

60827. *Professor Gangulee*: Further on, you say they are in fact only parasites. To whom are you referring?—Some of the old zamindars.

60828. The new ones are not parasites but the old ones are?—Yes, the old ones are.

60829. *Mr. Kamat*: I should like to ask you a question or two as to the public attitude in this Province to the road policy. You said just now you were in favour of levying a one-anna cess for compulsory primary education. Similarly, as a good citizen, would you not be in favour of some additional cess for roads?—I am afraid there will be an accumulation of such cesses which will be too much for the zamindars to pay.

60830. Such a cess would be too much?—Yes.

60831. Have you worked it out as a matter of profit and loss, if that were done? I mean, by comparing the present cost of transport on one side and the additional profits if the roads were improved on the other?—No, I do not think there will be any profit in that direction.

60832. At any rate, you know there is a bright future for Sind when this Barrage comes and a lot of additional produce either in the shape of cotton or other material is brought on the market; you can foresee that easily I suppose?—Yes.

60833. But unless this policy of giving good water from the Barrage is coupled with a policy of giving good roads, you may not get the maximum price for your additional produce?—Yes, that is quite possible.

60834. Cannot you see that improved methods of transport will give you bigger profits than when transport is by the camel cart going at a crawling pace. If it is a small cess compared with the increased profit, why should the public be against it?—If the roads are repaired I do not think it will make much difference in the methods of transport. If you bring in a railway or some feeder lines to carry produce, the rates will become lower and that will make a difference; but if there is no feeder line, and the roads are merely repaired and we have to resort to the same camel or cart traffic, I do not think it will make much difference.

60835. We will leave aside the question of feeder lines because feeder lines cannot touch every village; we are talking of the smaller roads. Would you

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be in favour of simply repairing the roads and perpetuating the camel traffic? Is that what you mean? You do not want motor traffic?—We do want motor traffic.

60836. You do not want better roads?—Certainly we do.

60837. If that is the case, do you imagine you can scrape up the necessary money merely from your sanitation expenditure or from any other minor expenditure in the budget?—No, I think our budget is too meagre and small.

60838. I suppose the people's representatives, both on your district local boards and your Legislative Council, scrutinise the budgets very carefully but find they cannot scope out the requisite additional funds for roads from any other head of revenue?—I believe not.

60839. If that is the case, why would not you favour a small cess, if that will save you a lot of transport costs, especially as you are going to have this Barrage and there are signs of plenty before you?—I personally am not going to benefit by the Barrage; on the contrary, I am going to suffer by it, so that I would not like to tax myself any more on account of the Barrage.

60840. But looking at the whole as a good citizen, would you not favour a small cess for road purposes, just as you are favouring this compulsory cess for education?—I would, certainly.

60841. *Mr. Jamshed Mehta*: You are a zamindar chiefly and in fact almost wholly interested in rice cultivation?—Yes, because of the nature of my land.

60842. With regard to the roads, do you think, if roads are built by the Government, there will be a good deal of motor lorry and motor car traffic?—There is bound to be.

60843. Then you would expect the Government customs revenue to be considerably increased: the zamindars would go in for motor cars. Would that constitute a source of revenue to Government?—Yes, it would.

60844. Would you recommend that, out of such increased revenue from motor lorries, the Central Government should give a part to the Provincial Government?—Yes, I think some contribution ought to be made by Government.

60845. Do you think, if compulsory education were applied to the village as it is now, agriculture would suffer. You speak of certain hours as not being practical from the point of view of health or education. Then what would you suggest? Would you suggest that the boys should not be given education, or that agricultural education should be given?—I should certainly suggest that education should be imparted to them. If the other suggestions I have made are not practicable, then of course the present morning and evening hours may be fixed.

60846. You make a suggestion on page 222 with regard to a mortgage bank. There is some fear in the minds of some people that if the zamindars are relieved of their debts they will incur fresh debts, and therefore it is no use helping them. What is your view? Supposing the zamindars are relieved of their debts by having long-term redemption loans, do you think they would incur debts again by spending the money lavishly in some other ways?—I do not think there is any truth in the suggestion that the zamindars spend lavishly. The fact is that their incomes are small. It is only in a few exceptional cases that there may be luxurious expenditure; generally speaking, I think they are the most parsimonious people living.

60847. What is the charge of the zamindar to the *hari*?—The zamindars' charges range from twelve to twenty-five per cent. As a matter of fact, as bad seasons occur frequently all advances cannot be recovered every year and generally the zamindar is forced to take the cattle or some other property of the *hari*, which does not pay half the debt.

60848. On page 223, you refer to the Gaja system. Will you explain what that means?—In Guni taluka there is the Gaja Canal which irrigates a good portion of the taluka. There is a proposal before the Government to dig a new canal called the Mehrani Canal which takes off direct from the river; that proposal is now before Government for sanction. My

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suggestion here is that that project should be sanctioned early so that the cultivation may extend and benefit by the new supply of water.

60849. You make very strong mention, in your statements, of certain agreements which have been made by the Government in the past with regard to the levying of *huccaba*?—Yes.

60850. You feel that that agreement was not carried out and you also use the word "misappropriation"?—Yes.

60851. Is that the general opinion of the zamindars of your district?—
Yes.

60852. You think the Government ought to carry out the contract by clearing the silt?—Yes; I will explain what it means, though I think I have given the explanation already in my answers. Formerly, in Sind, the cost of clearance of canals was considered to be a most important charge; without clearance of canals we cannot get water to the lands we cultivate.

60853. That was so formerly, but is that the opinion of the zamindars at present?—At present everybody is very strong on the point that clearance charges are a first item, and without clearance of canals we cannot advance cultivation. In fact what I say is that, from the extracts from Government records, formerly there was statute labour by which people used to supply labour for clearance. Then, after the conquest Government abolished that forced labour, and instead of that labour they imposed a kind of cess, specially for clearance. Then they merged that cess into the assessment, because the names of more cesses would only frighten the people; that is now being levied. Government used to spend about sixteen per cent. of the assessment upon clearance of canals. Now we find only three or four per cent. is being spent on clearance of canals.

60854. And that is what you call misappropriation?—When a special cess is levied for the purpose of clearance and it is not now spent for that purpose, certainly we say it is misappropriation.

60855. *Mr. Kamat*: Have you seen the actual wording in the Government records and seen whether the undertaking was for silt clearance or for maintenance of the canals as a whole?—It is maintenance of canals, which includes silt clearance.

60856. But all the while you are arguing that the whole of that percentage should be spent on clearance only. That is what Sir Chunilal Mehta pointed out?—Maintenance of canals here in Sind means clearance; clearance is the first charge upon the cost of maintenance.

60857. Maintenance may mean any amount of repairs and other charges?—No, repairs should not mean constructing bungalows, roads and gardens; all the cost is absorbed in those items, whereas the real item of clearing canals has very little spent upon it.

60858. *Mr. Jamshed Mehta*: You are very strongly against modules and you speak of robbing Peter to pay Paul. Modules are supposed to give equal water to the head and to the tail; how do you think it is robbing anybody? You are at both the head and tail, but, apart from that, what do you mean when you say it robs somebody to pay somebody else? We want to understand the situation?—The introduction of modules has resulted in taking off water from the head zamindars and transferring it to the tail zamindars. Formerly, without modules, there is no doubt that the tail zamindars used to get less water than the head zamindars; but by the introduction of modules the position has been reversed; that is to say, the modules are so narrow and designed in such a way that the water that the head zamindars used to get has been transferred from them to the tail portions.

60859. Does not the tail get more?—The tail people are getting more water than the head people.

60860. I can understand that the tail people are getting more water than they got before; but that would mean that some difficulties were removed from which they were suffering before?—But it is at the expense of the head people. Supposing the headman has been made to curtail his cultivation by a hundred acres, no doubt that water has been sent down to the tail, but the head people have suffered.

60861. Would you be in favour of the introduction of modules if an equal distribution system were adopted?—In the first place, I want to place this before the Commission: that equal treatment is not contemplated even according to the terms of the settlements. We have, in Sind, irrigational settlements; that is to say, the assessment is not charged equally to all but according to the extent of the convenience the irrigation supplies. For instance, those that are at the head portion are generally charged four rupees per acre for the same crop for which those at the tail are charged three rupees or two rupees eight annas per acre. When the settlement has differentiated in the rates of settlement between those at the head and those at the tail, there should be no equality of treatment in the distribution of water. Of course, if the settlement were changed and those at the head and those at the tail were charged the same rate of assessment, you might fairly say: "We will distribute water equally to all." The Revenue Officer comes and fixes the settlement rates unequally according to the convenience of the supply of water; that settlement has been guaranteed to run for about ten or twenty years; but before that period expires there comes the Irrigation Officer who says: "I am going to put a module in your *karia* head and diminish your supply and give it to tail zamindar." This is quite unfair.

60862. *The Chairman*: Is there no adjustment from year to year in the assessment?—No, the assessment is fixed for ten or twenty years.

60863. I am aware that that is the period of the settlement, but is no other adjustment possible?—No other adjustment is made at all, and in the meanwhile the *karia* heads are reduced.

60864. Your point is that where modules have been introduced a disparity used to exist in the agricultural advantage of the man at the head of the canal as compared with the man at the tail, and that was reflected in a difference in the assessment: but now, whereas that advantage is removed, the assessment remains, as it was before, weighted against the man at the head of the canal?—Yes.

60865. Is that the point?—Yes; that assessment remains the same but the advantage of the water has been reduced.

60866. Apart from that, does the presence of more water at the tail enable the zamindars at the tail to cultivate more land and to better purpose?—Yes, certainly.

60867. And to that extent they are paying more in terms of assessment, because land is only assessed when the crop is grown; is that so?—Yes.

60868. So that to that extent there is an automatic adjustment?—No, what the head people now complain of is that their area under cultivation is reduced. Formerly they cultivated five hundred acres, whereas now, owing to the introduction of modules, they can only cultivate three hundred acres. The economic position of the zamindars is completely disturbed; they are put in great difficulty. The zamindar has to evict his tenants or send them away because the area has been reduced and the water is transferred to the tail.

60869. If the area cultivated is reduced, the amount which a zamindar pays in terms of land revenue is also reduced, is it not?—Yes, the amount is reduced, but then he is subject to great hardship in that he cannot accommodate those people who live in his village who have been accustomed to live there for centuries: they cannot get the water they got before.

60870. How much substance is there left in your claim that, in terms of assessment, the introduction of a module brings about unfairness, if it is the case that any reduction in the total area of land cultivated on the property of the zamindar at the head is reflected in a reduced assessment?—For the advantage which the tail zamindar also gets he pays three rupees assessment per acre, whereas the headman pays four rupees. He gets the same advantage in water as the headman gets, whereas the headman pays a larger assessment.

60871. *Professor Gangulce*: How do you pay more assessment when your cultivated area has been reduced?—I pay four rupees for rice cultivation per acre while he (the tail man) pays three rupees per acre: it is the disparity in the pitch of the assessment per acre that we complain of.

The Chairman: He is concerned with the pitch of the land revenue.

60872. *Mr. Calvert*: You mentioned the question of mortgage banks. Is there any particular type of mortgage bank you wish to recommend?—No.

60873. Have you thought out the best way in which Government could assist the formation of mortgage banks?—No.

60874. *Sir Chunilal Mehta*: You said that the Agricultural Department has done nothing, and that crops which are not export crops are not being attended to. Is there no work being done on rice?—Yes, some work is being done. I do not say exactly nothing, but nothing substantial has come out of it.

60875. Mr. Thadani, as you know, was specially deputed to study research, and he has been appointed for the last five or six years?—I think he is doing more cotton work than rice work.

60876. Is there any other officer doing work on rice?—In my taluka there is no research station or experimental farm, but then I know of one at Larkana.

60877. Has any attempt been made to reduce smut and damage by stem borer in *juar*?—Not that I know of.

60878. Have any iron ploughs been introduced in Sind?—By iron ploughs, do you mean English-made ploughs?

60879. There are lots of them. The ploughs of Messrs. Kirloskar Brothers, for example?—We are using iron ploughs ourselves.

60880. The Agricultural Department have nothing to do with it?—They are exhibiting many forms of ploughs, but then we have not yet been able to select one that would suit rice land. I think the indigenous ploughs that we are now using are all right; we have made some modifications.

60881. In your note about cattle-breeding, you do not refer to the premium bull system in Sind. Do you know what the premium bull system is?—No.

60882. Do you know that Government are offering premium bulls at half the price *plus* ten rupees a month for maintenance, for the improvement of the breed of cattle?—I would have taken advantage of it, if I had known about it.

You may find it out from the Agricultural Department. That is one of the things which the Agricultural Department are doing.

60883. Are the figures of the total area cultivated, which you give on page 226, accurate?—Yes, they are quite accurate. They are taken from some official reports.

60884. I am told they are not quite accurate?—I know they have been taken from official reports.

60885. Let us turn to page 234. When was the new settlement introduced in the Guni taluka?—In 1913-14. It was due for re-settlement in 1923-24, but the old rates continue.

60886. Therefore, it is long ago?—Yes.

60887. If you look at the figures that you have quoted in column 2, "collection of land revenue", the collection of land revenue has increased of course. That has also been accompanied by a great increase in the area cultivated?—Yes, but these figures indicate up to 1921-22, whereas the other figures, on page 226, go up to 1922-23.

60888. That scarcely matters. But you see there is an increase in the collection, and that must be accompanied by an increase in the area cultivated?—Yes.

60889. Take the years from 1905-06, or even further back, 1901-02?—There has been a steady increase in the collection of land revenue.

60890. Which necessarily means also an increase in the area cultivated, not exactly to the same extent, but in some proportion?—I could tell you where we have drawn these figures from.

60891. You suggest that without silt clearance cultivation cannot be advanced?—Yes.

60892. Then how do you explain this increase in cultivation?—On the contrary, I have shown that the cultivation has been decreasing, according to my statement on page 226.

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60893. There you are comparing 1917-18 with 1922-23. We will not take that; there may be special reasons such as failure of the river in particular years. Let us take a long period for an average. How do you explain the increase in the area cultivated if silt clearance is not being attended to? If you get less water you get less area cultivated? Will that be the case?—It is not quite that way. Cultivation may go on, not without water, but on less water; all the same, it can go on. The only difference will be in the outturn. If a crop gets less water, it will make a difference in the outturn. All the people do not lessen their area of cultivation. In Sind, one does not know what kind of inundation there is going to be. One always prepares as large an area as one can for the next crop, and trusts to fortune whether one is going to get water for it or not. Therefore, because there is less silt clearance people will not lessen their area of cultivation; they will depend upon chance. Perhaps the inundation may be more favourable than in other years and they will go on cultivating as much as they can.

60894. But they pay assessment only on the area cultivated?—They pay assessment on the area they cultivate.

60895. The amount of assessment has gone up in the statement that you have given?—Yes.

60896. Therefore, the area must have increased, not decreased. You also compare that with the figures given in column 3, and you say that the amount spent on silt clearance is considerably less and it is steadily decreasing. Now take the figures for five years from 1900-01. The amounts spent are Rs. 30,000, Rs. 23,000, Rs. 36,000, and so on. For every rupee of that amount, you could in those days do probably two to three times as much as you can do to-day. Is not that the case?—Yes.

And yet the area under cultivation has increased. The amount spent has been reduced by one-third according to the statement; the work turned out by the money now spent has also been reduced by another half or one-third, and the area under cultivation has increased. You might think over those figures.

60897. On page 225 of your note, you are quoting Colonel Lambert, and the words he used are "a fixed proportion of the income for expenditure on canals". He does not specifically restrict it to silt clearance. A little further down on the same page, the quotation from Colonel Haig specifically mentions "expenditure on clearing and maintenance"?—Yes, but maintenance does not mean, I suppose, building of bungalows and other things.

60898. Certainly not. I want you to give me facts about these bungalows; we can stop them. What area are you referring to when you speak of bungalows. Can you give me instances? I will look into it?—Generally we find that money is now diverted to the non-essential factors of expenditure. For instance, building of bungalows for the residence of engineers, and gardens and wells attached to them, and such other items; whereas the cost of clearance is being diminished from year to year. That gives us the impression that what we require is not being attended to, whereas what the officers require for their own comfort is being provided.

60899. There is a distinction, therefore, between clearance and maintenance. You have given us figures about clearance; can you give us any idea as to what is being spent on maintenance?—I have got no figures. I would rather suggest that you may kindly obtain these figures.

60900. Will you be surprised to hear that on several canals we spend as much as we receive in assessment? Have you ever come across any such case?—No, I have not.

60901. Do you know how much of that has been spent on bungalows? Will you be good enough to give us some statement as to the amount spent on clearance as well as on maintenance, and the amount spent on bungalows? Do you suggest that bungalows are being built every year?—I think some provision is always being made for bungalows.

60902. Would it not be desirable to find out what is the proportion spent on bungalows?—I have not got the figures.

(The witness withdrew.)

Mr. J. W. N. Cumming, retired Extra Assistant Commissioner in Baluchistan, was next examined, for whose evidence, see Volume I, Part III. The Commission then adjourned till 10 a.m. on Wednesday, the 2nd November 1927, at Rangoon.

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Non-agriculturists, tendency for land to pass into hands of, *Dow*, 59027; no classification of agricultural and non-agricultural tribes; will have to be made, but not necessarily the same classification as in the Punjab, *Dow*, 59045-9.

Poverty of cultivators due to lack of water and burdens on land, *Bhutto*, 59154-5, 59289.

Protective measures: apt to shake cultivator's credit and should be avoided, *Shahani* (202) 60564-5.

AGRICULTURAL INDEBTEDNESS—contd.

PUNJAB LAND ALIENATION ACT :

- a Bad measure ; will divide Hindus and Mahomedans and will kill the small holder, *Shahani*, 60704-7.
- necessary, *Hussain* (131).
- will prevent Sellers obtaining market price for land and will cause land to accumulate in a few hands, *Shahani*, 60712-20.

REPAYMENT PREVENTED BY :

- Crop failures, *Azimkhan* (104-5), *Rahman* (143). Pests, *Rahman* (143). Bad Seasons, *Hussain* (130). Inadequate yield, *Shahani* (202).
- social Customs, *Dow* (37).
- Dishonesty, *Shahani* (202).
- Ignorance, *Dow* (37).
- Interest, high, *Hussain* (130).
- Inundation, capriciousness of, *Dow* (37), *Rahman* (143).
- Marketing, inability to hold up produce for better prices, *Azimkhan* (104-5).
- Method, lack of, in liquidating debts, *Hussain* (130).
- Moneylenders, dishonesty and extortion of, *Rahman* (143), *Hussain* (130).
- Mortgage of produce, *Rahman* (143).
- Poverty, *Dow* (37).
- Priestcraft, *Dow* (37).
- Prosperity, *Dow* (37).
- Restriction or control of credit of agriculturists only temporary remedies, *Bhutto* (68) ; inadvisable, *Shahani* (202) 60566-70.
- Restricting tenure legislation : has reduced credit of agriculturists, *Shahani*, 60567.

SOURCES OF CREDIT :

- Character, *Dow* (37).
- Co-operative societies, *Azimkhan* (104), *Rahman* (143), *Shahani* (202).
- Forward sales, *Azimkhan* (104).
- Government, *Shahani* (202).
- Land, *Dow* (37).
- Moneylenders, *Azimkhan* (104), *Hussain* (130), *Rahman* (143), *Shahani* (202).
- Taccavi, *Azimkhan* (104), *Rahman* (143).
- Zamindars, *Shahani* (202).
- Usurious Loans Act : danger of shaking cultivator's credit, *Shahani* (202) 60567 ; should be made applicable throughout India, *Hussain* (131) 59867-9.

AGRICULTURAL INDUSTRIES :

- Basket-making : recommended, *Shahani* (205).
- Bee-keeping : climatic conditions do not favour, *Rahman* (147) ; unknown, *Hussain* (132).
- Cattle-breeding restricted owing to lack of pasture lands, *Azimkhan* (105). (See under ANIMAL HUSBANDRY.)
- Cotton-ginning : recommended, *Shahani* (205).
- Dairy farming : popular with cultivator ; modern methods and transport necessary, *Azimkhan* (105).
- Employment, rural, might be increased by stimulating subsidiary industries, *Hussain* (132).
- Fruit-growing :
 - Impossible for lack of irrigation during 8 months, *Hussain* (132).
 - Prevented by cultivator having no permanent interest in the holding and unfavourable conditions of water supply, *Rahman* (147).
- Fruit and vegetable gardens introduced in Jamrao area, *Dow* (36).
- Ghi-making :
 - Advocated, and profit, *Shahani*, 60584-9, 60675.
 - Government aid advocated, *Shahani* (205), 60676-7.
- Implements, manufacture of locally, should be encouraged, *Musto* (91-2), *Karachi Indian Merchants' Association* (184).
- Indebtedness might be relieved by, *Karachi Indian Merchants' Association* (183).

INDUSTRIAL CONCERNS MOVING INTO RURAL AREAS :

- Effect doubtful owing to small number, *Hussain* (132).
- Flour mills, Ginning factories and Rice hulling mills suggested, *Rahman* (147).
- Government action desirable, *Azimkhan* (105-6).
- Require full-time labour, *Musto* (92).

AGRICULTURAL INDUSTRIES—contd.

LAC CULTURE :

- Possible to a limited extent, *Hussain* (132).
 some Scope for ; practised wherever necessary material is available, *Rahman* (147).
 Trees : babul and ber, *Aitchison*, 60343.
 Leather goods, manufacture of, *Karachi Indian Merchants' Association* (184).
 Leisure period from cultivation, available for : *Azimkhan* : (105), *Hussain* : (132),
Musto : (92), *Rahman* : 60121-8, *Shahani* : (205).
 Matches, manufacture of : possibility of ; a small factory exists, *Aitchison*, 60310-1.

OBSTACLES :

- Agriculture occupies whole time, *Bhutto* (72).
 Agricultural labour has been drawn to neighbouring factories and mills, *Bhutto*, 59279-80.
 Apathy, *Azimkhan* (105).
 Capital, Education and Initiative, lack of, *Shahani* (205), *Hussain* (132).
 Objection to work other than agricultural, *Azimkhan* (105).
 Transport, lack of, *Shahani* (205).
 Oilseed crushing recommended, *Karachi Indian Merchants' Association* (184), *Shahani* (205) 60675.
 Paper manufacture from rice straw in Lower Sind, a very useful supplementary industry, *Shewakram* (232).
 Pisciculture : no scope for, as large quantity of fish available naturally, *Rahman* (147), *Hussain* (132).

POULTRY REARING :

- Government might encourage, ; done spasmodically at present but not scientifically ; might be successful, *Hussain* (132).
 done on a limited scale, *Rahman* (147).
 Popular with cultivator, modern methods necessary, *Azimkhan* (105).
 Recommended, *Shahani* (205).
 Transport necessary, *Azimkhan* (105).
 Preparation of agricultural produce for market, industries connected with : should be encouraged by Government grants-in-aid, *Bhutto* (72), *Hussain* (132).
 Private enterprise should develop, *Musto* (92).
 Rice-hulling : recommended, *Shahani* (205).

ROPE-MAKING :

- to some extent done, *Hussain* (132). Practised wherever necessary material is available, *Rahman* (147). Recommended, *Shahani* (205).
 Scope for : not much, because haris do not lack employment, *Rahman*, 60125.

SERICULTURE :

- Climatic conditions do not favour, *Rahman* (147); Impossible owing to climate, *Hussain* (132) ; Profitable at Bangalore, *Shahani* (204) ;
 Spinning, recommended, *Bhutto* (72) ; *Shahani* (205) ; will not pay, but cultivator will produce sufficient cloth for himself, *Bhutto*, £9149.

STUDY, INTENSIVE, OF EACH RURAL INDUSTRY :

- Advocated, *Karachi Indian Merchants' Association* (184) ; Permanent board recommended, *Karachi Indian Merchants' Association* (184). *Hussain* (132). *Azimkhan* (106).
 by practical Experts, necessary, *Musto* (92).
 Subsidiary industries failing in competition with imported goods, *Bhutto* (72).
 Sugar-making : recommended, *Shahani* (205), 60675.
 Toys, wooden, *Karachi Indian Merchants' Association* (184).
 Vegetable gardens introduced in Jamrao area, *Dow* (36).

WEAVING :

- Cultivation should not be neglected for, *Shahani*, 60675. Government classes suggested, *Hussain* (132). Prejudice against, *Rahman*, 60127. Recommended, *Karachi Indian Merchants' Association* (183-4), *Shahani* (205), might be Successful, *Hussain* (132).

AGRICULTURAL LABOUR : (*See also Labour under LLOYD BARRAGE and Haris under LAND TENURE.*)

ATTRACTING LABOUR :

- under Barrage grants of land should be made, *Rahman* (147-8).
- Batal, liberal terms should be given, *Azimkhan* (106).
- Grants of land suggested, *Bhutto* (72).
- Haris, fair treatment of, recommended, *Azimkhan* (106).
- no Measures necessary, *Dow* (38).
- Small holdings for labourers recommended, *Azimkhan* (106).
- Cheap labour an obstacle in adoption of heavy machinery and labour-saving appliances, *Rahman* (146).

CULTIVATION AND DEVELOPMENT OF AREAS NOT AT PRESENT UNDER CULTIVATION :

- Necessity of measures in newly opened areas under the Barrage doubtful ; free Water should be given for two years if necessary, *Musto* (92-3).
- Hari has no permanent interest in the land and therefore gravitates to where labour is wanted, *Dow* (38). (*See Haris under LAND TENURE.*)
- Improved methods of cultivation would lead to demand for about four times as much labour, *Bhutto* (65).
- Lloyd Barrage : population will be sufficient to cultivate new lands, because : conversion of lift into flow will release cultivators, decrease of idleness, improved methods of organisation, increase of population, *Dow* (39).
- Migration : might be encouraged by free excursions, facilities for purchasing land, *Musto* (92).
- Migration into Sind from dry tracts such as Cutch, Marwar and Baluchistan : when rains are good in these dry tracts, there is shortage of labour in Sind, *Azimkhan* (106).

POPULATION :

- Sparse, while area of arable soil is very vast, *Azimkhan* (106), *Rahman* (147).
- Sufficient for present needs of cultivation ; no surplus, *Rahman* (148).

Shortage :

- Caused by :
 - Agriculture being unprofitable, *Bhutto* (72) 59294 ; Idling, *Khoso*, 60207-9, 60248 ;
 - Irrigation facilities, increase of, *Azimkhan* (106) ;
 - Expected when Barrage is completed, *Rahman*, 60129-30.
 - Improved crops, cultivation of, prevented by, *Bhutto* (70).
 - in Jacobabad District, *Khoso*, 60207-8.
 - Labour-saving implements will be necessary, *Rahman*, 60129-30.
 - None in Sind except in rice-transplanting and reaping seasons, *Musto* (92).
 - Supplied normally by immigration from Baluchistan, etc., which should be encouraged, *Azimkhan* (106).

AITCHISON, P. E., Conservator of Forests, Sind Circle (175-80).

ADMINISTRATION :

- Forests : should not be managed by local boards, 60335-7.

AGRICULTURAL INDUSTRIES :

- Lac trees : babul and ber, 60343.
- Matches, manufacture of : possibility of ; a small factory exists, 60316-1.

DEMONSTRATION AND PROPAGANDA :

- Forestry methods on the Fuleli (176), 60321-7.

FERTILISERS :

- Cowdung, use of, as fuel : not practised in forest areas ; huris (*which see under FORESTS*) should be encouraged, 60314-20.

AITCHISON, P.E.—contd.**FORESTS: (See also under LLOYD BARRAGE.)**

Afforestation : a sound commercial proposition (176).

Agricultural purposes : fullest use being made for (175).

Babul :

grown on the Best lands, 60298; in 7 years grows to a Diameter of about 6 ins., 60290; Easily grown (175); is very susceptible to Frost, 60305; on Huris, the only tree sown, 60304; is a Lac tree, 60343; will be grown under Lloyd Barrage, 60285.

Bahan tree : timber used to manufacturing matches; difficult to grow artificially in river flooded areas because the seed is so light, 60310-1.

Cultivation by local cultivators after felling before being sown with *babul* (175).

Department: income and work, 60331-2.

Deterioration : due to lopping for fodder for camels and goats, stopped by restrictions (176).

Firewood :

Lloyd Barrage : will be adequate for increased population in main Valley of the Indus, but doubtful as to Eastern Nara, 60295, 60314-20.

Supply in rural areas generally adequate (175).

Grazing :

by Camels and goats, in young babul plantations, disastrous; can only be permitted in mature forests or scrub jungle and not in large numbers (175); allowed in 250 square miles, 60303; when Lloyd Barrage is working area will be reduced (175); complaints as to restrictions, 60280.

by Cattle does comparatively little harm while in many places it is good for forests; facilities granted freely (175); in 800 square miles, 60302; season begins after floods subside; most grazing April and May, 60297-9.

Fees : scale of, 60300, 60328-30.

Huris (privately owned woods) :

Area about 20 to 30 square miles and is thought to be increasing; a great Asset to owners, should be encouraged by low assessment, grown on Fallow lands, fenced and rigidly protected, are very well Managed, owners copying methods of Government forests, give a good cash return to owners, Rs. 6 to Rs. 7 per acre per annum, Rotation of 7 years (175-6), 60314-27.

Babul (175) the only tree grown, 60304; grows very fast to a diameter of 6 ins. in 7 years; felled and sown with cotton and other field crops, 60290-2.

Timber mostly sold, 60288-9.

Kandi : like babul a thorny tree : will be grown under Lloyd Barrage, 60285-7. Khathar and Khatro forests on the Fuleli :

Afforested during the past 15 years, Assured supply of water which can be regulated, used for Demonstration, excellent Development and financial returns, (176).

Lao trees : Mulberry : grows in the Punjab and can probably be grown in Upper Sind, babul and ber, 60342-3.

Local Boards : should not manage forest, 60335-7.

Tali : a kind of Blackwood, a plantation financially very Successful; Rs. 100 for a mature tree, 60338-41, a Timber tree, 60285.

IMPLEMENTS : .

Forests : utilisation of labour saving implements unsuccessfully attempted, 60333-4.

LLOYD BARRAGE :

Forests :

Area : 70,000 acres set aside for, in blocks of varying sizes on old forests which under irrigation will grow excellent timber : babul, kandi and tali, 60281-7.

Experiments being made near Sukkur, 60308.

Huris (g. v.) will be irrigated at lower rates; very little water required except to start, 60293-4, 60305-7.

Grazing area for camels and goats will be diminished by (175).

SOILS :

Erosion :

Indus floods cannot be Stemmed by afforestation, owing to force of river and friable soil (175);

can not be Prevented by afforestation anywhere in Sind, 60296.

ALKALI LAND : see under SOILS and LLOYD BARRAGE.

ANIMAL HUSBANDRY :

Berseem, should be largely introduced, *Shahani* (204).

BHAGNARI CATTLE :

Bred in the north of Sind, should have Central breeding farm at Jacobabad, purely Draught, *Rahman* (146); bred for Military transport, not suitable for agricultural purposes, *Rahman*, 60010.

BULLS :

Ignorance of Government premium bull system, *Shewakram*, 60881-2.
should be Issued gratis from Government cattle stations to important villages, *Rahman* (147); and to zamindars, *Shewakram* (231).
Larkhana cattle a bit weak; bulls supplied by local board, Government paying half the cost, *Bhutto*, 59206-11.
Nadi breed; registers kept; *Bhutto*, 59206-11.

CASTRATION :

Increase in, by Burdizzo method, *Jerrom*, 59309.
not Successful over two years old, *Jerrom*, 59349-52.
Unknown; must be developed, *Rahman* (146) 60019-21.

CATTLE-BREEDING :

Agricultural Department in charge of, *Jerrom*, 59306.
Bhagnari and Cutchi cattle successfully imported to improve breed, *Khoso*, 60198-9.
stud Bulls in Government institutions, free access to, *Rahman*, 60064.
Central station for each breed essential, *Rahman* (146).
Export demand, *Rahman*, 60059-60.
Immediate attention needed as cattle are the only motive power, *Rahman* (146).
Lack of knowledge of principles of, among ordinary breeders, *Rahman*, 60063.
does not Pay except near towns where milk can be sold, *Rahman*, 60058-61.
Profitable, *Jerrom*, 59316-9.
Quality: in interior of Sind cattle all nondescript and poor, *Rahman* (146) 60006-7.
Restricted by lack of pasture lands, *Azimkhan* (105).
no Special arrangements made for, *Shahani*, 60611-4.
System unsatisfactory, *Rahman* (146).
Co-operative movement is not interested in, *Azimkhan*, 59529-32.
Dairies, private, should be encouraged by subsidies, grants of land, etc., to qualified men, *Shewakram* (231).
Dairy industry: unknown in Sind, *Bhutto* (71); Ruk dairy unprofitable and abandoned, *Bhutto* (71).
Dual purpose cattle, advocated, *Rahman*, 60166-7.

FODDER :

Abundant Supply from rice cultivation, *Bhutto* (70).
Bajri grown, *Rahman*, 60171.
Berseem: has been tried, *Rahman* (145); no prospects for until cold weather water supply; would solve fodder supply to a great extent, *Rahman*, 60056-7.
Cost of growing natural grass with canal water, *Dow*, 58946.
Dry, is sold; cattle are fed during the busy season and starved during the remainder of the year, *Rahman* (147).
Green, insufficient during hot weather, *Rahman* (146); shortage seriously affects milk supply from December to July, *Rahman* (147).
Juari should be grown for fodder, *Shahani*, 60588-9.
Scarcity:
Greatest between October and July, *Shahani* (204), in Lower Sind, greatest in May and June; green fodder available from August, *Shewakram* (232).
Storage: not necessary, *Rahman*, 60131-2; not stored in silos but in heaps, *Rahman*, 60172-3.

GRAZING :

"Huri" grants should be made by Government for growing babul trees and natural grasses, to be managed by the villagers co-operatively, *Rahman*, (147).
Insufficient owing to non-cultivation and inadequate irrigation facilities, *Rahman* (146).
Insufficient grounds, *Azimkhan* (105).

ANIMAL HUSBANDRY—contd.**KARACHI OR RED-SINDHI CATTLE :**

- Export, large, to Java, Formosa and Ceylon, for milking, *Jerrom*, 59316-22.
- Indian, pure, no non-Indian blood, *Jerrom*, 59308.
- thrive in Japan, etc., *Rahman*, 60168-70.
- Milch, purely, *Jerrom*, 59307.
- Purity : the only definitely pure type, *Rahman*, 60015-7.
- Quality : recognised as the best milk-producing cow in India, *Rahman*, (146).
- Lift irrigation by pumping would release cattle for field work, *Dow* (38).

PASTURES, common, in villages :

- Disappearing owing to encroachments for cultivation ; should be restored, *Shahani* (204).
- Equilibrium between cultivator and pasture has been lost, *Shahani*, 60584-9.
- would encourage Ghee making, *Shahani*, 60584.
- Scarcity of, owing to lack of water and greed of zamindars who utilise all available land for cultivation, *Shewakram* (231).
- Shows, cattle, should be held in each taluka, *Rahman* (147).

THAR PARKAR OR DHATTI CATTLE :

- Dual purpose, *Rahman* (146).
- not Pure bred, all mixed, *Rahman*, 60017-8, 60174-5.
- breeding Station to supply draught advocated, *Rahman* (146), 60174-5.

ARBITRATION of disputes :

- Advocated, *Karachi Indian Merchants' Association* (183), 60478-85.
- through Panchayats and communities, advocated, *Shahani* (203).

AZIMKHAN, KHAN BAHADUR INAYATALIKHAN, Assistant Registrar, Co-operative Societies in Sind (103-28) Experience, 59485-92 ; 59765-9.**AGRICULTURAL DEPARTMENT : Co-ordination with Co-operative Department.**

- Assistant Registrar of Co-operative societies acting as Agricultural Propaganda Officer 59604-13.
- Already closely linked, 59513-4.
- Co-operative Department should not be in charge of agricultural Propaganda, 59656-7, 59756-9.
- Has been successful in improving state of cultivators (103).

AGRICULTURAL INDEBTEDNESS :

- Causes of borrowing : inherited debts, illiteracy and want of business capacity, heavy interest, ceremonial expenses, inadequacy of water supply (104).
- Deccan Agriculturists' Relief Act and Encumbered Estates Act :
 - Applicable to Sind, except a few sections ; often used ; effects good, 59628-45, 59654-5.
 - Credit of cultivators decreased by (105).
 - not applicable to Haris, who have no land, 59761-4.
 - Interest : rates charged by sowcars 59810-5.
- Land Alienation Act, necessary (105), 59589-93 ; cultivators can borrow from co-operative societies, 59637-45.
- Measures for lightening agriculture's burden of debt : co-operative credit societies and land mortgage banks, purchase and sale societies, subsidiary industries (105).
- Mortgages, non-terminable, should be stopped (105).
- Repayment prevented by : crop failure and inability to hold up produce for better prices (104-5).
- Sources of credit : sowcars, co-operative societies, taccavi, forward sales (104).
- Sowcar gives mortgage loans in kind ; only gives cash loans on a sale of land 59587-93.

AGRICULTURAL INDUSTRIES :

- Cattle-breeding restricted owing to lack of pasture lands (105).
- Dair, farming : popular with cultivator ; modern methods and transport necessary (105).
- Health lectures should be given in villages to induce cultivators to devote their spare time to improving health conditions (106).

AZIMKHAN, K. B. INAYATALIKHAN—contd.

AGRICULTURAL INDUSTRIES—contd.

Industrial concerns, establishment in rural areas advocated; Government action desirable (105-6).
 Leisure period: April to December work on the fields; during the slack season dry ploughing, marketing, clearing water courses, collecting manure, rearing cattle; most cultivators remain idle during slack season (105).
 Obstacle: objection to work other than agricultural, and apathy (105).
 Poultry keeping: popular with cultivator; modern methods and transport necessary (105).
 Study, intensive, of rural industries worth trying (106).

AGRICULTURAL LABOUR:

Attraction of labour: should be by giving liberal terms of batai; fair treatment of haris; village sites, water and small holdings for labourers (106).
 Migration into Sind from dry tracts such as Cutch, Marwar and Baluchistan: when rains are good in these dry tracts, there is shortage of labour in Sind (106).
 Population, sparse, while area of arable soil is very vast (106).
 Shortage supplied normally by immigration from Baluchistan, etc., which should be encouraged (106); shortage caused by increased irrigation facilities (106).

ANIMAL HUSBANDRY:

Cattle-breeding restricted by lack of pasture lands (105).
 Grazing: insufficient grounds (105).

CO-OPERATION:

Agricultural Department, co-ordination with: *see* Co-operative Department under AGRICULTURAL DEPARTMENT.
 Animal husbandry, co-operative societies do not take an interest in, 59529-32.
 Audit: satisfactory; on every society every year by the Government auditor; takes two or three days, 59508-10.
 Central Banks:
 Deposits derived from local sources, 59736.
 Directors of, 59724.
 appoint Inspectors of primary societies, 59781-3.
 Progress of, 59506-7.
 Voting by societies and individual members, 59725-35, 59790-3.
 Central Co-operative Institute, Bombay, and branches: best non-official bodies for propaganda and development; Government might subsidise (108) 59542.
 Credit societies:
 the Best means of financing cultivators and should be developed (104). (*See under* Progress).
 Debt redemption loans generally for 5 years, secured on land mortgage, 59544-8;
 Interest of moneylenders being lowered by influence of co-operative movement, 59549.
 Loans for land improvement, seeds, manure and current needs; managing committee exercises great care to see that loans for land improvement are spent for that purpose, 59577-85, 59784-6.
 Maximum loan ordinarily Rs. 500, but up to Rs. 1,000 on the sanction of the Registrar, 59586.
 Moneylenders: members of societies more than 3 years old do not borrow from (108), 59543.
 Repayments regular: re-issue of loan after some time, not on the same day, 59553-4.
 Development: should come from the people, not from Government (107).
 Education:
 Co-operative Institute for Sind with headquarters at Hyderabad, 59500-505.
 Facilities: education by annual conferences, training classes for committee members, secretaries and honorary organisers, 59498-500.
 Illiteracy prevents spread of co-operation, 59550.
 Managing committee classes, 59770-5, 59787-9.
 Floods, recent:
 societies Distributed 2 lakhs in loans, 59602-3.
 Government should make advances at 5 per cent, 59698-9.

AZIMKHAN, K. B. INAYATALIKHAN—contd.**Co-OPERATION—contd.**

Floods, recent :—*contd.*

Housing societies being formed, 59602-3.

Fuel, wood, not grown co-operatively, 59528.

Haris :

Enlisted in societies (108).

when obtaining Loans must give credit of a landholder (108), 59573-5, 59599-601.

are Members of seed supply societies, 59824-5.

impossible to form Special societies for haris to make them independent of zamindars, 59674-83, 59692-4, 59743-6.

no Statistics as to proportion of membership, 59674-7.

Housing Societies :

Bombay Government make advances at 5 per cent, 59698-9.

being Organised in connection with recent floods, 59603.

Illiteracy prevents spread of, 59550.

Liquidation :

Extent of, and when action taken 59493-6.

Organisers, honorary, sometimes employed as liquidators, but not in their own locality, and generally liquidation is done by paid Government officials, 59716-23.

Registrar orders liquidation, after enquiry, on report of auditors, inspecting officials or honorary organisers, 59711-5.

Management :

Central Banks appoint inspectors of primary societies, 59781-3.

Managing Committee : Secretaries generally agriculturists ; have sufficient education, 59558-62.

Meetings : annual conferences in every district and central conferences in the vernacular, 59497-605.

Non-credit societies : require business capacity ; special propaganda officers necessary (107), 59511, 59537, 59653.

Organisation : enquiry held before formation of primary society, 59572.

Organisers, honorary : necessary (107) ; about 16 district honorary organisers ; doing good work ; movement mainly guided by non-officials, 59537-42, 59776-80.

Managing Committee and Secretary, 59558-62 ; honorary organisers unpaid but get travelling allowance ; are trained agriculturists and Chairmen and Secretaries of societies ; supervising work of primary societies ; recommend liquidation ; enquiry held ; sometimes act as liquidators, but not in their own locality, 59702-23.

Progress :

more valuable Crops cultivated and greater yield, crops held up for better prices. 59800-1.

Members learning thrift and investing more than they are bound to invest, 59576, fairly Satisfactory ; in 1918 only 63 simple credit societies, membership of nearly 3,000 and working capital 1½ lakhs ; 1927, over 900 societies, membership nearly 40,000, working capital nearly 1½ crores (108), 59737-42 ; about 800 agricultural credit societies, 59816-8.

Purchase societies :

Area of operations should be widened (108).

Seed should be purchased from Government Stores Department, 59695-7, 59820-5.

should be Supplied from large central agency with Government assistance of finance and technical advice (108).

Sale societies :

Cotton, none started yet, 59535-6 ; not necessary to start ginning factories first or to make crop advances, 59684-7.

Difficulties : merchants contracting forward sales, transport, co-operative societies cannot quote forward prices (109).

Government assistance should be given (109).

Loans should be made to cultivators on crops while waiting for better prices (108-9).

Management, investigation as to, 59537.

need of Marketing credit to enable cultivators to wait for better prices, 59525-7.

Necessity of, in view of trickery of middlemen (108).

Progress of, 59511-2.

Staff of, 59537, 59702. (See "Organisers, honorary", above.)

Supervising unions :

Non-official bodies which play an important part (108).

do Propaganda work, 59523.

have not such a wide field as Taluka development associations, 59802-3.

AZIMKHAN, K. B. INAYATALIKHAN—contd.

Co-OPERATION—contd.

Sweepers :—contd.

societies started in Karachi, 59810-5.
no societies for in the Villages, 59747.

Taluka Development Associations : *see under* that heading.

Zamindari banks :

Finance : limited liability ; nearly 1 lakh of rupees shares in each bank ; Rs. 50 per share ; deposits, and loans from Sind Central Bank, 59749-54.

Larkana Bank serves the whole district, 59748.

Loans made on mortgage of land ; $7\frac{1}{2}$ per cent. in arrears ; share system popular, 59749-60, (108), 59574, 59663-5.

Progress : being organised (104) ; 3 have been established and are working satisfactorily (108).

Thar Parkar Bank serves only two divisions, 59748.

CROPS AND CROP PROTECTION :

Seeds :

Cotton : 27 W. N. and Bhitshah, Wheat : Pusa 12 greatly appreciated (103).
Government Stores Department, should supply, 59695-7.

DEMONSTRATION AND PROPAGANDA :

Co-ordination of Agricultural and Co-operative Departments has been beneficial (103).
on Cultivators' own fields by organised bodies of zamindars and cultivators, *e.g.*,
taluka development associations (*q. v.*) ; comparative plots (103), 59624-7 ; more
successful than leaflets, pamphlets, etc. (103-4).

Improvements, list of, (103).

FINANCE :

Land mortgage banks :

Objects : for loan redemption and to finance big schemes of land improvement (104).
should be Organised, with power to issue debentures (104).
should not Wait to see whether experiments in other parts of the Presidency are
successful, 59666-8.

TACCAVI :

Administration : should only be given for land improvement schemes through
co-operative societies where such exist (104).

Defects : at present amounts inadequate and not given at proper time of the year,
59669-73.

HARIS :

in view of Labour scarcity, should be treated humanely and equitably in order to
attract labour from surrounding areas (106).

Relationship with zamindars, 59594-8, 59674-83.

Scarcity of : 59679-80.

IMPLEMENTS :

Ploughs :

Egyptian replacing Sindhi ; is as simple as Sindhi plough and can be manufactured locally, but its work is far superior, especially in soft soil (103).

Meston : iron plough as cheap as Egyptian and fit for hard soil (103).

Types : Egyptian, Meston, Rajah, Chatanuga, Monsoon, found useful (103).

IRRIGATION :

Screw water lift, found useful (103).

MARKETING : (*See also* Sale Societies *under* Co-OPERATION).

Cotton :

Conditions unsatisfactory (106).

not Graded (107).

Information : daily market quotations, etc., should be made available to cultivators
by Government (107).

no regular Markets (107).

Method of (107) Middlemen : number excessive (107).

Premium seldom paid to cultivators for improved quality (108).

Sowcar, cultivator at the mercy of, (107).

Credit, need of, to enable cultivators to wait for better prices, 59525-7.

AZIMKHAN, K. B. INAYATALIKHAN—concl'd.**MARKETING—concl'd.**

Facilities : defective, (106-7).

Legislation : Marketing Bill should be enacted (107), (109), 59598.

STATISTICS :

Haris : statistics as to proportion of membership of co-operative societies desirable, 59674-7.

TALUKA DEVELOPMENT ASSOCIATIONS :

Activities of, (103-4) 59515-21, 59819.

Animal husbandry : do not take part in, 59529-32, 59804.

Co-operation : play an important part in developing (108) ; are registered as non-credit co-operative societies, 59515-20, 59524, 59563.

Controlled by executive committee (103).

Effect of, 59569.

Finance and members' subscription,

59522-7, 59569-71, 59646-52.

Management : membership (103), 59564-8, 59566.

Programme of work framed with advice of Agricultural Department (103).

Progress : founded about four years ago, 59533-4.

Propaganda, best media for (103-4), 59523.

one Sufficient for each taluka, 59614-23, 59802-9.

WELFARE OF RURAL POPULATION :

Co-operative societies, where they exist, have effected a distinct improvement in life of agriculturists (108).

Propaganda necessary : lectures on sanitation, use of quinine, breeding of mosquitoes, purification of wells, refuse disposal (106).

Quinine :

Propaganda as to use of necessary (106).

Taluka development associations distribute free, 59521.

Refuse disposal : propaganda necessary (106).

Village sanitation committees will spring up as the result of sanitation propaganda (106).

Wells, purification of : propaganda necessary (106).

BATAI, see under LAND TENURE.

BABUL, see under FORESTS.

BANKS, see under CO-OPERATION and FINANCE.

BERSEEM, see under FODDER under ANIMAL HUSBANDRY.

BHUTTO, KHAN BAHADUR SHAH NAWAZ KHAN, C.I.E., O.B.E., Chairman of Larkana District Co-operative Bank (65-84). Holds about 10,000 acres cultivated by tenants on batai system 59133-7

ADMINISTRATION :

Centralisation always to be deprecated (67).

District local boards should undertake rural education (66), and welfare of rural population (73).

Meteorological Department : useless to agriculturists (67) ; information as to rainfall in Punjab and Himalayas should be published in local vernacular newspaper, 59212-5, 59302.

Posts and Telegraphs : satisfactory (67).

Roads : Serious consequences of lack of (67) ; Government, not district local boards, to blame ; tolls have been introduced and an additional road cess should be imposed 59264-7.

Sind should have separate Government (67) 59297.

AGRICULTURAL DEPARTMENT :

Funds, lack of, prevent thorough efficiency (67).

AGRICULTURAL INDEBTEDNESS :

Cause of borrowing : unprofitableness of agriculture (67).

BHUTTO, K.B. SHAH NAWAZ KHAN—contd.

AGRICULTURAL INDEBTEDNESS—contd.

Measures to lighten agriculture's burden of debt : to make agriculture more profitable (67), (68).
Poverty of cultivators due to lack of water and burdens on land : 59154-5, 59289.
Restriction or control of credit of agriculturists only temporary remedies (68).

AGRICULTURAL INDUSTRIES :

Leisure period : cultivator toils throughout the year (71-2); on one-crop land he plies bullock carts for hire or clears kariyas for three or four months (76).
Obstacles : agriculture occupies whole time of males and females (72); agricultural labour has been drawn to neighbouring factories and mills, 59279-80.
Preparation of agricultural produce for market, industries connected with : should be encouraged by Government grants-in-aid (72).
Spinning, hand : should be encouraged (72); will not pay but cultivator will produce sufficient cloth for himself, 59149.
Subsidiary industries failing in competition with imported goods (72).

AGRICULTURAL LABOUR :

Attracting labour : by grants of land (72).
Improved methods of cultivation would lead to greatly increased demand for, (65).
Scarcity of labour : is caused by unprofitableness of agriculture (72), 59294; and prevents cultivation of improved crops (70).

ANIMAL HUSBANDRY :

Bulls : Larkana cattle a bit weak; bulls supplied by local board, Government paying half the cost; Nadi breed; registers kept, 59206-11.
Dairy industry : unknown in Sind; Ruk dairy unprofitable and abandoned (71).
Fodder :
 Shortage does not normally exist, owing to Indus, except in Thar Parkar, (71), 59293.
 abundant Supply from rice cultivation (70).
Local Government should undertake improvement (71).

BATAI SYSTEM : see under LAND TENURE.

CAPITAL, ATTRACTING OF, TO AGRICULTURE :

Profits of agriculture must be increased by decreasing burden of assessment and by providing flow irrigation (73).

CO-OPERATION :

Credit societies : most are sound; directors of local banks decide whether loans are to be granted, 59168-81.
Government should purchase grass for Military Department through co-operative societies, 59288.
Interest :
 Government funds should be used to finance primary societies, 59188-90, 59285-7.
 rates paid by Primary societies must be reduced (73).
Larkana District Co-operative Bank : advances money to primary societies to whom members apply; makes no advances to individuals (77), 59170 81.
Lift irrigation by pumping might be done by Co-operative societies (83) 59286-7.
Minorities should be compelled to come into schemes for joint improvement (73); but consent of a majority of 75 per cent. necessary (80) 59225-6.
Progress : fairly good (73) 59166-7.

CROPS AND CROP PROTECTION :

Improvement impossible owing to shortage of labour (70).
Pests : research required (65); protective measures have all failed (70).
Rice :
 Income about Ra. 40 per acre, 59246-52.
 most Profitable crop in view of shortage of labour and its fodder yield; should be encouraged to the exclusion of all other crops (70).
Seed : increasing economy in use of (70).
Wild-animals, damage by : local authorities giving necessary licenses (70).

CULTIVATION :

Interference inadvisable (70).
Rotation : correct methods in use (70).

BHUTTO, K.B. SHAH NAWAZ KHAN—contd.**DEMONSTRATION AND PROPAGANDA :**

- Activities of Department should be increased (66); more funds required, 59161-2.
- Personality of officers, importance of (66).

EDUCATION :**Agricultural :**

- Careers, after, of students, disappointing (66).
- should be Compulsory for all schools (66), 59156-9.
- Facilities urgently require extension throughout Sind (66).
- Farms should be attached to rural schools (66), (73).
- Land should be given to students on leaving school (66).
- Progress : not marked (66).
- Pupils not drawn from agricultural classes (66).
- Teachers should be drawn from agricultural classes (66).
- Attendance at school limited by work in the fields and religious instruction (73).
- Compulsory education : being introduced but difficulties of scarcity of labour and lack of appreciation (73).
- District local boards, should control schools (66).
- Middle class youths, attraction of, to agriculture : by making agriculture more profitable (66).

FERTILISERS :

- Cowdung, use of as fuel, due to lack of other fuel (70).
- Firewood, supply of, 59144-8.

FINANCE :

- Failure of agricultural finance owing to agriculture being unprofitable (67).
- Long term loans :
 - Demand for, not very great; about 10 years; maximum of Rs. 10,000 to Rs. 20,000 lent by co-operative societies; to redeem mortgaged property, 59182-7.
 - not Wasted, 59291-2.
- Taccavi : interest too high, leakage between Government and borrower, undue strictness as to repayments (67-8), 59299-300.

FORESTS :

- Afforestation : no space for, near villages (72).
- District Local Boards :
 - should Control forests (72).
 - would give greater Grazing facilities, 59290.
- Firewood, supply of, (72), 59144-8.
- Grazing facilities, inadequate (72).
- Prices for grass from forests too high (72).
- Village plots should exist for supplying grass and firewood (72).

HOLDINGS :

- Fragmentation : Mahomedan law of inheritance is ruinous (68).
- Fragmented Holdings Bill, 59298.
- Legislation necessary absolutely prohibiting sub-division below a certain point (68), 59222-4.

IMPLEMENTS :

- Government should allot more funds for purchase of improved implements and free distribution (if possible) among cultivators (66-7); (70).
- Prices : should be reduced by means of Government bounties (71).
- Repairs, importance of providing facilities for (70).
- no great Successes (67), 59165-6.
- Threshing machines and tractors should be let out on hire by Agricultural Department (66-7); through Co-operative societies, 59301.

IRRIGATION :

- Distribution : not satisfactory, and suggestion, (69), 59296.
- Floods : no measures to prevent in many places (68).
- Kotri, barrage should be made (69), 59295.
- Lift irrigation by pumping might be done by co-operative societies, 59286-7.

BHUTTO, K.B. SHAH NAWAZ KHAN—contd.**IRRIGATION—concl'd.**

- Minor schemes (tanks, ponds, wells) : enough being done (69).
- Neglect of, in Sind (68).
- Non-Barrage zone, adversely affected by Lloyd Barrage (69), 59295.
- Punjab irrigation schemes, adversely affecting water-supply in Sind (68), 59295.

LAND TENURE :**Batai system :**

Division of produce : on lift lands zamindar takes two-fifths, on flow lands half the produce ; a fair arrangement, 59135-43.

Rent paid in kind, 59227-36.

Zamindar pays assessment, advances taccavi and pays interest, clears kariyas, etc., 59195-8.

Burdens on land :

local cesses ; rasai (providing for touring officials) ; lapo paid to officials who collect revenues ; corruption ; system of administration blamed ; committee appointed as to rasai and lapo, but nuisance remains 59253-63 ; should be discouraged ; rasai and lapo come out of zamindar's share of produce, but hari has to contribute labour ; touring officials should only accept hospitality from well-to-do people, 59281-4.

cause Poverty of cultivators, 59154-5.

Settlement every 20 years, 59227-36.

Haris : except one class, are all tenants-at-will, but in fact are seldom turned out, 59227-8.

LLOYD BARRAGE :

Zamindars anxiously awaiting completion, 59193-4, 59216-8.

MARKETING :

Facilities satisfactory (72).

Government should not interfere in packing, grading, etc., for market (72), 59278.

Information as to market conditions, etc., should be provided by co-operative societies (72).

Railways should give priority to agricultural produce (72).

Roads should be improved (67).

RESEARCH :

Diversity of conditions necessitating many kinds of research (65).

Implements, 59164.

Kallar land, research required into factors producing (65).

Pests, research required (65).

Poverty of cultivators prevents use being made of results of research, 59140, 59164-5, 59219-21.

SOILS :

Alkali land : only method of improvement is by supply of water and drainage (69).

Erosion, on Indus, money should not be spent on prevention of (69).

Government should not attempt improvement of (69).

Reclamation : by giving land to peasant class (69).

STATISTICS :

often invented owing to pressure of work (74).

Sufficient at present (74).

VETERINARY :**Department :**

under Director of Agriculture, should be (71).

Funds, lack of, prevents thorough efficiency (67).

Dispensaries :

under District local boards, who have not proper control of officers (71).

Extension taking place (71).

Provincial authority, should not be under (71).

Touring, visits are too short (71).

Use of, by agriculturists, prevented by distance (71).

Legislation necessary to prevent spread of contagious disease by contacts (71).

Research : Institute required in every Province (71) 59241-5.

BHUTTO, K.B. SHAH NAWAZ KHAN—concl'd.

WATERLOGGING: In the Lar portion, causes idleness; no system of drainage, 59237-40.

WELFARE OF RURAL POPULATION:

District local boards:

will provide Health officers, Government contributing two-thirds of expense, 59191-2.

subject has been Transferred to; they may be trusted to provide all that is necessary (73).

Surveys, economic, of typical villages not very helpful (73).

BORROWING, *see under* **AGRICULTURAL INDEBTEDNESS.**

BOSI, *see under* **CULTIVATION.**

CAPITAL, ATTRACTING OF, TO AGRICULTURE:

Capitalists are not encouraged to take up land, *Shewakram*, 60823-8.

Improvement of land discouraged by:

Capital and Enterprise, lack of, *Rahman* (149), *Shewakram* (232-3).

Conservative habits and Ignorance, *Shewakram* (232-3).

Long term credit at low interest necessary, *Rahman* (149).

Lloyd Barrage: will attract capital, *Rahman* (149).

Obstacles: dullness of country life and precarious seasons, *Rahman* (149).

Profits of agriculture must be increased by decreasing burden of assessment and by providing flow irrigation, *Bhutto* (73).

Waste land, grant of, at nominal prices or payment by instalment, to individual capitalists or companies, with facilities for constructing canals, advocated, *Shewakram* (232).

Water-supply must be assured, *Musto* (94).

CASTRATION, *see under* **ANIMAL HUSBANDRY.**

CENTRAL COTTON COMMITTEE: unsatisfactory; no criticism allowed; exclusion of best men, *Shahani*, 60553-5, 60673-4.

CO-OPERATION *see also under* **AZIMKHAN, K. B. INAYATALIKHAN.**

Agricultural Department, co-ordination with: *see under* **AGRICULTURAL DEPARTMENT.**

Amateurs, employment of undesirable, *Musto* (93).

Audit: satisfactory; of every society every year by the Government auditor, *Azimkhan*, 59508-10.

Cattle breeding societies, doubtful, *Musto* (94).

Consolidation of holdings: Societies should undertake, *Musto* (94).

holdings already Uneconomic should be acquired by the State, *Musto* (94).

Cotton ginning and marketing societies advocated, *Shahani* (205).

CREDIT SOCIETIES:

Collapse of a society in Jacobabad District owing to non-repayment of loans, *Khoso*, 60214-7.

should be Developed to supply all needs of cultivators for short term credit, *Shahani* (201).

Directors of local banks decide whether loans are to be granted, *Bhutto*, 59168-81.

Necessary to save cultivators from merciless exploitation of banias, *Hussain* (131):

Number has increased very greatly in the last few years, *Rahman* (148).

most are Sound, *Bhutto*, 59168-81.

Success of, *Hussain* (133).

Taccavi grants should be made to, *Khoso* (167).

Domestic current expenses, credit should be provided for, *Musto* (93).

Expert from Sweden, Denmark or England should be employed by Government, *Musto* (93).

Failure, instance of, *Dow* (39).

Fertilisers distributed through societies, *Rahman*, 60156-62.

Fragmentation of holdings should be prevented by, *Karachi Indian Merchants' Association* (183).

Government: should confine its activities to propaganda, organisation, finance and audit, *Hussain* (132).

Government should purchase grass for Military Department through co-operative societies, *Bhutto*, 59288.

CO-OPERATION—conold.

Implements : societies might Hire out, maintain Repair depôts for, and keep Stocks of, *Musto* (91-4), *Rahman*, 60155-9.

Importance of, great, *Musto* (93).

Improvement of land for general benefit of locality should be financed and carried out on a co-operative basis, *Musto* (94).

INTEREST :

Government funds should be used to finance primary societies, *Bhutto*, 59188-90, 59285-7.

rates paid by Primary societies must be reduced, *Bhutto* (73).

JOINT FARMING SOCIETIES :

Advocated to prevent excessive fragmentation of holdings, *Shahani* (202).

Doubtful, *Musto* (94).

of Educated young men :

on Lloyd Barrage land, desirable if members do manual work themselves, *Karachi Indian Merchants' Association* (192).

Might be tried, *Rahman*, 60118.

Premature ; would receive sympathetic treatment, *Dow* (39), 59073-4, 59122-9.

Failed in Punjab, *Dow*, 59053.

of Haris, worth while trying as an experiment, *Rahman*, 60103-4.

Larkana District Co-operative Bank : advances money to primary societies ; makes no advances to individuals, *Bhutto*, 59170-81.

Lift irrigation by pumping might be done by Co-operative societies, *Bhutto* (83), 59286-7.

Lloyd Barrage Scheme : purchasers of land might be financed by credit societies, *Dow*, 58930-1.

MINORITIES :

should be Compelled to come into schemes for joint improvement, *Dow* (39), 59029, 59075, 59130 ; *Musto* (94) ; *Bhutto* (73).

Expert approval of scheme, a condition, *Musto* (94).

Majority of 75 per cent. necessary, *Bhutto* (80), 59225-6.

Non-credit societies : with two exceptions, not organised, *Rahman* (148).

NON-OFFICIALS :

more Effective than Government in spreading movement, *Rahman* (148) ; command more confidence ; are coming forward, *Rahman*, 60069-70.

should Encourage co-operation by propaganda and education, *Hussain* (133).

Once Trained Officers should be retrained, *Musto*, 59434-8.

Progress :

Considerable, *Dow*, 58983-5.

has made an Important contribution to welfare, *Hussain*, 59828-30.

Pumping schemes to be run by co-operative societies, *Dow*, (37), 59076.

Punjab consolidation of holdings societies being studied, *Dow* (39), 58974-6, 58982.

PURCHASE AND SALE SOCIETIES :

Necessary, to save cultivators from clutches of banias, *Hussain* (131-3).

Purchase, should Stock, sell and hire out implements and machinery, *Musto* (93).

Sale of produce and stock, requires expert investigation, *Musto* (94).

Rectangulation of holdings in the Lloyd Barrage area should be done with the assistance of co-operative societies, *Dow* (39).

Seed depôts : might be financed by Government and managed by co-operative societies, *Musto* (89).

Seed distribution : should be undertaken by credit societies, *Dow* (38).

Seed supply societies, necessary, *Hussain* (131-2).

Zamindars, big, not yet affected by, *Hussain*, 59830.

COTTON, see under CROPS AND CROP PROTECTION, LLOYD BARRAGE, MARKETING and SOILS.

CROPS AND CROP PROTECTION :

Cattle straying, damaging crops : serious ; quick growing hedge plant should be evolved, *Karachi Indian Merchants' Association* (184), 60518-9 ; prickly pear, does not injure crops, grows quickly and supplies itself with water but gives no crop or fuel, *Karachi Indian Merchants' Association*, 60526-8.

Cereals : selection of seeds of selected varieties, recommended, *Shahani* (204).

CROPS AND CROP PROTECTION—contd.

COTTON :

Acala, American, the best variety ; being grown at Sakrand Farm, *Shahani*, 60562-3 ; 60618-24.

American, long staple :

should be Concentrated on under Barrage perennial water supply, *Dow* (38).

Profitable, *Shahani* (204).

Punjab 4 F :

Qualities : has proved to be healthy and prolific, fitting in with present conditions of water supply and possibly other environmental conditions ; popular, superior staple strain should be evolved, *Rahman* (145), 59983-7.

Quantity : 36,000 acres on Jamrao Canal, 1926-27, *Rahman* (145).

285 better than F.4, *Shahani*, 60541.

Spread of checked by unsuitable water conditions, *Dow* (38), and marketing conditions leading to cultivator not getting fair share of higher value, *Dow*, 58977-9.

Water supply in February or March necessary, *Shahani* (204).

Baker-Lane scheme does not provide for much cotton cultivation under Lloyd Barrage, *Rahman*, 60179.

in Deccan might be grown under irrigation instead of sugarcane, *Harrison*, 58846-7.

Deshi, Agricultural Department has attempted to improve in the past, because of unstable water supply, *Dow* (38).

Egyptian :

Cultivated under Fletcher for nearly 5 years, varieties tried, *Rahman*, 59998-9, 60002-4.

Experiments abandoned except at Sakrand with fresh seed from Egypt, *Rahman*, 60041-6.

Failed on Jamrao for lack of early water supply, *Rahman*, 60000-1.

Mettafifi and Abbasi, better than American, but given up for lack of early water supply, *Shahani* (204), 60556-9.

showed Promise of success as long as perennial irrigation existed on Jamrao, *Rahman* (145).

now under trial at Sakrand and doing comparatively well, *Rahman*, 60000.

Failure of crop, *Harrison*, 58882-6.

Variety 27 W. N. :

Quality : superior to deshi and is being distributed, *Rahman* (144).

Type : a selected strain from ordinary local cotton, which has four types ; is a white flowered ordinary *neglectum roseum* ; very popular, *Rahman*, 60005.

Fodder : abundant supply from rice cultivation, *Bhutto* (70) ; shortage does not normally exist (71).

Food crops : 81 per cent of total cropped area ; percentage will increase under Baker-Lane Scheme under Lloyd Barrage ; not much cotton cultivation, *Rahman*, 60177-9.

Important crops : in Sind, lists of, *Rahman* (144), *Shahani* (204), cultivation of Juar : should be increased, *Khoso* (167).

Improvement impossible owing to shortage of labour, *Bhutto* (70).

Income per acre from rice about Rs. 40 ; juar Rs. 20 at most, *Bhutto*, 59246-52.

Legumes : hybridisation recommended, *Shahani* (204).

Output : 23 per cent decrease, and distinct decrease in cropped area in Karachi : thought to be due to insufficient water supply, *Rahman*, 60038-40.

PESTS :

Demonstration and propaganda necessary, *Karachi Indian Merchants' Association* (184), 60518.

Expenditure on prevention of may make future remissions of taxation unnecessary, *Karachi Indian Merchants' Association* (184), 60518.

Protective measures have all failed, *Bhutto* (70).

Research necessary, *Bhutto* (65) ; *Karachi Indian Merchants' Association* (184), *Shahani* (204).

Serious, making agriculture precarious, *Karachi Indian Merchants' Association* (184), 60518.

Potato seed imported from Italy, Kalka and Farukhabad ; imported disease has not arisen, *Rahman* (145).

CROPS AND CROP PROTECTION—contd.

RICE :

- Consumes ten times as much water as dry crops, *Khoso*, 60224-6.
- Cultivation should be restricted as to irrigation, *Khoso* (167).
- Enquiry as to outturn advocated, *Shewakram*, 60803-5.
- Income about Rs. 40 per acre, *Bhutto*, 59246-52.
- Outturn, 10 to 12 maunds per acre in Sind as compared with 30 maunds in Italy and Spain, *Shewakram* (221).
- most Profitable crops in view of shortage of labour and its fodder yield ; should be encouraged to the exclusion of all other crops, *Bhutto* (70).
- Selection of local and foreign varieties and hybridisation, *Rahman* (144-5).

Seed : increasing economy in use of, *Bhutto* (70).

SEED DISTRIBUTION :

- in Bhitsah in Hyderabad cultivators and merchants co-operate to maintain pure cotton seed supply, *Rahman* (145).
- should be by Co-operative societies, supply coming from the Agricultural Department, *Hussain* (131-2) ; *Dow* (38), 58940.
- Cotton : 27 W. N. and Bhitsah, greatly appreciated, *Azimkhan* (103).
- Departmental organisation, though very limited, appears to be on right lines, *Rahman* (145).
- Depots should be financed by government and managed by co-operative societies or Government, *Musto* (89).
- Difficulty of obtaining good seed ; useless to approach Agricultural Department, *Shahani*, 60806-8.
- Free issue, value to be recovered from crop, until good strains are established, *Musto* (89).
- Government Stores Department, should be purchased from, *Azimkhan*, 59695-7.
- Improved seed : demand for very active at premium of annas 12 to Re. 1 per maund, *Rahman*, 59961-7.
- Multiplication : seed grown on department's farm and multiplied by private seed growers under supervision of department ; strain renewed every year by department, *Rahman*, 60051-5.
- Quality distributed by bania and mofussil seed merchants poor, *Rahman* (145).
- Small holder generally gets his seed from Zamindar ; village shopkeeper not sufficiently educated to be trusted with distribution, *Karachi Indian Merchants' Association*, 60486-94.
- Village bania or mofussil merchant generally depended upon, *Rahman* (145).
- Wheat : Pusa 12 :
 - Greatly appreciated, *Azimkhan* (103).
 - Obtained from Jacobabad Government Farm, *Khoso*, 60187-8.
- Seed improvement : by selection, isolation of superior strains and maintenance by pure line culture, *Rahman* (144), 60153-5.

SUGARCANE :

- Cultivation of in Deccan not diminished owing to irrigation charges, *Harrison*, 58844-7.
- Irrigation water used for might be diverted to other crops, *Harrison*, 58878-86.
- Wasteful methods of cultivation, *Harrison*, 58844-7, 58894-901.

WHEAT :

- Cultivation, *Khoso*, 60227.
- in Deccan might be grown under irrigation instead of sugarcane, *Harrison*, 58846-7.
- Improvement of local wheats, *Rahman* (144).
- Introduction of Pusa 12 c and Punjab 11, *Rahman* (144).
- Pusa 12 being grown on 50,000 acres ; is being extended ; difficulty, lack of steady water supply ; cultivator convinced of benefit, *Rahman*, 60047-50, *Azimkhan* (103) ; *Khoso*, 60187-8.

WILD ANIMALS, DAMAGE BY :

- more Gun licenses should be issued to zamindars, *Khoso* (167), 60263-4.
- Local authorities giving necessary licenses, *Bhutto* (70).
- Pig should be shot, *Shahani* (204).

CULTIVATION :

Bosi system : in Upper Sind Frontier ; land flooded in September and wheat grown without further irrigation ; provides work for 8 to 10 months in the year, *Rahman*, 60121-4.

Dry cultivation (without irrigation) impossible in Sind except desert portion of Thar Parkar and part of Karachi District, *Rahman*, 59911-8.

Interculturing cotton by plough, thus saving labour, *Rahman* (145).

Interference in the existing methods inadvisable, *Bhutto* (70).

Mixture of seeds when sowing not generally adopted in Sind, but mixed juar, bajri, maize and til sprinkled in cotton to supply early fodder for working cattle, *Rahman* (145).

Ploughing, dry, practised in some tracts as a result of departmental demonstration, *Rahman* (145), *Shahani* (200), (204), 60602, 60675.

Rotation :

Correct methods in use, *Bhutto* (70).

Experiments carried on, until Jamrao perennial water supply failed ; being carried out at Sakrand under Barrage conditions, *Rahman*, 60065-6.

not Necessary at present as irrigation facilities only allow one-third of the land to be cultivated per annum ; but under improved irrigation a good rotation must be devised, *Rahman* (145).

DEBT, see under AGRICULTURAL INDEBTEDNESS.**DECCAN AGRICULTURISTS' RELIEF ACT, see under AGRICULTURAL INDEBTEDNESS.****DEMONSTRATION AND PROPAGANDA.**

Activities of Department should be increased, *Bhutto* (66) ; more funds required, *Bhutto*, 59161-2.

Agriculture Day, All-India, should be observed, *Karachi Indian Merchants' Association* (182).

Central research station should assist provincial research and demonstration, *Harrison* (11), (12), 58782-3.

Cinema and magic lantern advocated, *Karachi Indian Merchants' Association* (182), *Shahani* (200).

Co-operative Department (through taluka development associations) has popularised improved seeds and ploughs, *Hussain* (129).

Co-ordination of Agricultural and Co-operative Departments has been beneficial, *Azimkhan* (103).

Cultivators : are not conservative ; are willing to adopt methods proved to be effective ; importance of sympathy with, *Karachi Indian Merchants' Association* (182).

Cultivators, selected, should be used for, *Shahani* (200), 60603-5.

on Cultivators' Own Fields, recommended : *Harrison* (11-2), 58712-5, 58778-81, 58795-7, *Dow* (36), 58954-6, *Musto* (89), *Azimkhan* (103), 59624-7, (103-4), *Hussain* (129), *Rahman* (141), 59948, 59963, 60153-5, *Karachi Indian Merchants' Association* (181-2), *Shahani* (200), *Shewakram* (221).

by Comparative plots, *Dow* (36), 58954-6, *Azimkhan* (103), 59624-7, *Shewakram* (221). with Guarantee against loss, *Harrison* (11-2), 58712-5, 58778-81, 58795-7, *Dow* (36), 58954-6.

by Organised bodies of zamindars and cultivators, *Azimkhan* (103), 59624-7.

more Successful than leaflets, pamphlets, etc., *Azimkhan* (103-4).

Daulatpur, reclamation of land a failure in demonstration, *Dow* (36).

Decorations : awarded at district Durbars, *Rahman* (142), should be given to Zamindars, *Khoso* (166).

Demand : for great owing to change of methods, *Mann*, 58644-5.

Demonstrators : defects of, *Shahani* (200), 60673-4.

Departments of Agriculture and Irrigation should work together, *Harrison* (10).

FARMS, departmental :

on the Batai system, the department taking one-third produce on lift irrigation and one-half on flow, *Rahman*, 59959-60.

Cultivation : 400 or 500 acres for multiplying seed ; cultivated by haris on a commercial basis, with no special advantages beyond those arising from better seed and cultivation and advances without interest, *Rahman*, 59947-58.

DEMONSTRATION and PROPAGANDA—contd.

FARMS, departmental—contd.

- too Elaborate; should be completely separated from experimental farms, *Harrison* (11).
- have not Influenced cultivators much, because not on commercial lines, *Hussain* (129), 59847-53; 59865-6.
- Farms, model, advocated, *Karachi Indian Merchants' Association* (182).
- Government should give small strips of land to zamindars, *Khoso* (166), to encourage good cultivation, *Khoso*, 60240-1.
- Improvements, list of, *Azimkhan* (103).
- Indigenous methods should be starting points for gradual improvement, *Harrison* (11), (*See also under RESEARCH.*)
- Jamesabad and Nawabshah sub-stations, managed on zamindari lines, *Rahman* (142).

Leaflets :

- Periodical publication of, advocated, though not very effective among illiterate cultivators, *Rahman* (142).
- often useless, *Harrison* (12).
- in Vernacular and popular, advocated, *Karachi Indian Merchants' Association* (182).
- Lectures advocated, *Karachi Indian Merchants' Association* (182).
- Obstacle : conservatism of cultivators, *Dow*, 58991-2.
- Organisation : should be central; Director of Agriculture should have advisory board representing agriculturists, etc., *Karachi Indian Merchants' Association* (182), 60373-4.
- Ploughs, improved, in Jamrao area, *Dow* (36).
- Pusa wheats introduced in Upper Sind, *Dow*, 58966.
- Reclamation of alkali land at Dowlatpur minor, a signal failure, *Shahani* (200).
- Research should be separate from, *Harrison* (10), (12).
- Shows, agricultural, held, *Rahman* (142), *Shahani* (199-200).

STAFF :

- Demonstrator required in every taluka, *Harrison*, 58798-800.
- in future will consist, as far as possible, of Sindhi Mussalmans, trained at Poona and Sakrand, *Mann*, 58641-3, 58691-3.
- Insufficient, *Harrison* (12), *Rahman* (142), 59947.
- Personality, importance of, *Harrison* (12), *Bhutto* (66), *Rahman* (142), 60163-5.
- Scholarships for training increased under new development scheme, *Rahman* (142).
- Successful measures : example of superior cultivator; breaking land several times; seed selection and distribution, demonstration on cultivators' own fields; bulletins issued by Agricultural Department in the vernacular; exhibitions and shows, *Shahani* (199-200).
- Taluka Development Association : should do all demonstration and propaganda and should be subsidised by Government, *Hussain* (129).
- Wireless broadcasting should be fully utilised, *Karachi Indian Merchants' Association* (182).

DOW, H., I.C.S., Revenue Officer, Lloyd Barrage and Canals scheme (36-64).

- Past appointments and present duties, 58913-6, 59117-8.

ADMINISTRATION :

- Co-ordination between Provinces insufficient (36).
- Transport :
 - Railways : feeder, required in Lloyd Barrage area (37); ordinary broad gauge, 58968; Government policy of extension, 58969; on the left bank 3 short lines proposed, 59042-4.
 - Roads : Board just appointed, 58971, 59077.
 - Improvement necessary and tolls for, justifiable (37).
 - Railways, co-ordination with, necessary, 58971-2.

AGRICULTURAL DEPARTMENT :

- Dowlatpur reclamation scheme, failure of, brought Department into disrepute locally (36).
- Staff : insufficient in numbers and quality, 58954-6.

DOW, H—contd.**AGRICULTURAL INDEBTEDNESS :**

Causes of borrowing : social customs, capriciousness of inundation, ignorance, priest-craft (37), 59107 ; poverty and prosperity (37).

Co-operation and Legislation like Punjab Alienation Act would tend to reduce uneconomic borrowing (37), 58973, 59096-103.

Lloyd Barrage :

Cost of clearing land would not be very heavy and would not cause indebtedness, 59096-103.

Rise of price of land has increased borrowing ; Barrage will therefore probably increase indebtedness which is not necessarily an evil, 59096-103.

Non-agriculturists, tendency for land to pass into hands of, 59027 ; no classification of agricultural and non-agricultural tribes ; will have to be made, but not necessarily the same classification as in the Punjab, 59045-9.

Repayment prevented by the same factors as cause borrowing (37).

Sources of credit : land and character (37).

AGRICULTURAL INDUSTRIES :

Fruit and vegetable gardens introduced in Jamrao area (36).

AGRICULTURAL LABOUR :

Attracting labour, no measures necessary (38).

Hari has no permanent interest in the land and therefore gravitates to where labour is wanted (38). (*See under "Haris" .*)

Lloyd Barrage : population will be sufficient to cultivate new lands, because : conversion of lift into flow will release cultivators, decrease of idleness, improved methods of organisation, increase of population (39).

CO-OPERATION :

Failure, instance of (39) ;

Joint farming societies : formed by Educated young men would receive sympathetic treatment, 59073-4, 59122-9 Failed in Punjab, 59053 ; Premature (39).

Lloyd Barrage scheme : purchasers of land might be financed by credit societies, 58930-1.

Minorities should certainly be compelled to come into schemes for joint improvement, (39) 59029, 59075, 59130.

Progress : considerable, 58983-5.

Pumping schemes to be run by co-operative societies, 59076.

Punjab consolidation of holdings societies being studied (39), 58974-6, 58982.

Rectangulation of holdings in the Lloyd Barrage area should be done with the assistance of co-operative societies (39).

CROPS AND CROP PROTECTION :

Cotton :

American, long staple, should be concentrated on under Barrage perennial water-supply, e.g., 4 F. ; spread of, checked by unsuitable water conditions (38), and marketing conditions leading to cultivator not getting fair share of higher value, 58977-9.

Deshi, Agricultural Department has attempted to improve in the past, because of unstable water-supply (38).

Seed distribution : should be undertaken by co-operative credit societies (38), in combination with Agricultural Department, 58940.

DEMONSTRATION AND PROPAGANDA :

on Cultivators' own fields, with guarantee against loss ; comparative plots model farms often useless (36), 58954-6.

Obstacles : conservatism of cultivators, 58991-2.

Ploughs, improved, in Jamrao area (36).

Pusa wheats introduced in Upper Sind, 58966.

DOW, H—contd.

EDUCATION :

Agricultural bias advocated (39) ; in all rural schools, 59003, 59030-2, 59081.
Attendance at school depends on boys not being required in the fields, 59004-5.

Books : elementary readers should contain descriptions of matters such as agricultural and Lloyd Barrage (39).

Hindus take to education more than Mussulmans, 59004.

Middle class youths should be attracted to agriculture and start as haris, 59073-4, 59122-9.

Night schools : not suitable for boys, 59006.

Vernacular, education of children is and must be in, 59007.

FERTILISERS :

Animal manure :

Preservation should be more careful, *e.g.*, folding (38).

Supply, very large if properly preserved (38).

Artificial : too expensive (38).

Blood, dried, from slaughter houses : used for fruit trees (38).

Cowdung : nothing can be done to discourage use of as fuel (38) ; alternative fuel supply in Sind, 58941-5, 59116.

Fish : where available used for fruit trees (38).

Goat and sheep dung : richer nitrogenous and phosphoric content recognised for expensive crops : folding advocated (38).

Kallar earth : used as top dressing for cotton, jwar and wheat (38).

Night soil and poudrette : near large towns used for garden crops (38).

Value of manure considerably increased recognition of, during last 15 years (38).

Village sites, old, earth collected from, used as top dressing for cotton, jwar and wheat (38).

FINANCE :

Lloyd Barrage scheme : purchasers of land might be financed by co-operative credit societies ; no special machinery proposed, 58930-1.

Fodder, cost of growing natural grass with canal water, 58946.

FORESTS :

Firewood : 58941-5 ; scrub jungle and forests near river, 59116.

Lloyd Barrage scheme : reduced assessments on plantations, 58941-5.

HARIS :

Freeholders, haris should be established as, 59068-70, 59108-12.

Outturn : both cultivator and zamindar have an interest in increasing, 59023.

has no Right in the soil ; generally on flow land zamindar takes half and on lift land one-third, 58998-9002, 59021-2.

Zamindar does not usually help the hari in cultivation, 59067.

HOLDINGS :

Consolidation :

Area, holdings, too small, should not be recognised by courts, Government or Irrigation Department, 59130.

Co-operative societies for consolidation in the Punjab being investigated (37), 58974-6, 58982.

Distribution of produce : zamindar takes half on flow land and one-third on lift land, 58998-9.

Fragmentation : not very serious ; rectangulation desirable (37) ; Revenue Department should do this work, 58974-6.

Rivers : loss of holdings through change of course, 58993-7.

Size : over 500 acres less than 2,000 ; 75 per cent under 25 acres ; average size 36 acres ; 7 per cent over 100 acres, 58924-7

DOW, H.—contd.**IMPLEMENTS :**

Ploughs, improved, successfully introduced in Jamrao area (36).

IRRIGATION :

Cotton : American, cultivation of, restricted in the past by unstable water supply (38).

Hakabo : water rate charged to jagirdars who do not pay land revenue : no obligation ever undertaken by Government to spend on silt clearance, 59131-2.

Lift, by pumping, of great importance ; should be investigated (37-8), 59028 ; might be done by co-operative societies, 59076 ; cattle would be released for field work (38).

Silt clearance, often not necessary, 59131-2.

LAND TENURE :

Peasant tenantry, such as exists in Sudan, should be considered, 59071.

LLOYD BARRAGE :

Afforestation : fuel problem not so acute as elsewhere ; exemption and decrease of assessment permitted as to babul groves, 58941-5.

Assessment rates : 59082-3.

Colonisation scheme :

Area : Government land available about 1½ million acres, practically all virgin land ; total area commanded 8 million acres ; cultivated area will be 6 million acres, 59054-7.

Auction of land not advisable till 2 years before flow irrigation commences, 58919-20, 58928-9.

Cost : 18 crores, 59057.

Finance of purchasers might be by co-operative societies ; no *ad hoc* machinery for financing suggested, 58930-1, 59059-64.

not yet Formulated, 58917.

Holdings : at present 75 per cent under 25 acres, 36 acres being average size, 58924-7.

Indebtedness : rise in price of land owing to Barrage may increase indebtedness ; land would be sold by auction free of restriction ; cost of clearing will not be heavy and will not lead to indebtedness, 59096-103.

Jungle land might be leased for clearing, 59065-6.

Large estates, policy as to formation of not decided upon ; Punjab experience against, 58932-35 ; lease to company, as in the Sudan, might be considered, 59071.

Leasing : land not considered ripe for sale should be leased, 58932-3.

Non-agriculturists, no feeling against, 59072.

Policy of Government should be published for public criticism, 59033-5.

Price : land should not be sold until a proper price can be obtained, 59050-2.

Punjabis, percentage in Sind small but growing ; realise value of land under perennial irrigation more than the Sindhis do ; should not be excluded, 59036-8, 59113-4 ; Punjabis, being more affluent, have probably contributed more of the capital borrowed from the Government of India for the Barrage, 59039-41.

Restrictions as to methods of tillage, improved varieties of seed, etc., not advisable as impossible to enforce ; experience on the Jamrao Canal, 58936-40.

Small-holders should be encouraged, 58923-24 ; example of Bikaner ; small-holder willing to pay proper price, 59058-9.

Temporary leases, concessions will have to be made in respect of, 58921-2.

Date of commencement of water flow : March 1931, 58918-9.

Drainage : adequate, 58953.

Popularity of scheme, 58989-90.

Railways, feeder, required (37).

MARKETING :

Cotton : American, spread of restricted in the past by bad marketing conditions, 58977-9.

DOW, H.—conold.**MOHAG : (frontage) :**

Fallow forfeited land included in zamindar's existing mohag, 59024.

Meaning of : claim to land in the frontage of a zamindar which cannot be granted to another zamindar without injuring the former's rights of user or access to his existing holding ; never claimed or recognised as a legal right ; founded on conditions attaching to inundation irrigation, 58947-50.

Provision for : Government in Lloyd Barrage scheme setting aside $3\frac{1}{2}$ lakhs of acres representing 25 per cent of the total Government land available, 59024, 59079-80.

necessary to Recognise the claim to some extent under the Lloyd Barrage, 58951-52.

RESEARCH :

Lift irrigation, by pumping, should be investigated (37-8).

Mirpurkhas experiment with Egyptian cotton, a failure mainly because of defective marketing, 59008-9.

Sakrand Research Station :

Control should be by an officer permanently in Sind and not from Poona, 58957.

Finance : cost being met from current revenues and not from Lloyd Barrage loan, though the station is not revenue-producing, 59119-21, 59014.

Kallar : experiments to be conducted under Barrage conditions, 59010-1.

Progress : at work nearly 2 years ; in a position to give a great deal of useful advice ; results of experiments will apply to right bank area except central rice canal, 59015-20.

Propaganda, now more important than research as to best varieties, 59012.

Soil deterioration due to irrigation, study of, not far advanced, 58960.

Sufficient probably for general purposes, 58958-9.

SOILS :

Daulatpur reclamation scheme, failure of (36).

Deterioration as a consequence of irrigation : importance and urgency of research, 58960-93.

STATISTICS :

Crop yield : figures unreliable ; method of collection must be revised ; indirect method of collection quite unreliable (40), 58986-8.

Livestock and implements : figures suspected to be quite unreliable : concentration of effort over a limited area suggested (40) ; figures collected every 5 years ; staff ill-paid and heavily worked, 59084-95.

TALUKA DEVELOPMENT ASSOCIATIONS :

Finance : need more funds, (36) ; Government will have to supply funds, 59025-6.

Progress : capable of doing good work, danger of falling into bad hands (36), 58964-5.

VETERINARY :

Service in Sind so small that its effect is hardly discernible (37).

WELFARE OF RURAL POPULATION :

Surveys, economic, in typical villages : most valuable but liable to be biassed and Government cannot afford to undertake the work (39-40).

DRAINAGE, see under SOILS.**EDUCATION :**

Account-keeping, importance of teaching, *Rahman* (140).

ADMINISTRATION :

of Agricultural education should be by Agricultural Department, *Shahani* (199).

of Educational schemes : could be through zamindars with Government financial help, *Khoso* (166).

EDUCATION—contd.

ADULT :

could be Done through zamindars with Government financial help, *Khoso* (166).
can be Popularised by being free, *Shahani* (199).

AGRICULTURAL :

Attendance :

(See also "Attendance at School" below).

school Hours should be in the afternoon and from 8 to 10 o'clock at night, *Shewakram* (221).

Insufficient, due to : disappointment in not obtaining Government appointments, distance of Poona Agricultural College; training not sufficiently practical; insufficient scholarships; not properly graded, *Shahani* (198).

lack of Interest of parents due to labour of children being required, *Shewakram* (221).

Number of boys should be increased, *Khoso* (166).

very sparse in several areas, *Shewakram* (221).

boys Work from 7 to 8 a.m. to 11 or 12; go out to work again at 4 or 5 p.m., *Shewakram*, 60735-41, 60845.

Bias :

Advocated, *Dow* (39); in all rural schools, *Dow*, 59003, 59030-2, 59081.

All education should have, *Karachi Indian Merchants' Association* (181).

Bias schools :

Agriculture only taught in higher standards, boys aged 13 to 18, *Rahman*, 59933-5.

Control : local boards have administrative control, but agricultural department lays out farms and visits in an advisory capacity, *Rahman*, 59929-31.

few sons of Cultivators; boys have no idea of taking up agriculture, *Rahman*, 59936-8.

Farm of about an acre attached to each : some buy or hire bullocks; 3 agricultural lessons of 1½ hours each per week, *Rahman*, 59939-41 : in Jacobabad; farms attached; good, *Khoso* 60273-7.

Number : six in an experimental stage, *Rahman* (139), (148).

not working Satisfactorily because not the right type of boy, mainly sons of landless haris, *Rahman* (139-40), 59942, 60151-2.

Schoolmasters trained for 6 months at Lyallpur, *Rahman*, 59931.

Careers of students :

Cultivation of their own lands rarely, *Shahani* (199).

Disappointing, *Bhutto* (66).

Government service, *Rahman* (139-40), *Shahani* (199).

College for Sind :

Agricultural would be preferable to Arts College, *Karachi Indian Merchants' Association*, 60434, not necessary, *Rahman*, 60071-5, 60105-8.

in Barrage area recommended, *Mann*, 58700-7.

Demand for, *Mann*, 58643, 58700-7, *Rahman*, 60071-5, 60105-8, *Karachi Indian Merchants' Association* (182), 60375-8, 60434, *Shahani*, 60542-5, 60727-8.

at Research Station recommended, *Karachi Indian Merchants' Association* (182).

should be Compulsory for all schools, *Bhutto* (66), 59156-9.

Curricula : agriculture should be an optional subject in Intermediate science and arts degrees; greater stress should be laid on agricultural practice, *Shahani* (199) 60581-3; should be taught in all primary classes, *Shewakram* (221) 60778-83.

Demand, may be stimulated by : demonstration that scientific agriculture is more paying; revision of ideals; reservation of tahsildarships for agriculturally trained applicants; grants of land to educated agricultural communities; scholarships, etc., *Shahani* (198).

Facilities, teaching, very necessary to extend, *Bhutto* (66), *Khoso* (166), *Shahani* (198), *Shewakram* (221).

Farms should be attached to rural schools, *Bhutto* (66), (73), *Khoso* (166), 60241.

Finance : additional land revenue of 1 anna in the rupee, earmarked for agricultural education, advocated, *Shewakram* (221).

High schools, in Lower and Upper Sind, with a 4 years' course, necessary, *Karachi Indian Merchants' Association* (182); demand will arise under Lloyd Barrage conditions, *Karachi Indian Merchants' Association*, 60422-4.

Land should be given to students on leaving school, *Bhutto* (66).

EDUCATION—contd.

* AGRICULTURAL—contd.

MIRPURKHAS AGRICULTURAL SCHOOL :

Boys were from 12 to 15 years of age, *Rahman*, 59919-21.

Closed 10 years after opening owing to non-attendance of students due to failure to secure jobs, *Rahman* (139).

Cost Rs. 18 to Rs. 20 per boy per month per term, *Rahman*, 59922-5.

not sons of Cultivators, *Rahman*, 59926-7.

Defect in recruitment of boys, not in teaching, *Rahman*, 60032-3, 60151-2.

English not taught, *Rahman*, 59928; might be provided as an attraction, *Rahman*, 60036-7, 60151-2.

Failed because it was carried on under artificial conditions and owing to unreasonable attitude of zamindars, which has changed, *Karachi Indian Merchants' Association*, 60379-81.

Opened in 1912, *Rahman* (139).

Qualification for admittance : vernacular 4th or 5th standard, *Rahman*, 60034-5.

Poona agricultural college, too distant and course too theoretical, *Karachi Indian Merchants' Association*, 60495-508.

Practical experience necessary, *Khoso* (166).

Primary Schools :

Boys would attend between the ages of 7 and 10, *Karachi Indian Merchants' Association*, 60474-7.

Curriculum : reading, writing and arithmetic should also be taught, *Karachi Indian Merchants' Association*, 60352-3, 60435-6.

with Farms attached; would prevent migration to towns, *Karachi Indian Merchants' Association* (181-2).

Requirements : at least one at headquarters of every division and centre of large group of villages, *Karachi Indian Merchants' Association* (182).

Rewards (employment or land) should be given to students after finishing course, *Khoso* (166) 60241.

Scheme for an agricultural school, *Rahman* (140-1), 59988-9, 59992-7, 60036-7, 60075-8, 60149-50.

Scholarships for boys advocated, *Shewakram* (221).

SCHOOL FARMS :

Advocated, Experimental, should be, *Shahani* (199); Necessary, *Khoso* (166).

School plots : necessary, *Khoso* (166), *Shahani* (199).

Students, drawn mainly from agricultural classes, *Khoso* (166), few sons of cultivators, *Rahman*, 59936-8 (139-40).

Subsidiary industries hampered by lack of, *Shahani* (205).

Teachers :

should be Drawn from agricultural classes, *Bhutto* (66), *Khoso* (166), *Shahani* (198), *Shewakram* (221).

Supply insufficient, *Khoso* (166), *Shewakram* (221).

Agricultural Day : should be observed, *Karachi Indian Merchants' Association* (182),
Agricultural efficiency not improved by, *Hussain* (133).

ATTENDANCE AT SCHOOL :

(See also "Attendance" under "AGRICULTURAL" above.)

Afternoon, recommended, *Karachi Indian Merchants' Association* (182), *Shewakram* (221).

Depends on boys not being required in the fields, *Dow*, 59004-5.

in 4th class poor owing to boys having to work, *Hussain* (133).

Limited by work in the fields and religious instruction, *Bhutto* (73).

should be in Non-crop season, *Karachi Indian Merchants' Association* (182).

BOOKS :

Elementary readers should contain descriptions of matters such as agricultural and
Lloyd Barrage, *Dow* (39).

Revision required, *Harrison* (15).

Cinema : advocated, *Shahani* (199).

Committee of 1920 : Report, *Rahman* (140-1).

EDUCATION—concl'd.**COMPULSORY PRIMARY EDUCATION :**

Advocated, to protect cultivators from extortion of moneylenders, *Rahman* (143), 60134-6.

Coercion would cause education to become unpopular, *Harrison* (15).

being Introduced but difficulties of scarcity of labour and lack of appreciation, *Bhutto* (73).

District local boards, should control schools, *Bhutto* (66).

English : should be taught ; boys cannot be kept on the land by refusing to teach them English, *Rahman*, 59944-6.

Finance : by Local Governments with compulsory cesses levied on large landholders, *Shahani* (199), 60670-2.

Haris : little use in establishing agricultural schools for sons of, *Rahman* (140-1) ; should not be admitted to zamindari schools, *Rahman*, 60149-50.

Hindus take to education more than Mussulmans, *Dow*, 59004.

Indebtedness :

Caused by lack of, *Shahani* (202).

might be Relieved by, *Karachi Indian Merchants' Association* (183).

Intermediate Agricultural Colleges, advocated ; to teach agriculture, rural economics, agricultural chemistry, etc., *Shahani*, 60542-5 ; at Karachi, Nawabshah and Sukkur, 60727-8.

Moral training essential, *Shahani*, 60363.

Nature study recommended, *Khoso* (166), *Shahani* (199), *Karachi Indian Merchants' Association*, 60354.

Night schools, not suitable for boys, *Dow*, 59006.

Rural, should not aim as high as at present, *Harrison* (15), 58753-5.

Schools, methods are too dull, *Karachi Indian Merchants' Association* (182).

Sind D. J. College : no agricultural teaching, *Shahani*, 60542, 60665-7.

Technical knowledge, very few movements for improving, *Shahani* (199).

Vernacular, education of children is and must be in, *Dow*, 59007.

Vocational training of children, advocated, *Karachi Indian Merchants' Association*, 60352-64.

Wireless, broadcasting should be fully utilised, *Karachi Indian Merchants' Association* (182).

ENCUMBERED ESTATES ACT, see under AGRICULTURAL INDEBTEDNESS.**EROSION, see under SOILS.****FERTILISERS.**

Adulteration : sale should be under guaranteed Government analysis, *Shahani* (204).

Animal manure :

Preservation should be more careful, e.g., folding, *Dow* (38).

Supply, very large if properly preserved, *Dow* (38).

ARTIFICIAL :

too Expensive, *Dow* (38).

less Profitable than natural manure, *Khoso* (167), *Shahani* (203).

for Wheat, sugarcane, etc., distributed through a private firm and co-operative societies, *Rahman*, 60156-62.

Blood, dried, from slaughter houses, used for fruit trees, *Dow* (38).

Bones should be preserved, *Shahani* (203).

COWDUNG, use of, as fuel :

Alternative fuel supply in Sind, *Dow*, 58941-5, 59116.

not a Common practice, *Rahman* (144).

might be Discouraged by relaxing forest rules and so cheapening firewood, *Shahani* (204).

Due to lack of other fuel, *Bhutto* (70).

Forest areas, not practised in, *Aitchison*, 60314-20.

FERTILISERS—contd.**Cowdung, use of, as fuel—contd.**

- Legal prohibition not desirable, *Shahani* (204).
 Legislation advocated to prevent cowdung being taken to towns and sold, *Rahman* (144).
 Nothing can be done to discourage use of as fuel, *Dow* (38).
 Penalisation of, recommended, *Khoso* (167) 60201-2.
 Experiments on land of cultivators recommended, *Shahani* (204).
 Fallow system, taking a crop every 3 years, has obviated great use of manure, *Rahman* (144).
 Fish where available used for fruit trees, *Dow* (38).
 Freights should be reduced, *Shahani* (204).
 Goat and sheep dung : richer nitrogenous and phosphoric content recognised for expensive crops : folding advocated, *Dow* (38).
 Grants should be made by Agricultural Department to manufacturers, *Shahani* (204).
 Green manure, in Sind should be used extensively, *Harrison* (14-5).
 Kalar earth : used as top dressing for cotton, juar and wheat, *Dow* (38), *Rahman* (144).
 Need of, only with intensive cultivation, *Rahman* (144) ; under irrigation, *Rahman*, 60156-62.
 Night soil and poudrette : near large towns used for garden crops, *Dow* (38).
 Oil-cakes should be preserved, *Shahani* (203).
 Research insufficient as to phosphates, nitrates, sulphate of ammonia and potash manures, *Shahani* (204).
 Silt from canal banks applied to cotton fields, *Rahman* (144), *Harrison*, 58910-2.
 Value of manure, considerably increased recognition of, during last 15 years, *Dow* (38).
 Village sites, old, earth collected from, used as top dressing for cotton, juar and wheat, *Dow* (38), *Rahman* (144).

FINANCE.

Failure of agricultural finance owing to agriculture being unprofitable, *Bhutto* (67).

IMPROVEMENT OF LAND :

- discouraged by want of Capital, *Rahman* (149).
 Long term credit at low interest necessary, *Rahman* (149).

LAND MORTGAGE BANKS :

- Advocated, *Shewakram* (222).
 would not lead to Extravagance, which is not a fault of zamindars, *Shewakram*, 60846, 60872-3.
 Interest should be not more than 6 per cent per annum, *Shewakram* (222).
 for Long term credit, *Hussain* (129), *Shahani* (201).
 Objects : for loan redemption and to finance big schemes of land improvement, *Azimkhan* (104).
 at least One in each district, for long term credit, *Shahani* (201).
 should be Organised, with power to issue debentures, *Azimkhan* (104).
 should facilitate redemption of mortgages, *Hussain* (131).
 should be established without Waiting to see whether experiments in other parts of the Presidency are successful, *Azimkhan*, 59666-8.
 Lloyd Barrage scheme : purchasers of land might be financed by co-operative credit societies ; no special machinery proposed, *Dow*, 58930-1.

LONG TERM LOANS :

- Demand for, not very great ; about 10 years ; maximum of Rs. 10,000 to Rs. 20,000 lent by co-operative societies ; to redeem mortgaged property, *Bhutto*, 59182-7.
 Land mortgage banks seem to be the only solution, *Hussain* (129).
 would not be Wasted, *Bhutto*, 59291-2.
 Seed might be issued free of cost till harvest, *Musto* (89).
 Short term : sufficiently well catered for by co-operative societies, *Hussain* (129).

FINANCE—contd.**TACCARI:**

Administration: should only be given for land improvement schemes through co-operative societies where such exist, *Azimkhan* (104).
 Amount should be increased, *Khoso* (166), *Azimkhan*. 59669-73; *Shewakram* (222).
 Cultivators would be induced to make fuller use of by: reducing interest to that paid by Government to public *plus* cost of establishment; fully meeting demands of cultivators; distribution by senior and vigilant officers, *Rahman* (143) 60137.
 Defects: at present amounts inadequate and not given at proper time of the year, *Azimkhan*, 59669-73.
 Exactions of subordinates, *Shewakram* (222), *Bhutto* (67-8) 59299-300.
 Formalities too great, *Lussain* (129), *Shahani* (201).
 to Haris, *see under LAND TENURE*.
 Interest too high, *Bhutto* (67-8) 59299-300, *Rahman* (143) 60137.
 In Jamrao tract implements advanced as taccavi, *Rahman* (141).
 Panchayats in villages should assist, *Shahani* (201).
 Promptness, greater, necessary, *Lussain* (129).
 Repayment, period of, should be increased, *Khoso* (166), *Shewakram* (222), *Bhutto* (67-8) 59299-300.

FODDER, *see under* ANIMAL HUSBANDRY and FORESTS.

FORESTS (*see also under* AITCHISON, P. E.).

AFFORESTATION:

Opening for schemes probably in the neighbourhood of villages, *Mus'o* (93).
 near Villages, no space for, *Bhutto* (72).

Destruction of, has caused great loss of fuel and grass, *Khoso* (168).

DISTRICT LOCAL BOARDS:

should Control forests, *Bhutto* (72).
 would give greater Grazing facilities, *Bhutto*, 59290.

FIREWOOD:

Canals, growing of trees on banks of, and karias, recommended, *Karachi Indian Merchants' Association* (184).
 Co-operatively, not grown, *Azimkhan*, 59529.
 Encouragement of, 58941-5.
 Huris, recommended, *Karachi Indian Merchants' Association* (184) (*see below*).
 Loss of, owing to destruction of forests in Jacobabad, *Khoso* (168), 60201-2.
 Price would be decreased by light railways in forests, *Karachi Indian Merchants' Association*, 60449.
 Production should be encouraged by remission of assessment, *Musto* (93).
 Supply of near River, *Dow*, 59116.
 Supply of, *Bhutto*, 59144-8.

Fodder: scarcity of, in Jacobabad because there are no forests, *Khoso*, 60200.

GRAZING:

Corruption in lower ranks of department, *Karachi Indian Merchants' Association*, 60448-50, *Bhutto* (72).
 Facilities, inadequate, *Bhutto* (72).
 Fees:
 Heavy, *Karachi Indian Merchants' Association*, 60448-50.
 Reduction recommended, *Khoso* (168), 60265-6.
 Grounds should be attached to every village, *Karachi Indian Merchants' Association*, 60519-22.
 Restrictions, undue, *Karachi Indian Merchants' Association*, 60448-50.
 in every Taluka, forests necessary for grazing, *Khoso* (167).

FORESTS—contd.**HURIS :**

- Advocated for fodder and fuel, *Karachi Indian Merchants' Association* (184).
- small huris should be Revenue free, *Karachi Indian Merchants' Association*, 60519-23.
- Irrigation : water supply should be increased as meadows in, are insufficient, *Khoso* (168).
- Lloyd Barrage scheme : reduced assessments on plantations, *Dow*, 58941-5.
- Object : to supply fuel for towns and not to help agriculturists, *Bhutto* (72).
- Prices for grass from forests too high, *Bhutto* (72).
- Research necessary to discover some plant of rapid growth useful as a crop, hedge and fuel, *Karachi Indian Merchants' Association* (184).
- Village forests advocated, *Khoso* (168).
- Village plots should exist for supplying grass and firewood, *Bhutto* (72).

FRUIT, *see under* **AGRICULTURAL INDUSTRIES.**

GHI, *see under* **AGRICULTURAL INDUSTRIES.**

GRAZING, *see under* **ANIMAL HUSBANDRY AND FORESTS.**

HARIS, *see under* **LAND TENURE.**

HARRISON, C. S. C., Chief Engineer, Lloyd Barrage and Canals Construction, Karachi (10-35).

 Past appointments, 58709-11.

ADMINISTRATION :**Transport :**

- Carts, in Sind inferior to those of Punjab and Gujerat, 58756-66 (35).
- Railways : feeder lines required ; break of gauge nuisance (12).

Roads : Feeder :

- Absolute Absence of in Sind ; more important to agriculture than trunk roads (13).

 Irrigation Department, should be under Roads and Buildings Branch of Public Works Department, 58850-3.

AGRICULTURAL DEPARTMENT :

 Irrigation Department and Agricultural Department should work together (10); should be under the same Minister, 58848-9.

 Services : satisfactory, 58907-8.

Staff :

- Demonstrator required in every taluka, 58798-800.
- Insufficient (12).
- Personality of officers of paramount importance (12) 58908-9.

CROPS AND CROP PROTECTION :

 Cotton : in Deccan might be grown under irrigation instead of sugarcane, 58846-7.

 Failure of unirrigated crop, 58882-6.

Sugarcane :

 Cultivation of, in Deccan not diminished owing to irrigation charges, 58844-7.

 Irrigation water might be diverted to other crops, 58878-86.

 Wasteful methods of cultivation, 58844-7, 58894-901.

 Wheat : might be grown in Deccan under irrigation instead of sugarcane, 58846-7.

DEMONSTRATION AND PROPAGANDA :

 Central research station should assist provincial research and demonstration (11) (12) 58782-3.

 On cultivators' own fields, any loss being borne by Agricultural Department (11-2); to remove suspicion of cultivators, 58712-5, 58778-81, 58795-7.

 Departments of Agriculture and Irrigation should work together (10).

 Farms : too elaborate ; should be completely separated from experimental farms (11).

 Indigenous methods should be starting points for gradual improvement (11).

 Pamphlets : often useless (12).

HARRISON, C. S. C.—contd.**DEMONSTRATION AND PROPAGANDA—contd.**

- Personality of officers of paramount importance (12).
- Research should be separate from (10), (12).
- Staff : insufficient (12); demonstrator required in every taluka, 58798-800.

EDUCATION :

- Books : revision required (15).
- Coercion : would cause education to become unpopular (15).
- Rural : should not aim so high as at present (15), 58753-5.

FERTILISERS :

- Green manure : in Sind should be used extensively (14-5).
- Silt : 58910-2.

HOLDINGS :

- Area : Minimum area for irrigation in future should be fixed : in Deccan 5 acres, in Sind 16 acres (13) 58793-4; 16 to 24 acres sufficient in Sind under perennial irrigation, 58801-2; existing uneconomic holdings must be recognised, 58831-7, 58840-3, 58887-9.

IRRIGATION :**Deccan :**

- Problem of making irrigation pay (13); irrigation charges do not affect extent of cultivation of sugarcane; alternative crops, 58844-7; insurance cess proposed, 58878-86.

- Wasteful methods of cultivating sugarcane, 58894-6.

Distribution :

- Landholders should not control, 58863-4.
- Module, proportionate, for all canal water (13).
- Volumetric system, practical method should be evolved (13).

Drainage :

- removal of choking Aquatic growth by dragline excavators mounted on caterpillars (14) 58746-50.

- Drains to be started in first year of giving water, 58737-44.

- Flow into Indus, 58890-3.

- Importance of, with perennial irrigation of Lloyd Barrage (14).

- Ghotki area : will require development during next decade (13) 58723-6.

- Hydraulic problems immediately connected with agriculture could be studied at central All-India research station (12).

- Inglis : agrees with written evidence of (10).

Inspector General of Irrigation :

- such a Co-ordinating authority required, 58782-7.

- Post should not have been abolished; should be advisory with no executive authority, 58902-5.

- Jamrao Canal : will be perennial on completion of Lloyd Barrage, 58824-7.

- Karia : a water channel leading to zamindar's field from the main channel, 58873.

Lift :

- Importance of lift systems in Sind (13).

- Low lift, high duty, pumps, possibilities of, should be investigated, 58735, 58829-30.

- Pumping difficulties on the Indus, 58727-35.

- Local considerations have been given too much prominence (10).

Lloyd Barrage :

- Area irrigated, 6 million acres; area commanded 8 million acres, 58861-2.

- Capital cost : Rs. 30 per acre irrigated, 58790.

- Drainage channels (*see under* Drainage).

- Rectangulation of land necessary (14) 58788-90.

- Marani project : practically complete, 58869-71.

- Mula scheme : should be taken up (13).

Non-Barrage area :

- Effect of Barrage on, exaggerated, 58810-1, 58865-8.

- Improvements, great scope for (13), 58824; by inundation, subsequently converted to perennial by a weir, 58723-6, 58869-71.

HARRISON, C. S. C.—concl'd.**IRRIGATION—cont'd.**

Plots : sub-division of holdings into, by bunds, necessary for even and economical use of water (14).

Revenue, land : percentage spent on maintenance of canals, 58875-7.

Silt :

Clearance of canals of silt, often useless, 58828 ; percentage of revenue should not be earmarked for this purpose, 58858-60, 58875-7.

Fertiliser, use of as, 58910-2.

Grading of canals to cause formation of berms (14) 58736.

Sugarcane, under irrigation : *See under CROPS.*

Wells : not much scope for in non-barrage tracts of Sind, 58822-3.

MOHAG : an indefinite right to adjacent land ; has now become a nuisance, 58791-2.

RESEARCH :**Central station :**

Control should not be by Provinces, 58817-8.

Financed from central funds, 58819-20, 58854-7.

Fundamental research, 58812-5.

Scope : to assist provincial research and demonstration (11-2) ; and for irrigation research, 58716-22, 58854-7, 58782-3.

Demonstration should be separate from research (10) (12).

Departments of Agriculture and Irrigation should work together (10) (12).

Indigenous methods should be studied ; should be starting points for gradual improvement (10).

Provincial stations : Bombay Presidency, two required : Deccan and Sind (12) 58771-3, 58812 ; would investigate local problems, 58812.

Sakrand Experimental Station : 58767-70, 58807-9, 58821 ; all the work being done by Agricultural Department, 58838-9 ; should be entirely separate from Poona, 58906.

Sind : peculiar conditions : separate research station required (12) 58906.

SOILS :

Alkali land : reclamation by leaching, growing hardy crops such as red rice and babul (14) 58751-2, 58772-7.

Drainage : Importance of, in Sind (14), 58737-45.

Removal of choking aquatic growth by dragline excavators mounted on caterpillars (14), 58746-50.

Erosion : not generally serious in Sind (15).

Green mulches : extensive use of, advocated (14).

VETERINARY :

Superior establishment, more required (12).

WATERLOGGING : largely due to methods of cultivation (14) 58803-6.

HEALTH, *see under* WELFARE OF RURAL POPULATION.**HOLDINGS.****CONSOLIDATION :**

Co-operative effort recommended, *Karachi Indian Merchants' Association* (183), *Musto* (94).

Co-operative societies for consolidation in the Punjab being investigated, *Dow* (37) 58974-6, 58982.

Existing uneconomic holdings must be recognised, *Harrison*, 58831-7, 58840-3, 58887-9.

Fragmented Holdings Bill, *Bhutto*, 59298.

Legislation recommended, *Bhutto* (68) 59222-4, 59298, *Karachi Indian Merchants' Association* (183) 60455-7.

Minimum area should be prescribed, *Harrison* (13) 58793-4, 58801-2, *Rahman* (143), *Karachi Indian Merchants' Association* (183) 60455-7, *Shahani* (202).

Obstacles, *Shahani* (202-3).

Recognition of unduly small holdings should be refused by Courts, Government and Irrigation Department, *Dow* 59130, *Harrison*, 58831-7, 58840-3, 58887-9.

State purchase system, suggested, *Musto* (89-90).

HOLDINGS—contd.**FRAGMENTATION :**

- Extent of : Evil more serious in Deccan than in Sind, *Musto*, 59398-9 ; not very serious, *Dow* (37).
 Importance of preventing, *Karachi Indian Merchants' Association* (183).
 Inheritance law mainly responsible for, *Bhutto* (68), *Rahman* (143), *Khoso* (167).
 Rectangulation desirable (*Dow*) (37) ; Revenue Department should do this work, *Dow*, 58974-6.
 Large holdings : should not be permitted to be excessively large, *Shahani*, 60702-3, *Karachi Indian Merchants' Association*, 60455-7.
 Legislation to deal with minors, widows, etc., present law inadequate ; zamindars should be attached to Courts to give advice, *Khoso* (167) ; *Shahani* (202).
 Size : over 500 acres less than 2,000 ; 75 per cent under 25 acres ; average size 36 acres ; 7 per cent. over 100 acres, *Dow*, 58924-7.

HAKABO (water rate), *see under* **IRRIGATION**.

HURIS (privately owned woods), *see under* **FORESTS**.

HUSSAIN, KHAN BAHADUR NABI BAKSH MAHAMMAD, M.A., LL.B., Manager, Encumbered Estates in Sind (129-38).

ADMINISTRATION :

- Posts and Telegraphs, greater expansion required (129).
 Transport :
 Railways, feeder, required (129).
 Roads : bad ; better main and arterial roads required (129).

AGRICULTURAL DEPARTMENT :

- Unsatisfactory (129) ; a very good department ; is gradually improving, 59847-51.

AGRICULTURAL INDEBTEDNESS :

- Causes of borrowing :
 Capricious inundation, illiteracy, unbusinesslike habits, ceremonies (129), 59376-7 ; selling produce to pay assessment (129), (132) ; high prices of seeds (129).
 Deccan Agriculturists' Relief Act : has afforded some relief (130) ; has functioned but not successfully, 59875 ; administration at fault, 59878-81.
 Encumbered Estates Act :
 Applications by debtors, 59833-5, restricted to landowners who pay more than Rs. 300 annual assessment, 59854-5.
 Cultivation : no control over lessee's method but wilful deterioration guarded against, 59841-46, 59871.
 Extent of activities : 1,200 estates have come under department, i.e., almost all the big landholders, 59860-4.
 Income : 7 per cent management charges, one-third of remainder to debtor for his maintenance, remainder of income devoted to liquidating debts, 59836.
 Interest reduced in the first year from 10 to 4 lakhs, 59859.
 Estates Leased by public auction, 59839.
 Loans : department does not lend money, 59853.
 Management, financial 59856-8.
 Minors, Commissioner decides upon motion of Collector or relations, 59836-7.
 Procedure : manager deals with claims as a court of equity, 59838.
 some Relief has been given (130).
 Usurious Loans Act, comparison with, 59867-9.
 Extravagance, only true of 10 per cent of the zamindars (130) 59876-7.
 Measures for lightening agriculture's burden of debt : restricting interest, making usury in extreme cases a criminal offence (130-1) 59870 ; compelling keeping of proper books of account ; Punjab Restriction of Alienation Act ; supplying credit facilities ; purchase and sale societies ; Usurious Loans Act of 1918 and English Moneylenders' Act of 1900 should be applied throughout India (130-1) ; special courts of equity should be set up, 59882-97.
 Moneylenders :
 British judicial system favourable to moneylender at ruinous cost of cultivators (130).

HUSSAIN, K. B. NABI BAKSH MAHAMMAD—contd.**AGRICULTURAL INDEBTEDNESS—contd.****Moneylenders—contd.**

Exploit cultivators mercilessly (130).

Profiteer as middlemen (131) 59872-74.

Moneylenders Act (English) of 1918 : some provisions of, should be applied to India (131).

Mortgages : non-terminable, must be prohibited (131).

Repayment prevented by : bad seasons, lack of method in liquidating debts, high interest, dishonesty of moneylenders (130).

Sources of credit : bania only principal source (130).

Usurious Loans Act : should be made applicable throughout India (131) 59867-9.

AGRICULTURAL INDUSTRIES :

Bee-keeping : unknown (132).

Employment, rural, might be increased by stimulating subsidiary industries (132).

Fruit-growing : impossible for lack of irrigation during 8 months (132).

Health conditions of villages, devotion of spare time to : should be encouraged by propaganda (132).

Industrial concerns moving into rural areas : of doubtful effect owing to small number (132).

Lac-culture : possible to a limited extent (132).

Leisure period : Cultivator works 180 days on his holding ; during the rest of the year he is idle or carting, cutting and selling fuel or working in the towns (132).

Obstacles : lack of initiative and money (132).

Pisciculture : out of the question owing to abundance of fish everywhere (132).

Poultry breeding : might be successful ; Government might encourage ; already pursued but spasmodically and not scientifically (132).

Preparation of agricultural produce for market, industries connected with, should be encouraged (132).

Rope-making : done to some extent (132).

Sericulture : impossible owing to climate (132).

Study, intensive, of each rural industry, recommended (132).

Weaving : might be successful ; Government classes suggested (132).

CO-OPERATION :

Credit societies : necessary to save cultivators from merciless exploitation of banias (131) ; are doing very well (133).

Government : should confine its activities to propaganda, organisation, finance and audit (132).

Non-official should encourage co-operation by propaganda and education (133).

Progress : has made an important contribution to welfare, 59828-30.

Purchase societies : necessary, to save cultivators from clutches of banias who sell at exorbitant prices (131).

Sale societies : necessary, to save cultivators from clutches of banias who buy at very low prices and cheat in weighment (131-3).

Seed supply societies, necessary (131-2).

Zamindars, big, not yet affected by, 59830.

CROPS AND CROP PROTECTION :

Seed distribution : should be by co-operative societies, supply coming from the Agricultural Department (131-2).

DEMONSTRATION AND PROPAGANDA :

Co-operative Department (through taluka development associations) has popularised improved seeds and ploughs (129).

on Cultivators' own plots, preferable (129).

Farms, Government, have not influenced cultivators much, because not on commercial lines (129) 59847-53, 59865-6.

Taluka Development Associations : should do all demonstration and propaganda and should be subsidised by Government (129).

EDUCATION :

Agricultural efficiency not improved by (133).

Attendance in 4th class poor owing to boys having to work (133).

HUSSAIN, K. B. NABI BAKSH MAHAMMAD—concl'd.

FINANCE :

- Land Mortgage Banks :
 - for Long term credit (129).
 - should facilitate Redemption of mortgages (131).
- Long term : land mortgage banks seem to be the only solution (129).
- Short term : sufficiently well catered for by co-operative societies (129).
- Tacavi : greater promptness and less formalities advocated (129).

IMPLEMENTS :

- Ploughs : Sindhi, cumbersome (132).
- Taluka Development Associations : have introduced improved plough ; propaganda should be left to them (132).

MARKETING :

- Facilities : no markets in the proper sense of the word (132).
- Information, marketing, should be placed at disposal of cultivators (132).
- Moneylenders : are middlemen ; buy agricultural produce at very low prices and cheat in weightment (131) ; buy crop before harvest and sell back to cultivator at 20 per cent. profit 6 months later (132).
- Revenue collection compels cultivators to sell crop before harvest at low prices (129) (132).

STATISTICS :

- Division of produce between zamindars and haris, revenue officers should be present at and keep accounts of (133).
- Yield estimates, not satisfactory (133).

TALUKA DEVELOPMENT ASSOCIATIONS :

- Agricultural propaganda : have done a great deal of work ; should be left to them entirely (129) (132).
- Government subsidies advocated (129).
- Ploughs : have done much to improve (132).

VETERINARY :

- Department : Services unsatisfactory (129).
- Dispensaries : Insufficient number (129).

WELFARE OF RURAL POPULATION :

- Dispensaries, more required (133).
- Drinking water, supply required (133).
- Education, necessary for welfare (133).
- Propaganda, sanitary, by lectures and lantern slides, advocated (133).

IMPLEMENTS.

- Agricultural Department : do not Understand manufacture of implements, *Musto* (92), 59458-62.
- Archimedian hand screw : on the market and being used to some extent, *Rahman* (141).
- Chaff-cutters, *Musto*, 59379-80.
- Co-operative societies should stock, issue on easy payment terms and maintain repair depôts, *Musto* (91-2).
- Cotton gins, oil presses, etc., would be made privately, *Musto* (91).
- Demonstrations should be made by Agricultural Department, *Musto* (91).
- Forests : utilisation of labour-saving implements unsuccessfully attempted, *Aitchison*, 60333-4.
- Government should allot more funds for purchase of improved implements and free distribution (if possible) among cultivators, *Bhutto* (66-7) (70).
- Harrow, produced locally in the Deccan, *Musto*, 59378.
- Labour-saving implements : will be necessary after Lloyd Barrage is completed as there will be shortage of labour, *Rahman*, 60129-30.
- List of implements being brought to the notice of the agriculturists, *Rahman* (146).
- Local manufacture, *Musto* (91-2).

IMPLEMENTS—contd.**Obstacles :**

- Agents : lack of, in the mofussil, *Musto* (92).
 Cheap labour and hari system, *Rahman* (145-6).
 Finance : difficulty of purchaser paying cash, *Musto* (92).

Ploughs :**Egyptian :**

- Heavy, inverting, *Rahman* (145).
 replacing Sindhi ; is as simple as Sindhi plough and can be manufactured locally, but its work is far superior, especially in soft soil, *Azimkhan* (103).
 Scope for, but cattle too poor, *Rahman* (145).
 largely used and manufactured, *Rahman* (145).
 Importance of, *Musto* (91) 59375-7.
 Improved, successfully introduced in Jamrao area, *Dow* (36).

Iron :

- Designed locally, probably better than European design, *Musto* (91).
 Used in Guni Taluka, *Shewakram*, 60878-80.

Lyallpur ploughs supplied by Jacobabad Government Farm ; successful, *Khoso*, 60189-91.

Meston :

- Iron plough as cheap as Egyptian but fit for hard soil, *Azimkhan* (103).
 on the Market and being used to some extent, *Rahman* (141) (145).
 Sarkar, a modification of Egyptian plough, generally adopted in some districts and locally manufactured in thousands annually, *Rahman* (141).
 Sindhi, cumbersome, *Hussain* (132).
 Types : Egyptian, Meston, Rajah, Chatanuga, Monsoon, found useful, *Azimkhan* (103).

Ploughing zamindari lands on hire system, to train haris in use of improved implements, *Rahman* (142).

- Prices : should be reduced by means of Government bounties, *Bhutto* (71).
 Private enterprise should be encouraged to hire out expensive machinery, *Musto* (94).
 Quality and variety very poor, *Rahman* (145).
 Repairs, importance of providing facilities for, *Bhutto* (70).
 no great successes, *Bhutto* (67) 59165-6.
 Threshing machines should be let out on hire by Agricultural Department, *Bhutto* (66-7) ; through Co-operative societies, *Bhutto*, 59301.

TRACTORS :

- Caterpillar on wet ground, *Musto*, 59407-9 ; Difficulty on sandy soil not insuperable, *Musto*, 59480-4.
 Cultivation costs : *Rahman*, 59968-70, 60109-10.
 Difficulty owing to smallness of plots under irrigation rules and undergrowth, *Rahman*, 59970.
 Educated young men holding land co-operatively might use tractors, *Rahman*, 60117-9.
 Efficiency : do superior work ; comparison with ordinary plough, *Rahman*, 60111-4.
 Instances of use, *Rahman*, 59971-81, 60115-16.
 should be let out on hire by Agricultural Department, *Bhutto* (66-7) ; through Co-operative societies, *Bhutto*, 59301.
 Private company should undertake ploughing, too much capital would be required for co-operative societies, *Musto*, 59410-3.
 Recommended, *Shahani* (204).
 Steam and motor, should be encouraged where possible, *Musto* (91) ; for reclaiming kalar soil, *Musto*, 59386-7.
 Transport facilities necessary to hasten adoption of improved implements, *Shahani* (204).
 Workshops should be opened by private enterprise, *Musto* (91) ; but co-operative societies should purchase implements manufactured, *Musto*, 59452-7.

IMPROVEMENTS, see under CAPITAL.

INDEBTEDNESS, see under AGRICULTURAL INDEBTEDNESS.

INOCULATION, see under VETERINARY.

INTEREST, see under AGRICULTURAL INDEBTEDNESS and CO-OPERATION.

IRRIGATION (*see also under* **HARRISON** *and* **SHEWAKRAM**).

Baluchistan, possibilities of control of water from, *Musto* (90) 59472.
 Barrages on Indus at extreme North of Sind and at Kotri should be investigated, *Musto* (90); desirable within 15 years, *Musto*, 59439-41; investigation to start at once, *Musto*, 59466-71.
 Clearance of canals: sufficient money spent on; no money earmarked for the purpose, *Musto*, 59420.
 Cotton: American, cultivation of, restricted in the past by unstable water-supply, *Dow* (38).
 Department is under-staffed, *Musto*, 59469-70.

DISTRIBUTION:

Begari canal: unequal distribution, *Khoso*, 60218-23.
 Board of representatives of zamindars, Agricultural and Irrigation Departments should be entrusted to, *Rahman*, 60138-9.
 Detailed distribution should be left to landholders, *Bhutto* (69), through a committee, *Bhutto*, 59296.
 Dishonesty of Government officials, *Bhutto* (69).
 Improvements suggested: silt clearance, excavation of branch karias, prevention of excessive drawing of water, restriction on paddy cultivation, *Khoso* (167).
 Internal distribution in holdings should be left to holders, *Shahani* (203).
 should be by a Joint committee, half zamindars; Engineering Department make mistakes because no agricultural experience, *Karachi Indian Merchants' Association*, 60446-7.
 Karias should be widened, *Khoso*, 60249-50, 60267-70.
 Modules, *see below*.
 Open karia heads or plain sluices, entirely unsatisfactory, favouring the upper reaches, *Musto* (90-1) 59364.
 Quarrels of landholders, *Bhutto* (69).
 not Satisfactory, *Bhutto* (69).
 System of rotation satisfactory, *Khoso* (167).
 Uniformity advocated, *Shahani* (203).
 Wastage of water through superabundant supply at tail of canals, *Shahani* (203).
Drainage, see under SOILS.
 Experimental stations: several required, *Musto* (89). (*See under* **RESEARCH**.)
 Forests: supply for meadows in, should be increased, *Khoso* (168).
 Gaj Nai River, administration of, *Musto*, 59383-5.
 Grazing grounds, attached to villages, should be supplied free, *Karachi Indian Merchants' Association*, 60521-2.
 Hakabo: water rate charged to *jagirdars* who do not pay land revenue: no obligation ever undertaken by Government to spend on silt clearance, *Dow*, 59131-2.
 Huris: should be supplied free or at lower rates, *Karachi Indian Merchants' Association*, 60523.
 Inspector General of Irrigation: post should be revived, *Musto*, 59426-7.
 Jacobabad District: great deficiency of water, *Khoso* (167) 60257-60.

JAMRAO CANAL:

Designed to be perennial; Head should be improved, *Shahani* (203).

KOTRI BARRAGE:

Construction of, recommended, *Bhutto* (69) 59295; Investigation necessary, *Musto* (90) 59439-41, 59466-71; Kotri: weir should be constructed at, *Shahani* (203).

LIFT, by pumping:

Cattle would be released for field work, *Dow* (38).
 Centrifugal pumps best, *Musto*, 59381-2.
 Co-operative societies might do, *Dow*, 59076, *Bhutto*, 59286-7.
 Importance of, *Dow* (37-8) 59028.
 Investigation recommended, *Dow* (37-8) 59028.
 Lloyd Barrage, *see under* that main heading.
 Minor schemes (tanks, ponds, wells): enough being done, *Bhutto* (69).
Modules:
 Advocated; under Consideration for 20 years; to give Equal shares to head and tail; Successful in the Punjab; Different types suitable for different conditions; Zamindars at tail in favour while head zamindars are opposed, *Musto* (90-1), 59364-7, 59419, 59444-9, 59476-7.

IRRIGATION —contd.**Modules—contd.**

Recommended, if properly worked, *Shahani*, 60721-5.

Neglect of irrigation in Sind, *Bhutto* (68).

NON-BARRAGE ZONE :

Adversely affected by Lloyd Barrage, *Bhutto* (69) 59295.

Barrage will have very little effect on level of Indus below it, 59414-5; will not appreciably suffer, *Musto*, 59478-9.

Loans, taccavi or co-operative, necessary to encourage development of wells, *Rahman* (144) 60067-8.

Poverty of cultivators due to lack of water, etc., *Bhutto*, 59154-5, 59289.

Punjab irrigation schemes, adversely affecting water supply in Sind, *Bhutto* (68) 59295.

Reservoirs, possibilities of in Baluchistan should be investigated, *Musto* (90).

RICE :

Restriction of cultivation recommended; Water consumption 10 times that of dry crops, *Khoso* (167) 60224-6.

Screw water lift, found useful, *Azimkhan* (103).

Silt clearance, often not necessary, *Dow*, 59131-2.

Sub-Soil water: research necessary to prevent waterlogging, *Shahani*, 60540.

Tanks and ponds: for storage for winter crops, *Shahani* (203).

WELLS : (See also DRINKING WATER under WELFARE OF RURAL POPULATION.)

Persian wheel worked by bullock power too costly, *Karachi Indian Merchants' Association* (183-4) 60364, 60524-5.

Tube :

Advocated where subsoil is sweet, *Shahani* (203) 60540-1.

Co-operative recommended, *Karachi Indian Merchants' Association* (183-4) 60364, 60524-5.

Power recommended; Research necessary, *Karachi Indian Merchants' Association* (183-4) 60364, 60524-5.

JERROM, J. H. G., Superintendent, Civil Veterinary Department, Sind and Rajputana, Karachi (85-6).

Qualified at Royal College in 1907, came to Karachi in 1921, 59314-5.

ANIMAL HUSBANDRY :

Castration: Increasein, by Burdizzo method, 59309; Not Successful over two years old, 59349-52.

Cattle-breeding: Agricultural Department in charge of, 59306; Profitable, 59316-9.

Karachi cattle: Export, large, to Java, Formosa and Ceylon, for milking, 59316-22; Indian, pure, no non-Indian blood, 59308; Milch, purely, 59307.

RESEARCH :

Veterinary, further facilities desirable (85).

VETERINARY :**Contagious diseases :**

Legislation beneficial, but difficult to enforce and expensive (85) 59326-7.

Obstacles to dealing with: ignorance, not promptly reported (85) 59330; objection to inoculation or slaughter, cattle coming from Indian States (85) 59327.

Department: should be independent (85), 59311; should have a veterinary Officer as its departmental head but might be in charge of Minister of Agriculture, 59328-9.

Dispensaries :

Extension necessary, but prevented by lack of funds (85) 59345; under Local district board, system not satisfactory (85), owing to joint control, 59323-4; Propaganda work necessary (85); Provincial authority should control (85); no Touring order to lack of funds (85), 59333; Use of, by agriculturists, not full (85); Wound cases principally dealt with, 59336-7.

Inoculation: No obstacles to popularising; no fees charged (85) 59325.

Muktesar Institute: extension advocated; should conduct research in the smaller Provinces (85).

JERROM, J. H. G.—contd.

VETERINARY—contd.

Provincial research institutes required in the larger provinces (85).

Research, further facilities desirable (85).

Rinderpest : Principal disease in Sind, Serum-alone method employed, not serum-simultaneous, 59304-5.

Serum : No difficulty in obtaining sufficient (85) 59310.

Staff : Recruitment and pay :

Assistants, all except one, Sindhis ; take scholarships at Bombay Veterinary College ; start at Rs. 75 going up to Rs. 155.

two Inspectors start at Rs. 175, going up to Rs. 225, 59342-8.

Superior Veterinary Officer with the Government of India, appointment of recommended, to co-ordinate and outline policy (85).

Surra : a few cases, 59338.

Veterinary Officer in Sind directly under Bombay Government through the Commissioner in Sind, 59311.

JESWANI (witness), *see under* **KARACHI INDIAN MERCHANTS' ASSOCIATION.**

KALAR LAND, *see* **ALKALI under SOILS.**

KARACHI INDIAN MERCHANTS' ASSOCIATION, Bunder Road, Karachi, represented by Mr. Jeswani (181-97).

Adulteration : has not considered what should be done to prevent, 60400-8 ; to the advantage of the members that pure seed should be supplied to cultivators by small shopkeepers, 60486-94 ; has set up standards of purity for cotton and wheat, 60409-13.

Compulsory arbitration clause used in contracts between members ; has worked quite well, 60478-83.

Members, largely exporters of grain, oil seeds and cotton, 60387-90 ; are largely commission agents, though some own factories ; less than one-fifth export on their own account, 60409-21.

Objects, 60344-6 ; has not interested itself in details of marketing in the mofussil, 60365-8, 60391-3.

ADMINISTRATION :

Director of Agriculture, separate, required for Sind (181).

Posts and Telegraphs : pice postcard, stoppage of, has hit agriculturists badly (183).

Wireless broadcasting should be fully utilised (182) ; loud speakers should be set up by every district local board (183).

Transport :

Railways, should have low rates for agricultural requirements ; feeder lines needed (183).

Roads, miserable state in rural area adversely affects agriculturists (183).

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : insufficient income, heavy interest, lack of education and thrift (183).

Measures for relieving agriculture's burden of debt : making agriculture more remunerative, subsidiary industries, reducing interest and middlemen's profits, education and propaganda, provision of credit facilities, legislation necessary (183).

AGRICULTURAL INDUSTRIES :

Health conditions, devotion of spare time to improving : propaganda for agricultural improvements advocated (184).

Implements, agricultural, manufacture of ; Leather goods, manufacture of ; Oil-seed crushing near large towns ; Toys, wooden ; Weaving, advocated (183-4).

Indebtedness might be relieved by (183).

Study, intensive, of each rural industry : very important ; permanent board recommended (184).

AGRICULTURAL LABOUR : *See under* **LLOYD BARBAGE.**

KARACHI INDIAN MERCHANTS' ASSOCIATION—contd.

ARBITRATION : of disputes, advocated, (183) 60478-85.

Co-OPERATION : Fragmentation of holdings should be prevented by (183).

Joint farming societies, of educated young men, on Lloyd Barrage land, desirable if members do manual work themselves, 60451.

CROPS AND CROP PROTECTION :

Cattle straying, damaging crops : serious ; quick growing hedge plant should be evolved (184) 60518-9 ; prickly pear does not injure crops, grows quickly and supplies itself with water, but gives no crop or fuel, 60526-8.

Pests : serious, making agriculture precarious ; research and then propaganda and demonstration necessary ; expenditure on this may make future remissions of taxation unnecessary (184) 60518.

Seed distribution : smallholder generally gets his seed from zamindar ; village shopkeeper not sufficiently educated to be trusted with distribution, 60486-94.

DEMONSTRATION AND PROPAGANDA :

Cinema and magic lantern advocated (182).

Cultivators : are not conservative ; are willing to adopt methods proved to be effective ; importance of sympathy with (182).

on Cultivators' own fields, advocated (181) ; and on model farms (182).

Leaflets in vernacular and Lectures advocated (182).

Organisation : should be central ; Director of Agriculture should have advisory board representing agriculturists, etc. (181).

Wireless broadcasting should be fully utilised (182).

EDUCATION :

Agricultural :

Bias, all education should have (181).

College at the Research station necessary (182) ; demand for, would arise under Lloyd Barrage conditions, 60375-8 ; preferable to an Arts College, 60434.

High schools, in Lower and Upper Sind, with a four years' course, necessary (182) ; demand will arise under Lloyd Barrage conditions, 60422-4.

Poona Agricultural College : too distant and course too theoretical, 60495-508.

Primary schools :

Agricultural with farms attached ; would prevent migration to towns (181-2).

Boys would attend between the ages of 7 and 10, 60474-7.

Curriculum : reading, writing and arithmetic should also be taught, 60352-3, 60435-6.

Requirements : at least one at headquarters of every division and centre of large group of villages (182).

Agriculture Day, All-India, should be observed (182).

Indebtedness might be relieved by (183).

Mirpurkhas school : failed because it was carried on under artificial conditions and owing to unreasonable attitude of zamindars, which has changed, 60379-81.

Nature study advocated, 60354.

Organisation, should be central ; Director of Agriculture should have advisory board representing agriculturists, etc. (181).

Schools : Attendance should be in the non-crop season and in the afternoon ; methods are too dull (182).

Vocational training of children, advocated, 60352-64.

Wireless, broadcasting should be fully utilised (182).

FORESTS :

Firewood :

Canals, growing of trees on banks of, and of karias, recommended and in huris (184).

Price would be decreased by light railways in forests, 60449.

Grazing :

Corruption in lower ranks of department, 60448-50 ; Fees, heavy, 60448-50 ; Grounds should be attached to every village, 60519-22 ; Restrictions, undue, 60448-50.

Huris : Advocated for fodder and fuel (184) ; small huris should be Revenue free, 60519-23.

KARACHI INDIAN MERCHANTS' ASSOCIATION—contd.**HARIS :**

Batai system : on lift land hari takes two-thirds and zamindar one-third ; on flow lands half and half, 60439.

Loans : hari pays 18 to 36 per cent interest on loans from shopkeepers and zamindars ; most zamindars lend money to haris ; Mohammedan zamindars take interest in produce but not in cash ; hari gets much less than the share of produce which is stated to be given to him, 60439-45, 60531.

Taccavi : advanced by zamindar to hari, usually without interest, usually Rs. 100 per holding of 10 acres of lift land which is irrigated by one wheel, 60461-71.

HOLDINGS :

Fragmentation : essential importance of preventing ; may be prevented by legislation but as far as possible should be done by co-operative effort ; area of individual holdings may be fixed (183) ; 25 acres the smallest economic holding, 60455-7.

Large holdings : not exploited to the best economic advantage of the country when too large, 60455-7.

IRRIGATION :

Distribution : should be by a joint committee, half zamindars ; Engineering Department make mistakes because no agricultural experience, 60446-7.

Grazing grounds, attached to villages, should be supplied free, 60521-2.

Huris : should be supplied free or at lower rates, 60523.

Wells : tube, worked by power, co-operative, advocated ; research necessary ; Persian wheel worked by bullock power too costly (183-4) 60364, 60524-5.

LLOYD BARRAGE : 60451-7, 60495-508. For details *see under* that main head.

MARKETING :

Adulteration (*see under* main title **MARKETING**).

Competition among buyers, good effect of (184).

Cotton Markets Bill : now before Council ; Karachi Indian Merchants' Association thinks it will not improve conditions, 60382-4 ; Jeswani thinks it will help the grower, 60458-60.

Indebtedness :

unfair Prices paid by shopkeepers from whom cultivators have borrowed money ; competition among shareholders decreasing this practice (184).

might be Relieved by reducing undue profits made by middlemen (183).

Information, marketing : reaches cultivators owing to increased competition between merchants, middlemen and buyers (184).

Quality : cultivator has not been encouraged by increased prices to improve quality of his produce, 60365-72.

RESEARCH :

Finance : 1 per cent of revenues of Central and Provincial Governments and $\frac{1}{2}$ per cent of revenues of district boards, should be contributed to an agricultural development fund, 60347-9 ; for all-India 4 crores, in Bombay Presidency 18 lakhs, divisional boards half a crore, 60472-3 ; expenditure on research may obviate remission of land revenue (184).

Hedge plant, quick growing, should be evolved, to protect crops from straying cattle (184), 60518-9 ; prickly pear, 60526-8.

Pests : (184), 60518.

Sakrand Farm : experimenting on watering, seeds, kallar, rotation, etc., 60516-7.

Station :

should be Directed by Director of Agriculture assisted by an advisory board representing agriculturists, etc. (182) 60373-4.

with Permanent endowment, needed in Sind (181).

Sakrand probably a suitable site, 60350-1.

TALUKA DEVELOPMENT ASSOCIATIONS : advocated, 60509.

VETERINARY : Department : officials should attend at peasants' farms (183).

KARACHI INDIAN MERCHANTS' ASSOCIATION—concl'd.**WELFARE OF RURAL POPULATION :**

Drinking water : tube wells worked by power co-operatively, advocated (183).
 Health conditions : economic improvement necessary (184).
 Malaria : regular surveys of talukas necessary (185).
 Non-official organisation proposed to improve economic position of cultivators (185), 60453 ; none exists, 60385-6, 60509-15.
 Surveys : economic and health advocated ; should be non-official (185).

KHOSO, KHAN BAHADUR DILMURADKHAN BAHADURKHAN, President,
 Jacobabad Municipality and Zamindar, Jacobabad (166-74).
 Family holding of land, 60182-4 ; cultivated on batai system, 60192-4 ; 40,000 acres,
 60224, 60235, 60277.

ADMINISTRATION :

Transport : Railways : satisfactory ; Roads, bad, Government grants necessary ;
 Steamers, satisfactory (166).

AGRICULTURAL DEPARTMENT : Services : satisfactory (166).

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : heavy expenses, heavy interest, water deficiency, want of control of taccavi given to haris ; heavy taxation, (*see* Land Revenue), and inadequate remissions, expenses of excavation (167).
 Marketing : borrowers have to sell their produce to sowcars, 60210-3.
 Measures to relieve agriculture's burden of debt : prices of grain should be Published (167) ; Taccavi should be advanced to co-operative credit societies (167).

AGRICULTURAL LABOUR : Scarcity in Jacobabad District, 60207-8 ; due to idling, 60207-9, 60248.

ANIMAL HUSBANDRY :

Breeding : Bhagnari and Cutchi cattle successfully imported to improve breed, 60198-9. Fodder : scarcity of in Jacobabad because there are no forests, 60200 ; Forests : necessary in every taluka for grazing ; Grass land should be free of tax (167).

CO-OPERATION :

Credit societies : Collapse of a society in Jacobabad District owing to non-repayment of loans, 60214-7 ; Taccavi grants should be made to (167).

CROPS AND CROP PROTECTION :

Juar : cultivation of, should be increased (167).
 Rice : cultivation should be Restricted as to irrigation (167) ; consumes 10 times as much Water as dry crops, 60224-6.
 Seed Distribution :
 Wheat : Pusa 12, obtained from Jacobabad Government Farm, 60187-8.
 Variety, large, of crops, advocated (167).
 Wild animals, damage by : more gun licenses should be issued to zamindars (167), 60263-4.

DEMONSTRATION AND PROPAGANDA : Decorations should be given to Zamindars (166) ; Government should give small strips of land to zamindars (166) ; to encourage good cultivation, 60240-1.

EDUCATION :

Administration of educational schemes including adult : could be through zamindars with Government financial help (166).
 Agricultural : (166, 168), 60241, 60273-7.

FERTILISERS : Artificial : less profitable than natural manure (167) ; Cowdung, use of, as fuel : should be penalised (167), 60201-2.

KHOSO, K. B. DILMURADKHAN BAHADURKHAN—contd.**FORESTS :**

- Destruction of, has caused great loss of fuel and grass (168).
- Fodder : scarcity of in Jacobabad because there are no forests, 60200.
- Fuel : loss of owing to destruction of forests in Jacobabad (168), 60201-2.
- Grazing :
 - Charges should be reduced (168), 60265-6.
 - forests necessary in every Taluka for grazing (167).
- Irrigation : water supply should be increased as meadows are insufficient (168).
- Village forests advocated (168).

HARIS :

- Restrictions : legislation advocated prohibiting haris from doing any but agricultural work which they should be compelled to do (168), 60251; and preventing them from leaving the village until they have repaid loans (168).
- Subsidiary industries : haris would profit by, but these should not be encouraged as cultivation would suffer (168); haris are few and insufficient, have no unemployed season : time not occupied in actual cultivation should be employed in land improvement (167), 60252-3.
- Taccavi grants to haris are not properly controlled (166-7); legislation necessary to prevent haris leaving village until they have repaid taccavi loans (168); run away when there are good rains in Baluchistan, 60207-8; legislation necessary to prevent haris absconding with money advanced by zamindars, 60246-7; present law inadequate; Workmen's Breach of Contract Act advocated, 60254-6.
- Tenure : receive a share of the produce on batai system, 60192-4; have no right to the land, 60261-2.

HOLDINGS :

- Fragmentation : difficulty of Mahommedan law of inheritance which cannot be amended (167).
- Legislation to deal with minors, widows, etc.; present law inadequate; zamindars should be attached to Courts to give advice (167).

IMPLEMENTS : Ploughs : Lyallpur ploughs supplied by Jacobabad Government Farm; successful, 60189-91.

Indebtedness, caused by heavy traction, 60248.

IRRIGATION :

- Distribution of canal water : Begari canal : unequal distribution, 60218-23;
- Improvements suggested : silt clearance, excavation of branch karias, prevention of excessive drawing of water, restriction on paddy cultivation (167); Karias should be widened, 60249-50, 60267-70; System of rotation satisfactory (167); great deficiency of water in Jacobabad District (167), 60257-60.

LAND REVENUE : amount levied, 60228-9.

LLOYD BARRAGE :

- Jacobabad district : only part will be benefited, 60203-4.
- Labour : no scarcity when Barrage working if idleness were discouraged, 60209.

MARKETING :

- Information, marketing, should be supplied to zamindars and traders (167); including prices in foreign markets, 60242-5.
- Moneylenders : borrowers have to sell their produce to, 60210-3.

RESEARCH :

- Enquiry necessary as to backward state agriculturally of Upper Sind Frontier district (166); Skilled workers : great need of (166),

SOILS : Improvement : in Jacobabad by increasing water supply (167).

VETERINARY :

- Department : some Assistance given to cultivators, but cultivators not used to taking assistance; 60195; should be under Director of Agriculture (167); Satisfactory (166).

KHOSO, K. B. DILMURADKHAN BAHADURKHAN—conclod.

VETERINARY—*concl.*

Disease: in cattle increasing, research necessary (166).

Rinderpest: inoculation advocated, 60196-7.

LABOUR. *see under* **AGRICULTURAL LABOUR**, and *see* **HARIS under LAND TENURE.**

LAND ALIENATION ACT, *see under* **AGRICULTURAL INDEBTEDNESS.**

LAND REVENUE :

Amount levied, *Khoso*, 60228-9.

LAND TENURE :

BATAI SYSTEM :

Division of produce: on lift lands zamindar takes two-fifths, on flow lands half the produce; a fair arrangement, *Bhutto*, 59135-43.

Hari gets much less than the share of produce stated to be given to him, *Karachi Indian Merchants' Association*, 60446.

Income from rice about Rs. 40 per acre, *juar* Rs. 20, of which zamindar takes half and pays revenue, *Bhutto*, 59246-52.

Rent paid in kind, *Bhutto*, 59227-36.

Zamindar pays assessment, advances taccavi and pays interest, clears kariyas, etc., *Bhutto*, 59195-8.

BURDENS ON LAND :

local Cesses: rasai (providing for touring officials); lapo paid to officials who collect revenues; corruption; assessment Rs. 6-10-0, *Bhutto*, 59199-205; system of administration blamed; committee appointed as to rasai and lapo, but nuisance remains, *Bhutto*, 59253-63; should be discouraged; rasai and lapo come out of zamindar's share of produce, but hari has to contribute labour; touring officials should only accept hospitality from well-to-do people, *Bhutto*, 59281-4.

cases Poverty of cultivator, *Bhutto*, 59154-5.

Settlement every 20 years, *Bhutto*, 59227-36.

Distribution of produce: zamindar takes half on flow land and one-third on lift land, *Dow*, 58998-9.

HARIS :

Co-operative farming society suggested as an experiment, *Rahman*, 60103-4.

Freeholders, haris should be established as, *Dow*, 59068-70, 59108-12.

Education, *see under* that heading.

INDEBTEDNESS :

in Bad seasons zamindars are forced to take cattle of haris in payment and incur losses, *Shewakram*, 60847.

Bania charges 25 to 30 per cent., *Shewakram* (222).

zamindars should be Financed at 6 per cent and should be bound to finance their haris at 9 per cent, *Shewakram* (222); zamindars charge their haris from 12 to 25 per cent, *Shewakram*, 60847.

Mahomedan zamindars lose on advances made to haris who abscond without repaying, *Shakani*, 60572-9, *Shewakram* (222), 60847.

in view of Labour scarcity, should be treated humanely and equitably in order to attract labour from surrounding areas, *Azinkhan* (106).

Loans: hari pays 18 to 36 per cent interest on loans from shopkeepers and zamindars; most zamindars lend money to haris; Mohammedan zamindars take interest in produce but not in cash; *Karachi Indian Merchants' Association*, 60439-45, 60531.

Numbers, by far the largest class of agriculturists, *Rahman* (141).

Outturn: both cultivator and zamindar have an interest in increasing, *Dow*, 59023.

Restrictions: legislation advocated prohibiting haris from doing any but agricultural work which they should be compelled to do, *Khoso* (168), 60251; and preventing them from leaving the village until they have repaid loans, *Khoso* (168).

LAND TENURE—concl'd.**HARIS—cont'd.**

Scarcity of, *Azimkhan*, 59679-80.

Share of produce: some zamindars make small deductions for charity from haris' half share of produce; on 10 acres growing cotton haris would get about Rs. 150 to Rs. 200 under normal conditions, *Rahman*, 60142-8.

Status: entirely dependent upon landlords for agricultural requisities and maintenance, *Rahman* (141); are landless; not very desirable state of things, *Rahman*, 60077-8.

Subsidiary industries: haris would profit by, but these should not be encouraged as cultivation would suffer, *Khoso* (168); haris are few and insufficient, have no unemployed season: time not occupied in actual cultivation should be employed in land improvement, *Khoso* (167), 60252-3.

Suggestions: land could be given to intelligent haris, but not to all. Jamrao colonisation scheme with Punjabis has been successful, but Sindhi haris are indolent and different from Punjabis, experiaent along the lines of the Jamrao suggested under Lloyd Barrage; danger of depriving zamindars of supply of labour, *Rahman*, 60077-85, 60101-2.

Taccavi grants to haris:

Control inadequate, *Khoso* (166-7).

Legislation necessary to prevent haris, leaving village until they have repaid to zamindar, *Khoso* (168), 60207-8, 60254-6, *Karachi Indian Merchants' Association*, 60461-71, *Shahani*, 60572-9.

Workmens' Breach of Contract Act advocated, *Khoso*, 60254-6.

Zamindars advance to haris, usually without interest, *Karachi Indian Merchants' Association*, 60461-71.

Tenure: receive a share of the produce on batai system, *Khoso*, 60192-4; have no right to the land, *Khoso*, 60261-2, *Dow*, 58998-9002, 59021-2, *Bhutto*, 59227-8.

Welfare: are under mujeris who are under zamindars; haris employ labourers, *Shahani*, 60625-30; relations with zamindars are very good; many zamindars treat haris well; zamindars who misbehave should be dispossessed by committees of villages, taluks, etc.; excessively large holdings should be prohibited; status of haris should be improved; should not be quite tenants at will, *Shahani*, 60696-703; taluka development and similar associations recommended; Deccan Agriculturists' Relief Act has made haris more dishonest, *Shahani*, 60708-11, has not known one zamindar who has improved the housing or educational conditions of his haris, *Shahani*, 60726, *Azimkhan*, 59594-8.

Zamindar does not usually help the haris in cultivation, *Dow*, 59067; relationship with, good, *Azimkhan*, 59674-83.

Peasant tenanship, such as exists in Sudan, should be considered, *Dow*, 59071.

LAPO, see BURDENS ON LAND under LAND TENURE.

LLOYD BARRAGE (see also under DOW and MANN).

Agricultural Department: staff will have to be increased, *Rahman*, 60140-1.

Alkali: a distinct danger, but can be met; quantity of salt in the soil greater than in almost any part of the world that is under cultivation; funds for investigation inadequate, *Mann*, 58697-9.

Capital: will be attracted by, *Rahman* (149).

COLONISATION:

Auction of land might encourage speculators, *Mann*, 58654-5.

Capitalist farming should not be excluded but should not be principally relied on, *Mann*, 58708.

by Communities might be tried, *Rahman*, 60120.

Haris: see under LAND TENURE:

Land will be divided into squares on the Punjab plan, *Mann*, 58656.

Policy not yet formulated, *Mann*, 58650-5.

Punjab experience might be utilised, *Mann*, 58694-6.

Small holders, encouragement of, advocated, *Mann*, 58646-9, 58688-90.

large Syndicates and possibly co-operative societies of educated young men should be given grants of land, *Rahman*, 60117-9.

Contouring satisfactory, has been closely done, *Musto*, 59128-30.

LLOYD BARRAGE—contd.**COTTON :**

Baker-Lane scheme does not provide for much cultivation, *Rahman*, 60179.
 on Right Bank supposed not to be possible to grow cotton; if it were possible a great saving of water would be effected, *Mann*, 58680-7.
 Date : water probably available in 1932, *Musto*, 59335-6, 59463-5.
 Development Scheme (*see under MANN*).
 Distribution of water : agitation to lower duties, *Musto*, 59401.

DRAINAGE :

Finance : very large sum of money provided for, *Musto*, 59357.
 Importance attached to drainage, *Musto*, 59362, 59369-71.
 Schemes sufficient to guarantee that no undue waterlogging and soil deterioration will take place, *Musto*, 59358-61.
 Waterlogging will take place if drainage is not attended to, *Musto*, 59400.
 Educated young men : societies for joint farming advocated if members themselves do manual work, *Karachi Indian Merchants' Association*, 60451-2; training, 60495-508.
 Employment : will lead to sufficient, in agricultural operations all the year round, *Rahman* (147).
 Food Crops : percentage of total cropped area will be increased under Baker-Lane scheme, *Rahman*, 60177-9.

FORESTS :

Area : 70,000 acres set aside for, in blocks of varying sizes in old forests which under irrigation will grow excellent timber, *Aitchison*, 60281-7.
 Experiments being made near Sukkur, *Aitchison*, 60308.
 Huris (q.v.) will be irrigated at lower rates; very little water required except to start, *Aitchison*, 60293-4, 60305-7.
 Grazing area for camels and goats will be diminished by, *Aitchison* (175).
 Holdings : should not be too large, *Karachi Indian Merchants' Association*, 60455-7.
 Jacobabad district : only part will be benefited, *Khoso*, 60203-4.

LABOUR :

Attraction of labour from Rajputana and Cutch, *Karachi Indian Merchants' Association*, 60454.
 from Baluchistan, Baluch and Brahuis, *Musto*, 59389-92.
 no Difficulty, because : cultivation under Baker-Lane scheme is mainly rabi and existing cultivation is kharif and flow irrigation requiring half or third labour required under lift irrigation, *Karachi Indian Merchants' Association*, 60454.
 Grants of land should be made to attract, *Rahman* (147-8).
 Implements, labour-saving, will be necessary as there will be labour shortage, *Rahman*, 60129-30.
 Machinery should be used to economise labour, *Musto*, 91.
 no Scarcity when Barrage working if idleness were discouraged, *Khoso*, 60209.
 Non-Barrage area, *see under Irrigation*.
 Regulators on canals, *Musto*, 59416-8.
 Research : (*also see under MANN*) several experimental stations necessary for studying reclamation of kallar lands, duties on water for various crops, waterlogging, drainage and rotations, *Musto* (89); should be provincial, *Musto*, 59421-3.
 Unemployment of cultivators will be decreased, *Musto* (92).
 Waterlogging : danger of, if careful drainage not introduced, *Shahani* (203).

LONGTERM LOANS, *see under FINANCE*.

MALARIA *see under WELFARE OF RURAL POPULATION*.

MANURE *see under FERTILISERS*.

MANN, Dr. HAROLD H., D.Sc., Director of Agriculture, Bombay Presidency (1-9).

DEMONSTRATION AND PROPAGANDA :

Demand : great owing to change of methods, 58644-5.
 Staff : in future will consist, as far as possible, of Sindhi Mussalmans, trained at Poona and Sakrand, 58641-3, 58691-3.

MANN, Dr. HAROLD H.—contd.**EDUCATION :**

Agricultural College for Sind, strong local demand for, 58643, Poona Agricultural College is too far away; Lyallpur Agricultural College charge the whole cost of students; College should be situated in Barrage area, 58700-7.

LLOYD BARRAGE :

Alkali : a distinct danger, but can be met; quantity of salt in the soil greater than in almost any part of the world that is under cultivation; funds for investigation inadequate, 58697-9.

Colonisation :

Auction of land might encourage speculators, 58654-5.

Capitalist farming should not be excluded but should not be principally relied on, 58708.

Policy not yet formulated, 58650-5.

Punjab experience might be utilised, 58694-6.

Land will be divided into squares on the Punjab plan, 58656.

Small holders, encouragement of advocated, 58646-9, 58688-90.

Cotton : supposed not to be possible to grow cotton on Right Bank; if it were possible a great saving of water would be effected, 58680-7.

Development Scheme :

Progress : further development of scheme advocated before 1931, when water will become available; big developments in 1935-8; 40 years to complete project, 58626-8; present proposals will be ready within 12 months, 58639; in the following year proposals will be put before Government in connection with Right Bank conditions, 58657-9; Rs. 1,35,000 passed by Council; additional expenditure proposed, 58672-9.

Proposals of Committee in 1924 accepted by Government in a very curtailed form because of heavy cost; rate of progress unsatisfactory, 58628-8.

Research staff can be recruited, 58667-70.

RESEARCH :**Larkana :**

Central station for Lloyd Barrage Right Bank Canals; rice and bosi wheat area, with annual cropping, 58631-4; farm has been in existence since 1906; will be extended, 58660-1.

Progress : two years to get Right Bank into full working order, 58665-6; running expenses 1 lakh, 58676-9.

Water supply from Ghar canal and bores; tube wells will be constructed, 58660-3.

Sakrand :

Central Cotton Committee contributing Rs. 20,000 a year for soil research, 58652-3. Scope : established as representing left Bank Rohri Canal area, the largest section, with sub-stations to work out results, 58629-31; a cotton area with one cropping in 3 years, 58629-40.

Staff : will have 3 first class research officers, of whom one will be whole-time Director, 58629-40; botanist engaged on cotton, wheat and juar, 58652-3.

Water : tube well constructed, 58663-4.

Stations : 3 proposed :

Central station for Nara Valley, Representing Eastern Sind, 58629-40; no research stations other than Sakrand and Larkana to be started next year, 58665.

Larkana : *see above.*

Sakrand : *see above.*

MARKETING :**ADULTERATION :**

(*see also under COTTON and WHEAT below.*)

Agricultural Department should interest itself in the problem, *Karachi Indian Merchants' Association*, 60407-421.

lack of Contact between exporters and cultivators, *Karachi Indian Merchants' Association*, 60404-6.

MARKETING—contd.

ADULTERATION—contd.

grain Contracts between exporting firms and commission agents specify percentages of foreign matter; doubtful if exporters will insist upon purity, *Karachi Indian Merchants' Association*, 60425-33.
 often not Deliberate, *Karachi Indian Merchants' Association*, 60398.
 cannot be done by large Exporters who are interested in seeing that produce is pure, *Karachi Indian Merchants' Associations*, 60399.
 Originates where produce is grown and not at the port, *Karachi Indian Merchants' Association*, 60394-6.
 supposed to be by village Shopkeeper, *Karachi Indian Merchants' Association*, 60397.
 Competition among buyers, good effect of, *Karachi Indian Merchants' Association* (184).
 Co-operative, see PURCHASE AND SALE SOCIETIES under CO-OPERATION.
 Co-operative ginning and marketing advocated, *Shahani* (205).

COTTON:

Adulterated with leaves, dry bolls and water; no premium paid for purity by trade who themselves adulterate; legislation necessary, *Rahman*, 60094-100.
 American, spread of, restricted in the past by bad marketing conditions, *Dow*, 58977-9.
 Conditions unsatisfactory, not Graded, no regular Markets, *Azimkhan* (106-7); *Shahani* (205).
 Cotton Markets Bill: now before Council; *Karachi Indian Merchants' Association* thinks it will not improve conditions, *Karachi Indian Merchants' Association*, 60382-4; *Jeswani* thinks it will help the grower, 60458-60; required, *Azimkhan* (109).
 Factories appoint agents who appoint village Sowcars sub-agents, *Azimkhan* (107).
 Ginning factories give reasonable conveniences to growers; their brokers arrange sales on growers' estates, supply gunnies, and arrange forward sales, *Rahman* (148).
 Karachi merchants, factories sell ginned and baled cotton to, *Azimkhan* (107).
 Middlemen's margin very large, *Shahani* (205).
 Premium seldom paid to cultivators for improved quality, *Azimkhan* (108).
 no better Price paid for long staple than for short, *Shahani* (205).
 small Quantity of long staple offered for sale, *Shahani*, 60560-2.
 Sowcar, cultivator at the mercy of, who does not quote proper market rates and uses false weights, *Azimkhan* (107).
 Credit, need of, to enable cultivators to wait for the better prices, *Azimkhan*, 59525-7.

FACILITIES:

Defective, especially sale of cotton: inadequate price and weight, excess of middlemen, no premium paid for improved varieties, *Azimkhan* (106-7).
 existence of Ginning factories of responsible firms guarantees fair values being obtained, *Rahman* (148).
 no regular Markets in the sense in which they exist elsewhere; but there are trade markets which are adequate for *bona fide* transactions where zamindar is not in debt, *Rahman* (148), *Hussain* (132).
 Satisfactory, *Bhutto* (72).
 Government should not interfere in packing, grading, etc., for market, *Bhutto* (72) 59278.
 Fertilisers, sale should be under guaranteed government analysis, *Shahani* (204).

GRADING AND PACKING:

Attention required, *Rahman* (148).
 Factory owners generally gin and bale cotton without sorting or grading, *Azimkhan* (107).
 Legislation necessary, *Rahman* (148).
 Standardisation of grading recommended, *Rahman* (148).

MARKETING—contd.**INFORMATION :**

Co-operative societies should supply, *Bhutto* (72).
 Cultivators obtain owing to increased competition between merchants, middlemen and buyers, *Karachi Indian Merchants' Association* (184).
 should be supplied to cultivators, *Azimkhan* (107), *Hussain* (132), *Rahman* (148), *Khoso* (167) 60242-5, *Shahani* (205).
 Telephone facilities should be placed at disposal of zamindars at nominal charges, *Shewakram* (222).
 Legislation: Marketing Bill should be enacted, *Azimkhan* (107) (109) 59598; *Karachi Indian Merchants' Association*, 60382-4, 60458-60, *Azimkhan* (109).

MIDDLEMEN :

Margin very large, *Shahani* (205).
 Number excessive, *Azimkhan* (107).
 Sowcar, cultivator at the mercy of, *Azimkhan* (107), *Hussain* (131-2), *Khoso*, 60210-3.
 Moneylenders: are middlemen; buy agricultural produce at very low prices and cheat in weightment, *Hussain* (131); buy crop before harvest and sell back to cultivator at 20 per cent. profit 6 months later, *Hussain* (132), *Khoso*, 60210-3.
 Premium for improved quality: rarely paid to cultivator, *Azimkhan* (107).
 Prices, unfair, paid by shopkeepers from whom cultivators have borrowed money; competition among shop-keepers decreasing this practice, *Karachi Indian Merchants' Association* (184).

QUALITY :

Cultivator has not been encouraged by increased prices to improve quality of his produce, *Karachi Indian Merchants' Association*, 60365-72.
 Names of distributors, *Shahani* (205) (208) 60546-52.
 Revenue collection compels cultivators to sell crop before harvest at low prices, *Hussain* (129) (132).

RICE :

local Capitalists who have mills control market, but tendency to combine slowly decreasing owing to increase in number of mills, *Rahman* (148).
 Chain of markets required which is prevented by lack of better roads and feeder lines, *Rahman* (148).
 Conditions not satisfactory, *Rahman* (148).
 Prices not always determined by supply and demand, *Rahman* (148).

RAILWAYS : } see **TRANSPORT under ADMINISTRATION.**

ROADS :
 Weights and measures: moneylenders cheat in weightment, *Hussain* (131); *Azimkhan* (107).

WHEAT :

Adulteration suspected; marketed on the basis of certain admixture of foreign grain, *Rahman*, 60091-2.
 Bania adulterates, *Rahman*, 60094-6.
 European markets pay less for lower standards of purity but this has not improved purity of exported wheat, *Rahman*, 60099.
 Exporting firms have sub-agencies at principal centres which purchase from big zamindars or through local traders at satisfactory prices, *Rahman* (148).
 Legislation suggested, *Rahman*, 60092.
 thought that some Merchants outside India accept wheat not pure and Indian export firms adulterate to that standard, *Rahman* 60100.
 no Premium paid for purity, *Rahman*, 60092.
 Small growers sell to village bania at low rates, *Rahman*, (148).

METEOROLOGICAL DEPARTMENT, see under ADMINISTRATION.

MIDDLE CLASS YOUTHS, ATTRACTION of, TO AGRICULTURE.

by making Agriculture more profitable, *Bhutto* (66).
 by Demonstration that agriculture can be made profitable, *Shahani* (199).

MIDDLE CLASS YOUTHS, ATTRACTION OF, TO AGRICULTURE—contd.

by Grants of Land, *Shahani* (199), obstacles, lack of amenities, land and water, *Shahani*, 60636-43, 60684-93, 60727-8.
 Middle class youths attracted to agriculture should be willing to start as haris, *Dow*, 59073-4, 59122-9.
 by Restricting appointments in Agricultural, Forest and Revenue services mainly to such men when agriculturally trained, *Shahani* (199).
 by Scholarships, *Khoso* (166).

MOHAG (frontage) :

deterred by : lack of amenities on the land sought by educated people, 60636-43, and lack of land itself and of water, 60684-93, 60727-8.
 Fallow forfeited land included in zamindar's existing mohag, *Dow*, 59024.
 Meaning of : claim to land in the frontage of a zamindar which cannot be granted to another zamindar without injuring the former's rights of user or access to his existing holding ; never claimed or recognised as a legal right ; founded on conditions attaching to inundation irrigation, *Dow*, 58947-50 ; *Harrison*, 58791-2.
 Provision for : Government in Lloyd Barrage scheme setting aside 3½ lakhs of acres representing 25 per cent of the total Government land available, *Dow*, 59024, 59079-80.
 necessary to Recognise the claim to some extent under the Lloyd Barrage, *Dow*, 58951-52.

MONEYLENDERS, see under AGRICULTURAL INDEBTEDNESS.

MUJERIS : Managing cultivators : hold land under zamindars, which they let to haris, *Shahani*, 60629-30.

MUSTO, A. A., C.I.E., M.INST.C.E., Superintending Engineer, Lloyd Barrage Circle (89-102).

Experience : 59363-4, 59372-4, 59450-1 ; 59463-5.

ADMINISTRATION :

Transport :

Railways : should be greatly extended (89).
 Roads : should be greatly extended (89) ; lack of Materials locally (97-8), 59402-3 ; Neglect by District Boards, 59405-6 ; Research as to use of brick and waste oil, 59404.

AGRICULTURAL DEPARTMENT :

Implements :

Officers do not understand manufacture of (92).

AGRICULTURAL INDUSTRIES :

Implements, manufacture of locally, should be encouraged (91-2).
 Industrial concerns in rural areas : require full-time labour (92).
 Leisure period : far less with perennial water-supply under Lloyd Barrage (92).
 Private enterprise should develop (92).
 Study of, by practical experts, necessary (92).
 Village health conditions, spare-time should be devoted to (92).

AGRICULTURAL LABOUR :

Cultivation and development of areas not at present under cultivation :
 Necessity of measures in newly opened areas under the Barrage, doubtful (92-3).
 free Water should be given for two years, if necessary (92-3).
 Machinery, should be used to economise labour under Lloyd Barrage conditions (91).
 Migration : might be encouraged by free excursions to show conditions and by facilities for purchasing land (92).
 Shortage of labour : none in Sind except in rice-transplanting and reaping seasons (92).

CAPITAL ATTRACTING OF, TO AGRICULTURE :

Water supply must be assured (94).

MUSRO, A. A.—contd.

Co-OPERATION :

- Amateurs, employment of, undesirable (93).
- Cattle breeding societies, doubtful (94).
- Consolidation of holdings :
 - Societies should undertake (94).
 - holdings already Uneconomic should be acquired by the State (94).
- Domestic current expenses, credit should be provided for (93).
- Expert from Sweden, Denmark or England should be employed by Government (93).
- Implements :
 - might be Hired out by societies (93).
 - Repair depôts should be maintained by societies (91-2).
 - should be Stocked and issued by societies (91-2).
- Importance of, great (93).
- Improvement of land for general benefit of locality should be financed and carried out on a co-operative basis (94).
- Joint farming, doubtful (94).
- Minorities should be compelled to come into joint improvement schemes, if large majority are in favour and scheme is approved by experts (94).
- Purchase societies : should stock, sell and hire out implements and machinery (93).
- Sale of produce and stock, expert examination of possibilities desirable (94).
- Seed depôts : might be financed by Government and managed by co-operative societies (89).
- Trained officers should remain at the work, 59434-8.

CROPS AND CROP PROTECTION :

Seed :

- Depôts should be financed by Government and managed by co-operative societies or Government (89).
- Free issue, value to be recovered from crop, until good strains are established (89).

DEMONSTRATION AND PROPAGANDA : on Cultivators' own fields, with normal water supply, if possible (89).

FINANCE : Seed might be issued free of cost and value recovered from crop, till good strains are established (89).

FORESTS :

- Afforestation : probably opening for schemes, in the neighbourhood of villages (93).
- Firewood and fodder production should be encouraged by remission of assessment (93).

HOLDINGS :

- Co-operative societies should prevent fragmentation ; holdings already uneconomic should be acquired by the State (94).
- Fragmentation :
 - Evil more serious in Deccan than in Sind, 59398-9.
 - State purchase system might remedy (89-90).

IMPLEMENTS :

- Chaff-cutters, 59379-80.
- Co-operative societies should stock, issue on easy payment terms and maintain repair depôts (91-2).
- Co-operative societies should finance purchase of, manufactured by private enterprise (91) 59452-7.
- Demonstrations should be made by Agricultural Department (91).
- Harrow, produced locally in the Deccan, 59378.
- Local manufacture (91-2).
- Obstacles : Agents : lack of, in the mofussil (92).
- Finance : difficulty of purchaser paying cash (92).
- Ploughs : Importance of (91) 59375-7.
- Iron, designed locally, probably better than European design (91).

MUSTO, A. A.—contd.

IMPLEMENTS—contd.

Private enterprise should be encouraged to hire out expensive machinery (94).
Tractors: Caterpillar on wet ground, 59407-9; Difficulty on sandy soil not insuperable, 59480-4; Private company should undertake ploughing, too much capital would be required for co-operative society, 59410-3; Steam and motor, should be encouraged where possible (91), for reclaiming kallar soil, 59386-7.

IRRIGATION :

Baluchistan, possibilities of control of water from (90), 59472.
Barrages on Indus at extreme North of Sind and at Kotri should be investigated (90); desirable within 15 years, 59439-41; investigation to start at once; Department is under-staffed, 59466-71.
Clearance of canals: sufficient money spent on; no money earmarked for the purpose, 59420.
Distribution of canal water: by open karia heads or plain sluices, entirely unsatisfactory, favouring the upper reaches (90-1), 59364. (*See* Modules.)
Experimental stations: several required (89). (*See under* Research.)
Inspector General of Irrigation: post should be revived, 59426-7.
Lift: centrifugal pumps best, 59381-2.
Modules:
 Advocated (90-1); under Consideration for 20 years, 59419; to give Equal shares to head and tail, 59364-7; Successful in the Punjab, 59476-7; different Types suitable for different conditions, 59444-9; Zamindars at tail in favour while head zamindars are oppose-1, 59478-7.
Non-Barrage Zone; Barrage will have very little effect on level of Indus below it, 59414-5, 59478-9.

LLOYD BARRAGE :

Contouring satisfactory, has been closely done, 59428-30.
Date: water probably available in 1932, 59335, 59463.
Drainage:
 Finance: very large sum of money provided for, 59357.
 Importance attached to drainage, 59362, 59369-71.
 Schemes sufficient to guarantee that no undue waterlogging and soil deterioration will take place, 59358-61.
 Waterlogging will take place if drainage is not attended to, 59400.
Distribution of water: agitation for lower duties, 59401.
Labour: from Baluchistan, Baluchs and Brahuis, 59399-92.
Regulators on canals: 59416-8.
Research: several experimental stations necessary for studying reclamation of kallar lands, duties on water for various crops, waterlogging, drainage and rotations (89); should be provincial, 59421-3.
Unemployment of cultivators will be decreased (92).

RESEARCH :

Administration: both Provincial and Central, 59421-31, 59425-7.
should be Co-ordinated by Inspector General of Irrigation, who should be re-appointed, 59425-7.
Hydraulic experiments: could be carried on at Sukkur; research officer should be appointed to investigate purely irrigation hydraulic problems, 59424.
Road-making; use of bricks and waste oil, 59404.

SOILS :

Drainage: Importance of (91).
 Valley lines should be entirely kept open and given free outlet (91).
Kallar soil: deep cultivation necessary: use of tractors, 59386-8.
Reclamation of land should be encouraged by temporary remission of assessment (91), 59431-3.

STATISTICS :

Baluchistan mountains, rainfall statistics necessary (90).
Improvement in, necessary (94).

MUSTO, A. A.—contd.**STATISTICS—contd.**

should be Published in more intelligible and interesting form (94).

TARIFFS AND SEA FREIGHTS :

Custom duties on agricultural implements and machinery might be removed (93).
Director General of Stores, London, Co-operative supplies might be shipped by (93).
Sea freight : too high (93).

WATERLOGGING :

Cause, often blockage of valley lines (91).
Lloyd Barrage system will suffer from if drainage is not attended to, 59400.

WELFARE OF RURAL POPULATION :

Gardens round houses necessary (92).
Horticultural shows would be beneficial (92).
Surveys, economic, in typical villages : useful if information is properly applied (94).
Town-planning necessary (92).
Trees should be planted in village by public bodies (92).

PANCHAYATS :

should Arbitrate in disputes as to holdings, *Shahani* (203).
Organisation has disappeared under stress of western democratic ideas, *Shahani*, 60615-7.
Taccavi, should assist in distribution of, *Shahani* (201).

POSTS AND TELEGRAPH, see under ADMINISTRATION.**POULTRY, see under AGRICULTURAL INDUSTRIES.****PROPAGANDA, see under DEMONSTRATION AND PROPAGANDA.****PUBLIC HEALTH, see under WELFARE OF RURAL POPULATION.****PUNJAB LAND ALIENATION ACT, see under AGRICULTURAL INDEBTEDNESS.****QUININE, see under WELFARE OF RURAL POPULATION.**

RAHMAN, KHAN BAHADUR GULMAHOMED ABDUR, Acting Deputy Director of Agriculture, Sind (139-65).
Qualifications and experience, 59900-4, 60022-5.

ADMINISTRATION :

Meteorological Department : weather forecasts circulated, would be appreciated (143).

Transport :

Railways : should be Extended in rural tracts (142) ; Feeder lines necessary for marketing of wheat, 60086-90 ; fairly Satisfactory (142).
Roads : Insufficient and unsatisfactory (142-3) ; Marketing : lack of roads prevents provision of chain of markets for rice (143) ; and adversely affects marketing of wheat, 60086-90.
Steamers, fairly satisfactory (142).

AGRICULTURAL DEPARTMENT :**Staff :**

Demonstration and propaganda, insufficient for (142), 59947 ; Requirements when Lloyd Barrage is working, 60140-1 ; Statistics, insufficient for (149).

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : poverty, accumulation of interest upon interest, low yield, cultivation expenses, illiteracy and ignorance of account (143), 60134-6 ; bondage to usurer, precarious inundation, social customs (143).

RAHMAN, K. B. GULMAHOMED ABDUR—contd.

AGRICULTURAL INDEBTEDNESS—contd.

Measures for lightening agriculture's burden of debt : compulsory primary education and cheap credit (143), 60134-6.

Repayment prevented by : Crop failures due to poor or late inundation or pests, mortgage of produce to bania and his extortions (143).

Sources of credit : co-operative societies, taccavi, village *bania* (143).

AGRICULTURAL INDUSTRIES :

Bee-keeping : climatic conditions do not favour (147).

Fruit growing : prevented by cultivator having no permanent interest in the holding and unfavourable conditions of water supply (147).

Health conditions, devotion of spare time to improving : travelling health officers should lecture on hygiene (147).

Industrial concerns, establishment of, in rural areas : ginning factories and rice hulling mills established near rural areas and absorb some spare labour ; small flour mills might be opened in wheat growing tracts (147).

Lac culture : some scope for ; practised wherever necessary material is available (147).

Leisure period : Where both rabi and kharif cultivation is possible, cultivator works all the year round ; where kharif only is possible, he has 6 months' work ; in the slack season he takes holidays at fairs, etc., does carting, canal clearance, building labour, tends livestock ; Lloyd Barrage will lead to sufficient employment in agricultural operations all the year round (147) ; work for 8 to 10 months in Upper Sind Frontier under boai system of cultivation, 60121-8.

Pisciculture : no scope for, as large quantity of fish available naturally (147).

Poultry rearing : done on a limited scale (147).

Rope-making : some scope for ; practised wherever necessary material is available (147).

Scope for : not much, because haris do not lack employment, 60125.

Sericulture : Climatic conditions do not favour (147).

Weaving : prejudice against, 60127.

AGRICULTURAL LABOUR :

Attracting labour : under Barrage grants of land should be made (147-8).

Cheap labour an obstacle in adoption of heavy machinery and labour-saving appliances (146).

Haris : See under LAND TENURE.

Population : Sparse (147) ; Sufficient for present needs of cultivation ; no surplus (148).

Shortage expected when Barrage is completed ; labour saving implements will be necessary, 60129-30.

ANIMAL HUSBANDRY :

Bhagnari cattle : Bred in the north of Sind (146) ; should have Central breeding farm at Jacobabad (146) ; purely Draught (146) ; bred for Military transport, not suitable for agricultural purposes, 60010.

Bulls should be issued gratis from Government cattle stations to important villages (147).

Cattle breeding :

stud Bulls in Government institutions, free access to, 60064 ; Central station for each breed essential (146) ; Export demand, 60059-60 ; Immediate attention needed as cattle are the only motive power (146) ; Lack of knowledge, 60063 ; does not Pay except near towns where milk can be sold, 60058-61 ; Quality : in interior of Sind cattle all nondescript and poor (146), 60006-7 ; System unsatisfactory (146).

Castration, practice of, must be introduced (146), 60019-21.

Dual purpose cattle, advocated, 60166-7.

Fodder :

Bajri grown, 60171 ; Berseem : has been tried (145) ; no prospects for until cold weather water supply ; would solve fodder supply to a great extent, 60056-7 ; Dry, is sold ; cattle are fed during the busy season and starved during the remainder of the year (147) ; Green, insufficient during hot weather (146) ; shortage seriously

RAHMAN, K. B. GULMAHOMED ABDUR—contd.

ANIMAL HUSBANDRY—contd.

- affects milk supply from December to July (147); Storage: not necessary, 60131-2; not stored in silos but in heaps, 60172-3.
- Grazing:
 - "Huri" grants should be made by Government for growing babul trees and natural grasses, to be managed by the villagers co-operatively (147).
 - Insufficient owing to non-cultivation and inadequate irrigation facilities (146).
- Karachi or Red-Sindhi cattle:
 - Bulls: a farm for supplying pedigree bulls exists (146); thrive in Japan, etc., 60168-70; Purity, the only definitely pure type, 60015-7; Quality: recognised as the best milk-producing cow in India (146); Small in size and number, 60008-9.
- Shows, cattle, should be held in each taluka (147).
- Thar Parkar or Dhatti cattle:
 - Dual purpose (146); not Pure bred, all mixed, 60017-8, 60174-5; Reared in Thar Parkar desert (146); Size medium, 60008; breeding Station to supply draught advocated (146), 60174-5; Number small, 60008-9.

CAPITAL, ATTRACTING OF, TO AGRICULTURE:

- Improvements of land: discouraged by want of capital (149); Long term credit at low interest necessary (149); Lloyd Barrage: will attract capital (149);
- Obstacles: dullness of country life and precarious seasons (149).

CO-OPERATION:

- Credit societies: number has increased very greatly in the last few years (148).
- Farming, joint, society:
 - of Educated young men, on Lloyd Barrage land, might be tried, 60118.
 - of Haris, worth while trying as an experiment, 60103-4.
- Fertilisers distributed through societies, 60156-62.
- Non-credit societies: with few exceptions, not organised (148).
- Non-officials; more effective than Government in spreading movement (148); command more confidence; are coming forward, 60069-70.
- Tractor-leasing societies: 60115-9.

CROPS AND CROP PROTECTION:

- Cotton:
 - Baker-Lane scheme does not provide for much cotton cultivation under Lloyd Barrage, 60179.
- Egyptian:
 - Cultivated under Fletcher for nearly 5 years, 59998-9, 60002-4.
 - Experiments abandoned except at Sakrand renewed with fresh seed from Egypt, 60000, 60041-6.
 - Failed on Jamrao, after showing Promise of success, for lack of early water supply (145), 60000-1.
- Punjab F. 4: (American):
 - Qualities: has proved to be healthy and prolific, fitting in with present conditions of water supply and possibly other environmental conditions; popular (145), 59983.
 - Quantity: 36,000 acres on Jamrao Canal 1926-27 (145).
 - Staple, medium, $\frac{5}{8}$ inch; superior staple strain should be evolved (145), 59983-7.
- 27 W. N.:
 - Quality superior to deshi and is being distributed (144); type, 60005.
- Food crops; 81 per cent of total cropped area; percentage will increase under Baker-Lane Scheme under Lloyd Barrage; not much cotton cultivation, 60177-9.
- Important crops: cotton, wheat, rice and juar (144).
- Output: 23 per cent decrease and distinct decrease in cropped area in Karachi; thought to be due to insufficient water supply, 60033-40.
- Potato seed imported from Italy, Kalka and Farukhabad; imported disease has not arisen (145).
- Rice: selection of local and foreign varieties and hybridisation (144-5).
- Seed distribution, particulars regarding (145), 60051-5.

RAHMAN, K. B. GULMAHOMED ABDUR—contd.

CROPS AND CROP PROTECTION—contd.

Seed improvement : by selection, isolation of superior strains and maintenance by pure line culture (144) 60153-5.

Wheat :

Improvement of local wheats (144); Introduction of Pusa 12 c and Punjab 11 (144); Pusa 12 being grown on 50,000 acres; is being extended; difficulty, lack of steady water supply; cultivator convinced of benefit (144), 60047-50.

CULTIVATION :

Bosi system : in Upper Sind Frontier; land flooded in September and wheat grown without further irrigation; provides work for 8 to 10 months in the year, 60121-4. Dry-cultivation (without irrigation) impossible in Sind except desert portion of Thar Parkar and part of Karachi District, 59911-8.

Interculturing cotton by plough, thus saving labour (145).

Mixture of seeds when sowing not generally adopted in Sind, but mixed jwar, bajri, maize and til sprinkled in cotton to supply early fodder for working cattle (145).

Ploughing, dry, long before sowing season, to aerate and enrich the soil, is practised in some tracts as a result of departmental demonstration (145).

Rotation :

Experiments carried on, until Jamrao perennial water supply failed; being carried out at Sakrand under Barrage conditions, 60065-6.

not Necessary at present as irrigation facilities only allow one-third of the land to be cultivated per annum; but under improved irrigation a good rotation must be devised (145).

DEMONSTRATION AND PROPAGANDA :

on Cultivators' own holdings, advocated (141), 59948, 59963, 60153-5.

Decorations awarded at district Durbars (142).

Farms, departmental :

on the Batai system, the department taking one-third produce on lift irrigation and one-half on flow, 59959-60; 400 or 500 acres cultivated for multiplying seed by haris on a commercial basis, with no special advantages beyond those arising from better seed and cultivation and advances without interest, 59947-58.

Jamesabad and Nawabshah sub-stations, managed on zamindari lines (142).

Landlords, wield considerable influence, and must be influenced to make improvements (141).

Leaflets, periodical publication of, advocated, though not very effective among illiterate cultivators (142).

increased Price of 12 annas to Re. 1 per maund for improved seed, for which there is a very active demand, 59947-67.

Shows, agricultural, held (142).

Staff :

Insufficient : Importance of personality; number of Scholarships increased under new development scheme (142), 59947, 60163-5.

EDUCATION :

Account-keeping, importance of teaching (140).

Agricultural :

Bias schools :

Agriculture only taught in higher standards, boys aged 13 to 18, 59933-5.

Control : local boards have administrative control but agricultural department lays out farms and visits in an advisory capacity, 59929-31.

few sons of Cultivators, boys have no idea of taking up agriculture, 59936-8.

Farm of about an acre attached to each; some buy or hire bullocks, 3 agricultural lessons of 1½ hours each per week, 59939-41.

Number : six in an experimental stage (139), (148).

not working Satisfactorily because not the right type of boy, 59942, 60161-2.

Schoolmasters trained for 6 months at Lyallpur, 59931.

Careers of students : Government service (139-40).

Students : mainly sons of landless haris (139-40).

RAHMAN, K. B. GULMAHOMED ABDUR—contd.**EDUCATION—contd.**

Agricultural College for Sind : demand for, from certain sections, townspeople and a few zamindars; not necessary because not sufficient jobs for students when leaving, 60071-5, 60105-8.

Committee of 1920 on, Report (140-1).

Compulsory primary education : advocated, to protect cultivators from extortion of moneylenders, (143) 60134-6.

English : should be taught; boys cannot be kept on the land by refusing to teach them English, 59944-6.

Haris : little use in establishing agricultural schools for sons of (140-1); should not be admitted to zamindari schools, 60149-50.

Mirpurkhas Agricultural School : particulars regarding, (139), 59919-28, 60032-7, 60151-2.

Mullas' agricultural schools recommended (141), 60136.

Scheme for agricultural school, (140-1), 59988-9, 59992-7, 60036-7, 60075-6, 60149-50.

FERTILISERS :

Artificial : for wheat, sugarcane, etc., distributed through a private firm and co-operative societies, 60156-62.

Cowdung, use of, as fuel, and recommendations to prevent, (144).

Fallow system, taking a crop every 3 years, has obviated great use of manure (144).

Kalar soil : saline efflorescence applied to cotton fields (144).

Need of, only with intensive cultivation (144), under irrigation, 60156-62.

Silt from canal banks applied to cotton fields (144).

Village, old sites, mounds used in cotton tract (144).

FINANCE (see also under) CAPITAL.)**Taccavi :**

Cultivators would be induced to make fuller use of by : reducing interest to that paid by Government to public plus cost of establishment; fully meeting demands of cultivators; distribution by senior and vigilant officers (143) 60137.
in Jamrao tract implements advanced as taccavi (141).

HOLDINGS, Fragmentation of : Inheritance law mainly responsible for, should be amended; Minimum area should be prescribed by law (143).

IMPLEMENTS :

Archimedian hand screw : on the market and being used to some extent (141).

Labour-saving implements : will be necessary after Lloyd Barrage is completed as there will be shortage of labour, 60129-30.

List of implements being brought to the notice of the agriculturists (146).

Obstacle : cheap labour and hari system (145-6).

Ploughs :

Egyptian (145), Meston (141) (145); Sarkar (141).

Ploughing zamindari lands on hire system, to train haris in use of improved implements (142).

Quality and variety very poor (145).

Tractors :

Cultivation costs, 59968-70, 60109-10.

Department recently rented out a tractor, 60115-16.

Difficulty owing to smallness of plots under irrigation rules and undergrowth, 59970.

Educated young men holding land co-operatively might use tractors, 60117-9.

Efficiency of, 60111-4.

RAHMAN, K. B. GULMAHOMED ABDUR—contd.

IRRIGATION :

Distribution : should be entrusted to a board of representatives of zamindars, Agricultural and Irrigation Departments, 60138-9.
Non-barrage area, loans, taccavi or co-operative, necessary to encourage development of wells (144) 60067-8.

LAND TENURE :

Fruit growing : prevented by cultivator having no permanent interest in the holding (147).
Haris (tenants) :
 haris Co-operative farming society worth while trying as an experiment, 60103-4.
 Education : *see under* that title.
 Numbers : by far the largest class of agriculturists (141).
 Share of produce : value of, under normal conditions, 60142-8.
 Status : entirely dependent upon landlords for agricultural requisites and maintenance (141) ; are landless ; not very desirable state of things, 60077-8.
 Suggestions : land could be given to intelligent haris, but not to all. Jamrao colonisation scheme with Punjabis has been successful, but Sindhi haris are indolent and different from Punjabis, experiment along the lines of the Jamrao suggested under Lloyd Barrage ; danger of depriving zamindars of supply of labour, 60077-85, 60101-2.

LLOYD BARRAGE :

Agricultural Department : staff will have to be increased, 60140-1.
Capital : will be attracted by Barrage (149).
Colonisation :
 by Communities might be tried, 60120.
 Haris : *see under* Land Tenure.
 large Syndicates and possibly co-operative societies of educated young men should be given grants of land, 60117-9.
Cotton : Baker Lane Scheme does not provide for much cultivation, 60179.
Employment : will lead to sufficient, in agricultural operations all the year round (147).
Food Crops : percentage of total cropped area will be increased under Baker-Lane Scheme, 60177-9.
Labour :
 Grants of land should be made to attract (147-8).
 Labour-saving Implements will be necessary as there will be labour shortage, 60129-30.

MARKETING :

Cotton :
 Adulterated with leaves, dry bolls and water ; no premium paid for purity by trade who themselves adulterate ; legislation necessary, 60094-100.
 Ginning factories give reasonable conveniences to growers ; their brokers arrange sales on growers' estates, supply gunnies, and arrange forward sales (148).
Facilities :
 existence of Ginning factories of responsible firms guarantees fair values being obtained (148).
 no regular Markets in the sense in which they exist elsewhere ; but there are trade markets which are adequate for *bona fide* transactions where zamindar is not in debt (148).
Grading and packing :
 requires serious Attention (148) ; Legislation necessary (148), grading should be Standardised (148).
Information, marketing, should be put at disposal of cultivators, etc. 148).
Rice : *see under* **MARKETING**.
Wheat : *see under* **MARKETING**.
Transport : *see under* **ADMINISTRATION**.

RAHMAN, K. B. GULMAHOMED ABDUR—contd.**RESEARCH :**

Mirpurkhas Farm : Cotton breeder appointed in 1922 (139).

Plan of experiments : drawn up by committee consisting of Director of Agriculture, Botanist or Cotton Breeder and Acting Deputy Director, 60026-8.

Sakrand Research Station, to study post Barrage problems : Baker-Lane Scheme of 81 per cent intensity of cropping ; water requirements of crop ; effects on the soil of perennial irrigation (139) ; rotation (145) 60065-6, 59905-10, 60029-31.

Stations, two more required in Indus Right Bank area and Eastern Nara tract (139) ; not immediately necessary, 60176.

SOILS : Alkali lands reclaimed at Sukkur and Doulatpur by surface drainage and then continual cropping (144).

STATISTICS : Agricultural Department should do ; additional staff necessary ; at present statistics are not accurate and are published too late (149) 59982.

TALUKA DEVELOPMENT ASSOCIATION : Seed distribution : of very great help (157).

VETERINARY : Department should be under Director of Agriculture (146) 60133.

RAILWAYS, *see under* TRANSPORT *under* ADMINISTRATION.

RASAI, *see* BURDENS *under* LAND TENURE.

RECLAMATION, land, *see under* SOILS.

RESEARCH :

on Agricultural problems arising out of irrigation ; need for provincial, co-ordinated by Inspector General of Irrigation who should be re-appointed *Musto*, 59425-7.

CENTRAL AND STATION :

should not be Controlled by Provinces, *Harrison*, 58817-8.

services of Experts should be pooled, *Shahani* (201).

should be Financed from central fund, *Harrison*, 58819-20, 58854-7.

should undertake Fundamental research, *Harrison*, 58812-5.

should be confined to Higher research, *Shahani* (198), (200-1) 60664.

Scientific staff should be increased and Indianised as far as possible, *Shahani* (201).

Scope : to assist provincial research and demonstration, *Harrison* (11-2) ; and for irrigation research, *Harrison*, 58716-22, 58854-7, 58782-3.

Crops : Government devotes undue attention to export crops such as cotton and wheat as compared with attention given to crops consumed in India such as paddy, bajri and jwar, *Shewakram* (221) 60733-4, 60800-2, 60874-7.

Demonstration should be separate from research, *Harrison* (10) (12).

Departments of Agriculture and Irrigation should work together, *Harrison* (10) (12).

Diversity of conditions necessitating many kinds of research, *Bhutto* (65).

Enquiry necessary as to backward state agriculturally of Upper Sind Frontier district (166).

Expenditure on research may make future remissions of taxation unnecessary (184).

Fertilisers, artificial : research insufficient, *Shahani* (204).

Finance of, *Karachi Indian Merchants' Association*, 60347-9, 60472-3.

Hedge plant, quick growing, should be evolved, to protect crops from straying cattle, *Karachi Indian Merchants' Association* (184), 60518-9.

Hydraulic experiments : could be carried on at Sukkur ; research officer should be appointed to investigate purely irrigation hydraulic problems, *Musa*, 59424.

Implements, *Bhutto*, 59164.

Indigenous methods should be studied ; should be starting points for gradual improvement, *Harrison* (10).

Kallar land, research required into factors producing, *Bhutto* (65).

RESEARCH—contd.

LARKANA :

Central station for Lloyd Barrage Right Bank Canals ; rice and bosi wheat area, with annual cropping, *Mann*, 58631-4 ; farm has been in existence since 1906 ; will be extended, *Mann*, 58660-1.
 will take two years to get research for Right Bank into full working order, *Mann*, 58665-6 ; running expenses estimated at 1 lakh, *Mann*, 58676-9.
 Water supply from Ghar canal ; tube wells will also be constructed, *Mann*, 58660-3.
 Lift irrigation, by pumping, should be investigated, *Dow* (37-8).

MIRPURKHAS FARM :

Cotton breeder appointed in 1922, *Rahman* (139).
 Experiment with Egyptian cotton, a failure mainly because of defective marketing, *Dow*, 59008-9.
 Pests, research required, *Bhutto* (65), *Karachi Indian Merchants' Association* (184) 60518.
 Plan of experiments : drawn up by committee consisting of Director of Agriculture, Botanist or Cotton Breeder and Acting Deputy Director, *Rahman*, 60026-8.
 Poverty of cultivators prevents use being made of results of research, *Bhutto*, 59140, 59154-5, 59219-21.
 Provincial :
 should be better Financed, *Shahani* (198), (200-1).
 should be confined to Local problems, *Shahani* (198), (200-1).
 Provincial stations : Bombay Presidency, two required : Deccan and Sind, *Harrison* (12), 58771-3, 58812 ; would investigate local problems, *Harrison*, 58812.
 Rats, research required as to, *Bhutto* (65), *Shahani* (204).

RICE :

Research required as to ; some Work being done but nothing substantial, *Shewakram*, (221), 60874-6.

SAKRAND RESEARCH STATION :

Agricultural Department doing all the work, *Harrison*, 58767-70, 58807-9, 58821, 58838-9.
 Control should be by an officer permanently in Sind and not from Poona, *Dow*, 58957 ;
 Director of Agriculture with an advisory board suggested, *Karachi Indian Merchants' Association* (182) 60373-4.
 Experimenting on watering, seeds, kallar, rotation, etc., *Karachi Indian Merchants' Association*, 60516-7.
 Finance :
 Central Cotton Committee contributing Rs. 20,000 a year for soil research, *Mann*, 58652-3.
 Cost being met from current revenues and not from Lloyd Barrage loan, though the station is not revenue-producing, *Dow*, 59119-21, 59014.
 Kallar : experiments to be conducted under Barrage conditions, *Dow*, 59010-1.
 Poona, should be entirely separate from, *Harrison*, 58906.
 Progress : at work nearly two years ; in a position to give a great deal of useful advice ; results of experiments will apply to right bank area except central rice canal, *Dow*, 59015-20.
 Propaganda, now more important than research as to best varieties, *Dow*, 59012.
 Scope : established as representing left Bank Rohri Canal area, the largest section, with sub-stations to work out results, *Mann*, 58629-31 ; a cotton area with one cropping in three years, *Mann*, 58629-40.
 Soil deterioration due to irrigation, study of, not far advanced, *Dow*, 58960.
 Staff : will have three first-class research officers, of whom one will be whole-time Director, *Mann*, 58629-40 ; botanist engaged on cotton, wheat and juar, *Mann*, 58652-3.
 to Study post Barrage problems : Baker Lane Scheme of 81 per cent intensity of cropping ; water requirements of crops ; effects on the soil of perennial irrigation, *Rahman* (139) ; rotation *Rahman* (145) 60065-6, 59905-10, 60029-31.
 Sufficient probably for general purposes, *Dow*, 58958-9.
 Water : tube well constructed, *Mann*, 58663-4.

RESEARCH—contd.

Scholarships offered by Government of India for higher research, number should be greater, *Shahani* (198).

Sind : peculiar conditions : separate research station required, *Harrison* (12) 58906.

Skilled workers ; great need of, *Khoso* (166).

Soil deterioration as a consequence of irrigation : importance and urgency of research, *Dow*, 58960-93.

STATION :

should be Directed by Director of Agriculture assisted by an advisory board representing agriculturists, etc., *Karachi Indian Merchants' Association* (182), 60373-4.

with Permanent endowment, needed in Sind, *Karachi Indian Merchants' Association* (181).

Sakrand probably a suitable site, *Karachi Indian Merchants' Association*, 60350-1.

STATIONS PROPOSED :

Central station for Nara Valley, representing Eastern Sind, *Mann*, 58629-40 ; no research stations other than Sakrand and Larkana to be started next year, *Mann*, 58665.

Two more required in Indus Right Bank area and Eastern Nara tract, *Rahman* (139) ; not immediately necessary, *Rahman*, 60176.

Success, lack of, in many cases, *Bhutto* (65).

Veterinary, *see under* that heading.

RICE, *see under* CROPS AND CROP PROTECTION, MARKETING, SOILS, RESEARCH and IRRIGATION.

RINDERPEST, *see* Rinderpest and Inoculation *under* VETERINARY.

ROADS, *see under* TRANSPORT *under* ADMINISTRATION.

ROTATION, *see under* CULTIVATION.

SHAHANI, S. C., M.A., Zamindar, Jamrao, Sind, Principal, D. J. Sind College, and Secretary, Sind Collegiate Board (198-220) ;

out of 4,000 acres only able to Crop 600 or 700 acres ; cultivates by haris and 150 acres himself by hired labour, 60625-30.

successfully Experimented in American, Egyptian and desi cotton and wheat, 60601-8, 60536-7.

his land is situated on Jamrao Canal and suffers from insufficiency of water, 60538-9.

Staff : has 14 salaried supervisors, whom he trains himself, 60634-6.

Students of Sind College not attracted as amenities sought by educated people are not available, 60637-43.

unable to grow Wheat because water is not available in October ; has grown various wheats, 60631-3.

ADMINISTRATION :

Co-ordination : by inter-provincial conferences and interchange of bulletins (200-1).

Meteorological Department : unsatisfactory ; needs development (201).

Posts and Telegraphs :

Generally fairly satisfactory ; charges should be reduced (201).

Wireless : unsatisfactory ; needs considerable development (201).

Transport :

Facilities, necessary for introduction of improved agricultural implements (204).

Railways :

Freights should be reduced (201), (204).

fairly Satisfactory (201).

Roads : unsatisfactory ; a metalled road within 2 miles of every village (201).

Steamers : fairly satisfactory.

SHAHANI, S. C.—contd.

AGRICULTURAL DEPARTMENT :

Education, agricultural : should be administered by (199).

Services :

better Organisation called for in personnel, demonstration and propaganda (201).
fairly Satisfactory (201).

refuse to Utilise experience of practical cultivators, 60606-10, 60673-4.

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : for improvements owing to lack of surplus ; for ordinary operations owing to inadequacy of water, wrong methods of cultivation, high taxation, ceremonial expenses, Deccan Agriculturists' Relief Act, etc., dishonesty, improvidence due to lack of education, physical inefficiency due to bad housing and lack of hospitals (202).

Deccan Agriculturists' Relief Act :

Co-operative movement : village moneylender should be corrected by, and organisations such as the Taluka Development Associations, 60708-11.

causes Dishonesty and indebtedness (202) 60660-2.

Leads to moneylender insisting on receiving a sale deed instead of a mortgage, 60678-83.

Haris : *See under* that heading.

Interest : is really insurance against risk, 60564.

Measures for lightening agriculture's burden of debt : improvement of water supply, better training, laws calling for exact accounts from moneylenders but not interfering with collection of legitimate debts, provision of credit on easy terms (202).

Mortgages, non-terminable, should not be made ; hereditary cultivator's should be maintained (202) 60580, 60656-9, 60694-5.

Protective measures : apt to shake cultivator's credit and should be avoided (202) 60564-5.

Punjab Land Alienation Act :

a Bad measure ; will divide Hindus and Mohammedans and will kill the small holder, 60704-7.

will prevent Sellers obtaining market price for land and will cause land to accumulate in a few hands, 60712-20.

Repayment prevented by : inadequate yield and dishonesty (202).

Restricted Tenure Act : has reduced credit of agriculturists, 60567.

Restriction or control of credit of cultivators inadvisable (202) 60566-70.

Sources of credit : zamindar, sowcar, Government and co-operative societies (202).

Usurious Loans Act : danger of shaking cultivator's credit (202) 60567.

AGRICULTURAL INDUSTRIES : Recommended, basket making, cotton ginning, ghee-making, oil pressing, poultry rearing, rice hulling, rope making, spinning, sugar making, weaving, but cultivator should not neglect cultivation (205) 60675.

Government aid advocated (205) 60676-7.

Leisure period : cultivating cotton, 6 months ; cultivating cereals, longer leisure period than cotton ; cultivating on perennial irrigation, 4 months (205).

Obstacles : lack of agricultural education, funds and transport (205).

Sericulture : profitable at Bangalore (204).

ANIMAL HUSBANDRY :

Berseem : should be largely introduced (204).

Bulls, required, 60611-2.

Cattle-breeding : no special arrangements made for, 60611-4.

Fodder shortage :

Bajri and jari should be grown for fodder, 60588-9 ; greatest between October and July (204) ; better Water supply necessary (204).

Horses, stud, not available, 60609.

Pastures, common in villages :

Disappearing owing to encroachments for cultivation ; restoration would encourage Ghee-making (204) 60584.

Equilibrium between cultivator and pasture has been lost, 60584-9.

SHAHANI, S. C.—contd.**ARBITRATION :**

of disputes through panchayats and communities, advocated (203).

CENTRAL COTTON COMMITTEE :

unsatisfactory; no criticism allowed; exclusion of best men, 60553-5, 60673-4.

Co-OPERATION :

Cotton ginning and marketing societies advocated (205).

Credit societies : should be developed to supply all needs of cultivators for short term credit (201).

Joint farming societies advocated to prevent excessive fragmentation of holdings (202).

CROPS AND CROP PROTECTION :

Cereals, selection of seeds of selected varieties, recommended (204).

Cotton :

Acala, American the best variety; being grown at Sakrand Farm, 60562-3; further experiment necessary, 60618-24.

American (and Egyptian) long staple: water supply in February or March necessary; profitable (204); American 285 better than F 4, 60541.

Egyptian: Metaffai and Abbasi, better than American, but takes 7 to 8 months to ripen; given up for lack of early water supply to enable crop to ripen before October; has yielded 18 maunds per acre, 60556-9.

Fruit, in Quetta, profitable (204).

Legumes: hybridisation recommended (204).

Rats: research as to ratbane necessary (204).

Seed distribution: difficulty of obtaining good seed; useless to approach Agricultural Department, 60606-8.

Wild animals, damage by: pigs should be shot (204).

CULTIVATION :

Ploughing, early and repeated, and aeration, recommended (200) (204) 60602, 60675.

DEMONSTRATION AND PROPAGANDA :

Cinema, advocated (200).

Cultivators, selected, should be used for (200) 60603-5.

on Cultivators' own fields, advocated (200).

Demonstrators: autocratic and snobbish behaviour of (200) 60673-4.

Reclamation of alkali land at Dowlatpur minor, a signal failure (200).

Successful measures: example of superior cultivator; breaking up land several times; seed selection and distribution (*see under* CROPS AND CROP PROTECTION), demonstration on cultivators' own fields; bulletins issued by Agricultural Department in the vernacular; exhibitions and shows (199-200).

EDUCATION :

Administration: of agricultural education should be by Agricultural Department (199).

Adult: can be popularised by being free and demonstrations that agriculture can be made to pay (199).

Agricultural :

Attendance: insufficient, due to: disappointment in not obtaining Government appointments; distance of Poona Agricultural College; training not sufficiently practical; insufficient scholarships (198).

Careers of students: Government service, rarely cultivation of their own lands (199).

College, first grade, for Sind, advocated, 60727-8.

SHAHANI, S. C.—contd.

EDUCATION—contd.

- Curricula : agriculture should be an optional subject in Intermediate science and arts degrees ; greater stress should be laid on agricultural practice (199) 60581-3.
- Demand, may be stimulated by : demonstration that scientific agriculture is more paying ; revision of ideals ; reservation of tahsildarships for agriculturally trained applicants ; grants of land to educated agricultural communities ; scholarships, etc. (198).
- Institutions insufficient (198).
- Pupils not solely drawn from agricultural classes (199).
- Subsidiary industries hampered by lack of (205).
- Teachers : in rural areas should be drawn from agricultural classes (198).
- Teaching facilities, urgent need for extension of (198).
- Cinema : advocated (199).
- Finance : by Local Governments with compulsory cesses levied on large landholders (199) 60670-2.
- Indebtedness : caused by lack of, (202).
- Intermediate Agricultural Colleges, advocated ; to teach agriculture, rural economics, agricultural chemistry, etc., 60542-5 ; at Karachi, Nawabshah and Sukkur, 60727-8.
- Middle class youths, can be attracted to agriculture by : restricting appointments in Agricultural, Forest and Revenue Services mainly to such men when agriculturally trained ; grants of land, demonstration that agriculture can be made profitable (199) are deterred by lack of amenities on the land, sought by educated people, 60636-43 ; lack of land and water, 60684-93, 60727-8.
- Moral training essential, 60663.
- Nature study : advocated (199).
- School farms and plots : advocated (199).
- Sind, D. J. College : no agricultural teaching, 60542, 60665-7.
- Technical knowledge : very few movements for improving (199).

FERTILISERS, suggestions (203-4).

FINANCE :

- Land mortgage banks, at least one in each district, for long term credit (201).
- Taccavi : village Panchayats should assist in its distribution and the system should be less rigid (201).

HARIS :

- Indebtedness : Mahomedan zamindars lose on advances made to haris who abscond without repaying, 60572-9.
- Welfare : are under mujeris who are under zamindars, 60625-30 ; relations with zamindars are very good ; many zamindars treat haris well ; zamindars who misbehave should be dispossessed by committees of villages, taluka organisations, etc. ; excessively large holdings should be prohibited ; status of haris should be improved ; should not be quite tenants-at-will, 60696-703 ; taluka development and similar associations recommended ; Deccan Agriculturists' Relief Act has made haris more dishonest, 60708-11, has not known one zamindar who has improved the housing or educational conditions of his haris, 60726.

HOLDINGS :

- Fragmentation : would be reduced by : co-operative farming, fixing a standard unit for holdings, small holdings being sold to neighbours (202).
- Legislation to deal with minors, widows, etc., necessary (203).
- Obstacles to consolidation (202-3).
- Large holdings : should not be permitted to be excessively large, 60702-3.

IMPLEMENTS :

- Tractors : recommended ; transport facilities necessary to hasten adoption of improved implements (204).

SHAHANI, S. C.—contd.

IRRIGATION :

Distribution :

- Internal distribution in holdings should be left to holders (203).
- Modules recommended, if properly worked, 60721-5.
- should be made Uniform (203).
- Wastage of water through superabundant supply at tail of canals (203).
- Jamrao Canal : Designed to be perennial ; Head should be improved ; Research into conditions for successful working necessary (203), 60537-40.
- Kotri : weir should be constructed at (203).
- Sub-soil water : research necessary to prevent waterlogging, 60540.
- Tanks and ponds : for storage for winter crops (203).
- Wells, tube : advocated where sub soil is sweet (203) 60540-1.

LLOYD BARRAGE :

- Waterlogging : danger of, if careful drainage not introduced (203).

MARKETING :

- Co-operative ginning and marketing advocated (205).
- Cotton : unsatisfactory (205) ; small quantity of long staple offered for sale, 60560-2.
- Information : should be given to cultivators, etc. (205).
- Quality and grading : names of distributors (205) (208) 60546-52.

- MUJERIS : (Managing cultivators) : hold land under zamindars, which they let to haris, 60629-30.

PANCHAYATS :

- should Arbitrate in disputes as to holdings (203).
- Organisation has disappeared under stress of western democratic ideas, 60615-7.
- Taccavi, should assist in distribution of, (201).

RESEARCH :

Central :

- services of Experts should be pooled (201).
- should be confined to Higher research (198), (200-1) 60664.
- Scientific staff should be increased and Indianised as far as possible (201).
- Fertilisers, artificial : research insufficient (204).

Provincial :

- should be better Financed (198), (200-1).
- should be confined to Local problems (198), (200-1).
- Rathane : research necessary as to (204).
- Scholarships offered by Government of India for higher research, number should be greater (198).

SOILS :

- Alkali lands : reclaimed by profuse waterings, by rice and by fertilisers (203).
- Drainage, essential (203).
- Reclamation : land gone out of cultivation should be granted free (203).

TALUKA DEVELOPMENT ASSOCIATIONS, ETC. :

- Committees should be supplemented by nomination ; problem of obtaining right type of men to form development committees, 60590-600.
- will act as a Corrective to the village moneylender, 60708-9.
- Government has discouraged formation of non-official organisations, 60644-55.
- should be Non-official ; officials should consult, 60541.
- Organisation : should be associated with village committees, and should be combined by divisions, district and province, 60541.

SHAHANI, S. C.—concl'd.

VETERINARY DEPARTMENT :

does not Assist when epidemics break out ; does not desire Interchange of ideas with cultivators, 60609-10 ; not Satisfactory (201).

WATERLOGGING :

Research as to subsoil water necessary, 60540.

WELFARE OF RURAL POPULATION :

Communal dissension ; caused by Punjab Land Alienation Act, 60704-7 ; is - an obstacle to measures for, 60642.
Dispensaries necessary in villages, 60663.

SAKRAND RESEARCH STATION, *see under* RESEARCH.

SEEDS, *see under* CROPS AND CROP PROTECTION.

SHEWAKRAM, Rao Sahib UDHARAM, Zamindar, Guni, District Hyderabad (221-45).

Cultivates through haris ; no home farm, 60729-32.
his land will not benefit by Lloyd Barrage, 60839.
almost entirely Rice cultivation, 60841.

ADMINISTRATION :

Meteorological Department : insufficient publicity (222).

Posts and Telegraphs :

Postal :

Delivery in rural tracts should be free of additional unauthorised charges (222) 60784-6.

Facilities unsatisfactory (222).

village Schoolmaster could be put in charge, 60787-99.

Telephones : facilities should be placed at disposal of zamindars at nominal charges for obtaining marketing information, etc. (222).

Transport :

Communications : great importance of improvement, 60742.

Railways : feeder lines required (222).

Roads :

extremely Bad (222), 60767.

Cess has been increased from 4 to 5 pice and cannot be further increased, 60772-73, 60829-40.

Improved roads would lead to increased motor revenue, part of which should go to the Provincial Government, 60842-4.

Provincial grants necessary (222).

AGRICULTURAL DEPARTMENT :

Services : unsatisfactory ; Staff : insufficient and inexperienced (222).

AGRICULTURAL INDEBTEDNESS :

Extravagance : not a fault of zamindars, 60845.

Irrigation : assured perennial flow would solve problem (224).

AGRICULTURAL INDUSTRIES :

Paper manufacture from rice straw in Lower Sind, would be a very useful supplementary industry (232).

ANIMAL HUSBANDRY :

Bulls :

Ignorance of Government premium bull system, 60881-2.

should be Supplied to zamindars free of cost to improve breeds of draught cattle (231).

Dairies, private, should be encouraged by subsidies, grants of land, etc., to qualified men (231).

SHEWAKRAM, R. S. UDHARAM—contd.**ANIMAL HUSBANDRY—contd.**

Fodder shortage, in Lower Sind, greatest in May and June; green fodder available from August (232).

Pastures :

- Scarcity of, owing to lack of water and greed of zamindars who utilise all available land for cultivation (231).
- every Village should be compulsorily supplied with 20 to 50 acres of common pasture land irrigated free (231).

CAPITAL, ATTRACTING OF, TO AGRICULTURE :

Demonstration of improved methods by capitalists (232).

Hereditary landowners : policy of favouring and of discouraging newcomers with capital, criticised (232), 60823-8.

Improvement of land discouraged by : ignorance, conservative habits, want of enterprise, fatalism, lack of capital, etc. (232-3).

Waste land, grant of, at nominal prices or payment by instalment, to individual capitalists or companies, with facilities for constructing canals, advocated (232).

CROPS AND CROP PROTECTION : Rice :

Enquiry as to outturn advocated (221), 60803-5.

DEMONSTRATION AND PROPAGANDA :

on Cultivators' own fields, by comparative plots, recommended (221).

EDUCATION :**Agricultural :****Attendance :**

school Hours should be in the afternoon and from 8 to 10 o'clock at night (221), 60735-41, 60845.

lack of Interest of parents due to agriculture not being taught and labour of children being required (221).

in several areas very Thin (221).

Institutions, insufficient (221).

Scholarships for boys advocated (221).

Teachers :

should be Drawn, if possible from agricultural classes (221).

Supply insufficient (221).

Teaching facilities, are absent in agricultural districts (221).

Curricula : agriculture should be taught in all primary classes (221) 60778-83.

Finance : additional land revenue of 1 anna in the rupee, earmarked for agricultural education, advocated (221).

FINANCE :

Haris, indebtedness of : *see under* that heading.

Land mortgage banks :

Advocated (222); would not lead to Extravagance, which is not a fault of zamindars, 60846, 60872-3.

Taccavi : criticism of system (222).

HARIS :**Indebtedness :**

in Bad seasons zamindars are forced to take cattle of haris in payment and incur losses, 60847.

zamindars should be financed at 6 per cent and should be bound to finance their haris at 9 per cent (222); zamindars charge their haris from 12 to 25 per cent, 60847; and banias charge 25 to 30 per cent (222).

IMPLEMENTS :

Ploughs, iron, being used in Guni Taluka, 60878-80.

SHEWAKRAM, R. S. UDHARAM—contd.

IRRIGATION :

Alkali lands : in Lower Sind, could be reclaimed by abundant canal silted water (232).

Capitalists : should be afforded facilities for constructing canals (232).

Distribution : present methods cause great difficulties (227-8). (*See under MODULES below.*)

Drainage : *see under SOILS.*

Extension, very great, advocated (223-4).

Finance : almost all irrigation works pay adequate interest (224).

Fuleli canal :

present Distribution system is reducing outlets and throwing land out of cultivation (227).

water supply of, for winter crops will be cut off by Lloyd Barrage, with ruinous results (223).

the only existing Perennial canal in Sind (223).

Gaja canal system : supply insufficient and should be supplemented by canal construction (223) 60848.

Haig, Colonel, Settlement Officer : letter of 1873 as to inadequate expenditure on clearance and maintenance of canals (225).

Hakabo (water rate) :

Expenditure is being diverted from silt clearance to building bungalows, etc., for comfort of officers, 60897-902. (*See under SILT CLEARANCE below.*)

in Guni Taluka from 1893 to 1920 3·5 to 4 per cent. spent on clearance whereas 16 per cent ought to have been spent (225-6) ; table of figures as to Guni Taluka (234) ; accuracy of figures questioned, 60883-96.

Levied per acre to keep Government canals in efficient order (224-7).

undertaking was as to Maintenance of canals, which in Sind means silt clearance, 60849-57.

was Merged in land revenue (224-7).

Government is therefore under an Obligation to spend a proportionate percentage of land revenue on clearance and improvement of canals, but has not done so (224-7).

Replaced forced labour (224-7).

Importance of :

Assured perennial flow supply would solve problems of cultivators (223-4).

Kotri Barrage :

would enable Alkali lands to be reclaimed (229).

would Diminish expenditure on silt clearance (227).

would remedy Fodder shortage (231).

Necessary (223).

should Precede introduction of modules (228).

Mehrani Canal :

Early construction advocated (223).

Sanctioned, estimates and plans before Government (223).

Modules :

Assessment : new assessment necessary before introduction of, 60861-71.

Distribution : formerly tail got less than head ; now with modules tail gets more than head (228), 60756-9, 60858-60.

should be Preceded by regulators securing constant level and discharge (228).

have Reduced discharge and water levels (228).

Successful from point of view of engineers (228).

Non-barrage zone : effect of Lloyd Barrage on :

land will go out of Cultivation and loss will amount to crores (223).

Flow land will become lift (223).

Fuleli winter supply will be cut off rendering winter crops impossible (223).

Kotri barrage necessary (223).

Lloyd Barrage should be constructed but resulting hardship should be provided for, 60748-55.

Supply of inundation water will be shortened by 40 days at critical seasons, with ruinous results (223).

Pastures should be supplied free (231).

Rice cultivation : Department's wrong policy of restricting (229-30) 60746-7.

SHEWAKRAM, R. S. UDHARAM—contd.

IRRIGATION—contd.

- Silt clearance of canals :
 - widespread Complaints of zamindars (224-7).
 - Figures showing decrease in arca cultivated (224-7) 60743-5 ; figures showing percentage of revenue spent on clearance (234) ; accuracy of figures questioned, 60883-96.
 - Forced labour for canal clearance was replaced by *hakabo* (see under that heading above), (224-7).
 - letter 1873, of Colonel Haig, Settlement Officer (225).
 - letter of Sir H. E. M. James, Commissioner (226).
 - report of Colonel Lambert, Collector of Karachi (225).
 - report 1874, of Colonel Merewether, Commissioner (224-5).
 - Obligation of Government to spend definite proportion of land revenue on clearance and improvement of canals has been forgotten (224-7).
 - petition (1925) of Zamindars Association, Tando division (224-5).

MARKETING :

- Information : Telephone facilities should be placed at disposal of zamindars at nominal charges (222).

RESEARCH :

- Crops : Government devotes undue attention to export crops such as cotton and wheat as compared with attention given to crops consumed in India such as paddy, bajri and juar (221) 60733-4, 60800-2, 60874-7.

SOILS :

- Alkali land :
 - a Great deal in Lower Sind could be rendered cultivable by abundant canal silted water (229) 60761-4 ; and rice cultivation (229).
 - Instance of land becoming alkaline through lack of drainage (230-1).
 - mostly above Level of flow water at present and kotri barrage should be built to facilitate reclamation of, (229).
- Drainage :
 - Cultivation : lack of, prevents enrichment of rice soil by cultivation of winter pulse (230).
 - Floods in lower Sind, due to lack of, (228-9).
 - Instance of lack of, causing land to become alkaline (230-1), 60760.
 - additional Revenue of 4 annas per acre suggested to provide drainage (228-9), 60817-9.
 - Yield of rice decreasing owing to lack of, 60811-3.

Rice :

- Advantages :
 - little Capital required (229-30).
 - Continuous cultivation without manure (229-30).
 - with Drainage soil can be enriched by cultivation of winter pulse (229-30).
 - Malaria can be prevented by drainage (229-30).
 - can be grown in Marshes, etc., where no other crop can be grown (229-30).
 - Output is doubled if stagnant water is drained at intervals (229-30).
 - greater net Profit than any other cereal crop (229-30).
- lack of Drainage on land continuously cultivated with rice in Lower Sind has led to waterlogging (228).
- Irrigation and Revenue Departments look upon rice with undeserved disfavour because it consumes nearly twice as much water as dry crops and causes malaria (229-30), 60746-7.
- Red rice more effective, 60765.

Silt :

- Alkali land can be reclaimed by (229).
- Inundation canals lay rich deposit on flow lands, 60761-4.

TALUKA DEVELOPMENT ASSOCIATIONS : advocated, 60806-10.

SHEWAKRAM, R. S. UDHARAM—contd.

VETERINARY :

Department : unsatisfactory ; staff insufficient (222).

WATERLOGGING : *see under SOILS above.*

WELFARE OF RURAL POPULATION :

Drinking water supply :

Village receives no grant (237).

Wells : during 7 or 8 months in the year, when canals are dry, sole supply from wells which are often brackish, 60820-2.

Malaria :

Due to lack of Drainage in Lower Sind (228-9).

Sanitation : local boards contribute to village sanitary boards, 60774-5.

SOILS :

ALKALI land : (*also see under LLOYD BARRAGE*).

Instance of land becoming alkaline through lack of drainage, *Shewakram* (230-1).

Kotri barrage should be built, to facilitate reclamation of, *Shewakram* (229).
mostly above Level of flow water, *Shewakram* (229).

Reclamation by :

Babul growing, *Harrison* (14) 58751-2, 58772-7.

Drainage, *Bhutto* (69), *Rahman* (144), *Shahani* (203), *Shewakram* (230-1).

Fertilisers, *Shahani* (203).

Hardy Crops, *Harrison* (14) 58751-2, 58772-7, *Rahman* (144).

Leaching, *Harrison* (14) 58751-2, 58772-7.

Rice cultivation, *Harrison* (14) 58751-2, 58772-7, *Shahani* (203), *Shewakram* (229).

Silt, *Shewakram* (229) 60761-4.

Waterings, *Bhutto* (69), *Shahani* (203), *Shewakram* (229) 60761-4.

Daulatpur reclamation scheme, failure of, *Dow* (36).

Deterioration as a consequence of irrigation : importance and urgency of research, *Dow*, 58960-93.

DRAINAGE :

Floods in Lower Sind, due to lack of, *Shewakram* (228-9).

Importance of in Sind, *Harrison* (14) 58737-45, *Musto* (91), *Shahani* (203).

Instance of lack of, causing land to become alkaline, *Shewakram* (230-1) 60760.

Lack of, prevents enrichment of rice soil by cultivation of winter pulse, *Shewakram* (230).

Removal of choking aquatic growth by dragline excavators mounted on caterpillars, *Harrison* (14) 58746-50.

additional Revenue of 4 annas per acre suggested to provide drainage, *Shewakram* (228-9), 60817-9.

Valley lines should be entirely kept open and given free outlet, *Musto* (91).

Yield of rice decreasing, *Shewakram*, 60811-3.

EROSION :

Indus floods cannot be stemmed by afforestation, owing to force of river and friable soil, *Aitchison* (175), *Bhutto* (69).

cannot be Prevented by afforestation anywhere in Sind, *Aitchison*, 60296.
not generally Serious in Sind, *Harrison* (15).

Government should not attempt improvement of, *Bhutto* (69).

Green mulches : extensive use of, advocated, *Harrison* (14).

Improvement : in Jacobabad by increasing water supply, *Khoso* (167).

Kalar soil : deep cultivation necessary : tractors, *Musto*, 59386-8.

RECLAMATION : (*see also under ALKALI above*).

Assessment, temporary remission recommended, *Musto* (91) 59431-3.

Grants of land recommended, *Bhutto* (69), *Shahani* (203).

SILT :

Alkali land can be reclaimed by, *Shewakram* (229).

Inundation canals lay rich deposit on flow lands, *Shewakram*, 60761-4.

STATISTICS :

Agricultural Department should do ; additional staff necessary ; at present statistics are not accurate and are published too late, *Rahman* (149) 59982.
 Baluchistan mountains, rainfall statistics necessary, *Musto* (90).
 Crop yield : figures unreliable ; method of collection must be revised ; indirect method of collection quite unreliable, *Dow* (40) 58986-8.
 Division of produce between zamindars and haris, revenue officers should be present at and keep accounts of, *Hussain* (133).
 Haris : statistics as to proportion of membership of co-operative societies desirable, *Azimkhan*, 59674-7 (See under LAND TENURE).
 Implements, see below : " Livestock and Implements ".
 Improvement necessary, *Musto* (94).
 often Invented, owing to pressure of work, *Bhutto* (74).
 Livestock and implements : figures suspected to be quite unreliable : concentration over a limited area suggested, *Dow* (40) ; figures collected every 5 years ; village accountant sends in his return to the taluka head-quarters ; staff ill-paid and heavily worked, *Dow*, 59084-95.
 should be Published in more intelligible and interesting form, *Musto* (94).
 Sufficient at present, *Bhutto* (74).
 Yield estimates, not satisfactory, *Hussain* (133).

SUKKUR BARRAGE, see LLOYD BARRAGE.

TACCAVI, see under FINANCE.

TALUKA DEVELOPMENT ASSOCIATIONS, etc. :

Advocated, *Karachi Indian Merchants' Association*, 60509, *Shewakram*, 60806-10.
 Agricultural propaganda : have done a great deal of work ; should be left to them entirely, *Hussain* (129) (132), *Azimkhan* (103-4) 59523.
 Animal husbandry : do not take part in, *Azimkhan*, 59529-32, 59804.
 Committees should be supplemented by nomination ; problem of obtaining right type of men to form development committees, *Shahani*, 60590-600.
 Co-operation : play an important part in developing, *Azimkhan* (108) ; are registered as non-credit co-operative societies, *Azimkhan*, 59515-20, 59524, 59563.
 Controlled by executive committee, *Azimkhan* (103).
 will act as a Corrective to the village moneylender, *Shahani*, 60708-9.
 Cultivation of comparative plots, *Azimkhan* (104).
 Demonstrators maintained, *Azimkhan* (103-4), 59515-21.
 Depôts of seeds and implements for sale and hire maintained, *Azimkhan* (103), 59515.

FINANCE :

Funds sufficient, *Azimkhan*, 59569-71 ; need more funds, *Dow* (36) ; Government will have to supply funds, *Dow*, 59025-6, *Hussain* (129).
 Government subsidy equal to expenditure up to Rs. 1,000, *Azimkhan*, 59522, 59569-71 ; some not drawing the full Government subsidy, *Azimkhan*, 59646-52.
 Members, ordinary pay Re. 1 or Rs. 2, life members Rs. 25, and patrons Rs. 200, *Azimkhan*, 59522.
 Government has discouraged formation of non-official organisations, *Shahani*, 60644-55.
 Jacobabad District : no association, *Khoso* (174) 60271-2.
 Management : Managing Committee elected by general body of members, one man one vote ; haris have the same vote as zamindars, *Azimkhan*, 59564-8.
 should be Non-official ; official should consult, *Shahani*, 60541.
 Ploughs : have done much to improve, *Hussain* (132).
 Programme of work framed with advice of Agricultural Department, *Azimkhan* (103).
 Progress : capable of doing good work, need more funds, danger of falling into bad hands, *Dow* (36) 58964-5, founded about 4 years ago, *Azimkhan*, 59533-4.
 Organisation : should be associated with village committees, and should be combined by divisions, districts and province, *Shahani*, 60541.
 Propaganda, best media for, *Azimkhan* (103-4), 59523, *Hussain* (129) (132).
 Quinine, distributed by, *Azimkhan*, 59521.
 Seed, distributed by, *Azimkhan*, 59515-6, 59819, *Rahman* (157).
 Self-help, have developed a spirit of *Azimkhan*, 59569.
 one Sufficient for each taluka, *Azimkhan*, 59614-23, 59802-9.
 consist of Zamindars, co-operators, *Azimkhan* (103) 59566.

TARIFFS AND SEA FREIGHTS :

Custom duties on agricultural implements and machinery might be removed, *Musto* (93).
 Director General of Stores, London, co-operative supplies might be shipped by, *Musto* (93).
 Sea freights: too high, *Musto* (93).

TRACTORS, see under IMPLEMENTS.**TRANSPORT, see under ADMINISTRATION.****USAR LAND, see ALKALI under SOILS.****USURIOUS LOANS ACT, see under AGRICULTURAL INDEBTEDNESS.****VETERINARY :****CONTAGIOUS DISEASES :**

Legislation beneficial, but difficult to enforce and expensive, *Jerrom* (85) 59326-7.
 Obstacles to dealing with: ignorance; not promptly reported, *Jerrom* (85) 59330;
 objection to inoculation or slaughter; cattle coming from Indian States, *Jerrom* (85) 59327.

DEPARTMENT :

does not Assist when epidemics break out, *Shahani*, 60609-10.
 some Assistance given to cultivators, but cultivators not used to taking assistance, *Khoso*, 60195.

Control :

Director of Agriculture, should be under, *Bhutto* (71), *Rahman* (146) 60133, *Khoso* (166).

should be Independent, *Jerrom* (85) 59311.

Minister of Agriculture, might be in charge of, but should have Veterinary officer as its departmental head *Jerrom*, 59328-9.

Funds, lack of, prevents thorough efficiency, *Bhutto* (57).

does not desire Interchange of ideas with cultivators, *Shahani*, 60609-10.

Officials should attend at peasants' farms, *Karachi Indian Merchants' Association* (183).

Services :

Satisfactory, *Khoso* (166); not satisfactory, *Hussain* (129), *Shahani* (201), *Shewakram* (222).

so Small that its effect is hardly discernible, *Dow* (37).

Staff :

Insufficient, *Shewakram* (222).

Recruitment and pay: *Jerrom*, 59342-8.

Disease: in cattle increasing, research necessary, *Khoso* (166).

DISPENSARIES :**Control :**

under District Local Boards, who have not proper control of officers, *Bhutto* (71) system not satisfactory, *Jerrom* (85); owing to joint control, *Jerrom*, 59323-4.

Provincial authority should control, *Jerrom* (85); should not, *Bhutto* (71).

Extension necessary, but prevented by lack of funds, *Jerrom* (85) 59345.

Extension taking place, *Bhutto* (71).

Insufficient number, *Hussain* (129).

Propaganda work necessary, *Jerrom* (85).

Touring, none, owing to lack of funds, *Jerrom* (85); visits are too short, *Bhutto* (71).

Use of, by agriculturists, not full, *Jerrom* (85); prevented by distance, *Bhutto* (71).

Wound cases principally dealt with, *Jerrom*, 59336-7.

Inoculation, no obstacles to popularising; no fees charged, *Jerrom* (85) 59325, *Khoso* 60196-7.

Legislation necessary to prevent spread of contagious disease by contacts, *Bhutto* (71).

Muktesar Institute: extension advocated; should conduct research in the smaller Provinces, *Jerrom* (85).

Provincial research institutes required in the larger provinces, *Jerrom* (85).

VETERINARY—contd.**RESEARCH :**

further Facilities desirable, *Jerrom* (85)
 Institute required in every Province, *Bhutto* (71) 59241-5.

RINDERPEST :

Inoculation advocated, *Khoso*, 60196-7.
 Principal disease in Sind, *Jerrom*, 59304.
 Serum-alone method employed, not serum-simultaneous, *Jerrom*, 59304-5.
 Serum, no difficulty in obtaining sufficient, *Jerrom* (85) 59310.
 Superior establishment, more required, *Harrison* (12).
 Superior Veterinary Officer with the Government of India, appointment of recommended, to co-ordinate and outline policy, *Jerrom* (85).
 Surra : a few cases, *Jerrom*, 59338.
 Touring, insufficient funds for, *Jerrom*, 59333.
 Veterinary Officer in Sind directly under Bombay Government through the Commissioner in Sind, *Jerrom*, 59311.

WATER, see under **IRRIGATION**, and under **WELFARE OF RURAL POPULATION** for drinking water.

WATERLOGGING :**CAUSES :**

often Blockage of valley lines, *Musto* (91).
 Cultivation methods largely, *Harrison* (14) 58803-6.
 Drainage, lack of, in Lower Sind on land continuously cultivated with rice has led to waterlogging, especially in depressions, and *usar* soil on higher land ; causing reduced outturn, idleness, malaria and flooding *Shewakram* (228-9) 60760, *Bhutto*, 59237-40, *Musto*, 59400.
 Lloyd Barrage system will suffer from if drainage is not attended to, *Musto*, 59400.
 Research as to sub-soil water necessary, *Shahani*, 60540.
 additional Revenue of 4 annas per acre suggested to provide drainage, *Shewakram* (228-9).

WELFARE OF RURAL POPULATION :

Communal dissension :
 caused by Punjab Land Alienation Act, *Shahani*, 60704-7 ; is an obstacle to measures for, 60642.
 Co-operative societies, where they exist, have effected a distinct improvement in life of agriculturists, *Azimkhan* (108).
 Dispensaries :
 More required, *Hussain* (133).
 Necessary in villages, *Shahani*, 60663.
 District local boards :
 will provide Health officers, Government contributing two-thirds of expense, *Bhutto*, 59191-2.
 subject has been Transferred to ; they may be trusted to provide all that is necessary, *Bhutto* (73).

DRINKING WATER :

Supply required, *Hussain* (133).
 Village receives no grant, *Shewakram* (237).
 Wells : during 7 or 8 months in the year, when canals are dry, sole supply from wells, which are often brackish, *Shewakram*, 60820-2, propaganda as to purification necessary, *Azimkhan* (106) ; tube wells worked by power co-operatively, advocated, *Karachi Indian Merchants' Association* (183).
 Economics, rural, attention should be paid to, *Shahani* (198).
 Education, necessary for welfare, *Hussain* (133).
 Feuds, village, have been brought under by co-operative agency, *Azimkhan*, 59551.
 Gardens round houses necessary, *Musto* (92).
 Haris (cultivators), see under **LAND TENURE**.

WELFARE OF RURAL POPULATION—contd.

HEALTH CONDITIONS OF VILLAGES, DEVOTION OF SPARE TIME TO IMPROVING :

- economic improvement necessary, *Karachi Indian Merchants' Association* (184).
- Lectures recommended, *Azimkhan* (106), *Rahman* (147).
- Propaganda recommended, *Hussain* (132), *Karachi Indian Merchants' Association* (184).
- Recommended, *Musto* (92).
- Horticultural shows would be beneficial, *Musto* (92).

MALARIA : (*See also* Quinine below).

- due to lack of Drainage in Lower Sind; additional Revenue of 4 annas per acre suggested to provide drainage, *Shewakram* (228-9).
- regular Surveys of talukas necessary, *Karachi Indian Merchants' Association* (185).
- non-official Organisation proposed to improve economic position of cultivators, *Karachi Indian Merchants' Association* (185) 60453; none exists, 60385-6, 60509-15.
- Propaganda necessary: lectures on sanitation, use of quinine, breeding of mosquitoes.
- purification of wells, refuse disposal, *Azimkhan* (106), *Hussain* (133).

Quinine :

- Propaganda as to use of necessary, *Azimkhan* (106).
- Taluka development associations distribute free, *Azimkhan*, 59521.
- Refuse disposal: propaganda necessary, *Azimkhan* (106).
- Sanitation: local boards contribute to village sanitary boards, *Shewakram*, 60774-5; propaganda advocated, *Hussain* (133), *Azimkhan* (106).

SURVEYS, ECONOMIC, in typical villages :

- Advocated, *Karachi Indian Merchants' Association* (185).
- Biassed, liable to be, *Dow* (39-40).
- Government cannot afford to undertake the work, *Dow* (39-40).
- Information must be properly applied, *Musto* (94).
- Non-official recommended, *Karachi Indian Merchants' Association* (185).
- Useful, *Dow* (39-40), *Musto* (94), *Karachi Indian Merchants' Association*; not very helpful, *Bhutto* (73).
- Village sanitation committees will spring up as the result of sanitation propaganda, *Azimkhan* (106).
- Water, *see* Drinking water, above.
- Wells, *see* Drinking water, above.

WIRELESS, *see under* POST AND TELEGRAPHS *under* ADMINISTRATION.

GLOSSARY.

Abadgar	. . .	. A cultivator.
Abkalani	. . .	. The season during which water is available for irrigation.
Afrin-nama	. . .	. A certificate.
Babul	. . .	. A common tree (<i>acacia arabica</i>).
Bahan	. . .	. A large deciduous tree (<i>populus euphratica</i>).
Bajri (Bajra)	. . .	. A small millet (<i>pennisetum typhoideum</i>).
Bandara	. . .	. A dam.
Bandi	. . .	. An account book.
Bania	. . .	. A Hindu trader who is generally also a moneylender.
Batai	. . .	. Division of the crop between the cultivator and the landlord.
Bawa	. . .	. A Hindu ascetic.
Perseem	. . .	. Egyptian clover (<i>trifolium alexandrinum</i>).
Bosi	. . .	. Land on which a crop is grown after it has been flooded from an inundation canal.
Bund	. . .	. A dam; a field embankment.
Deh	. . .	. A village with the lands belonging to it.
Deshi (Desi)	. . .	. Native to the country; indigenous.
Dhand	. . .	. A lake.
Dhoro	. . .	. A depression.
Divana	. . .	. Madman.
Divani	. . .	. The civil court.
Dubari	. . .	. Double cropping.
Eksali	. . .	. Leased for one year.
Fakir	. . .	. A Muhammadan ascetic.
Ghi	. . .	. Clarified butter.
Guar	. . .	. Field vetch (<i>cyamopsis psoraloides</i>).
Gur	. . .	. Unrefined Indian sugar, jaggery.
Haccaba (Hakabo)	. . .	. Water rate; (the term is usually confined to the water rate charged to <i>jagirdars</i> who do not pay any land revenue).
Hari	. . .	. A peasant.
Huri	. . .	. A tree plantation or reserve.
Jagir	. . .	. An assignment of the revenue of a given area of land.
Jagirdar	. . .	. The holder of any assignment of revenue.
Jambho	. . .	. An oil-seed (<i>eruca sativus</i>).
Jerabe (Jireb)	. . .	. A varying measure of land, roughly half an acre.
Jowar (juar)	. . .	} The large millet (<i>sorghum vulgare</i>).
Jowari (juari)	. . .	
Kabuli	. . .	. An agreement, as applied to Government fields taken up for cultivation.
Kalar (Kallar)	. . .	. Saline efflorescence.
Kamgar	. . .	. A petty officer.
Kandi	. . .	. A thorny tree (<i>prosopis spicigera</i>).
Karia	. . .	. A water channel.
Katcha	. . .	. Low alluvial land; soil resulting from recent inundation.
Kharif	. . .	. The autumn harvest; crops sown in the beginning of the rains and reaped in October-December.
Khatedar	. . .	. A holder of land.
Kuran	. . .	. The Muhammadan Scripture.
Lakh	. . .	. One hundred thousand.
Lapo	. . .	. An illegal exaction by officials making revenue collections.

Lar	Lower Sind, south of Hyderabad.
Mah (Mung)	Green gram (<i>phaseolus mungo</i>).
Maistri	A petty officer.
Malkana (Malkano)	Occupancy price.
Maund	A measure of weight which varies in different places.
Matar	Chickling vetch (<i>lathyrus sativus</i>).
Mofussil	The country as opposed to the town.
Mohag	The indefinite right of a landholder to land adjacent to his holding.
Mujeri	A managing cultivator.
Mukhtiarkar	Revenue officer in charge of a <i>taluka</i> .
Mulla	A Muhammadan religious preacher.
Nar	A Persian wheel.
Panchari	Grazing fee.
Panchayat	Literally, a committee of five; a popular jury; a committee of arbitrators.
Panchsali	Leased for five years.
Pathari	A gang; also a place where cattle-dealers or lifters reside.
Phutti	A cotton pod.
Pucca	Solid, firm, correct, complete, etc. (the contrast in all respects to <i>kutchi</i>).
Pun	Elephant grass (<i>typha elephantina</i>).
Rabi	The spring harvest; crops sown in the autumn and reaped at the end of the cold weather.
Rasai	An illegal exaction in the shape of supply of provisions.
Reh	Land impregnated with sodium salts and thereby rendered barren.
Ryot	A cultivator, a peasant proprietor.
Ryotwari	The system of tenure under which the land is held by the cultivator direct from Government.
Sarah (Sarhia)	Rapeseed (<i>brassica campestris</i>).
Seer	A weight of 2·057 lbs. avoirdupois.
Sethia	A moneyed man, who is either a trader or money-lender or both.
Sowcar	A moneylender.
Sudhar	Improvement.
Sudra	A man belonging to one of the lower castes.
Taccavi	An advance made by Government to cultivators for agricultural purposes.
Tahsildar	A revenue officer in charge of a <i>taluka</i> .
Tali	Sissoo wood (<i>dalbergia sissoo</i>).
Taluka	A revenue division of a district.
Tapedar	A village accountant.
Thur	Prickly pear; milk bush (<i>euphorbia tirucalli</i>).
Til	An oil-seed (<i>sesamum indicum</i>).
Tuar	Pigeon pea (<i>cajanus indicus</i>).
Urd	A pulse (<i>phaseolus radiatus</i>).
Usar	Land impregnated with sodium salts and thereby rendered barren.
Verandawalla	Literally, one who sits on the veranda and does little or no work.
Zamindar	A landowner; a peasant proprietor.
Zamindari	A property of a landholder.
Zabardast	Powerful, oppressive.