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ROYAL COMMISSION
ON
AGRICULTURE IN INDIA

Volume XIII

EVIDENCE
TAKEN IN
BIHAR AND ORISSA



BOMBAY
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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 Bihar and Orissa 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.

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(„) 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

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Question.

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

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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—

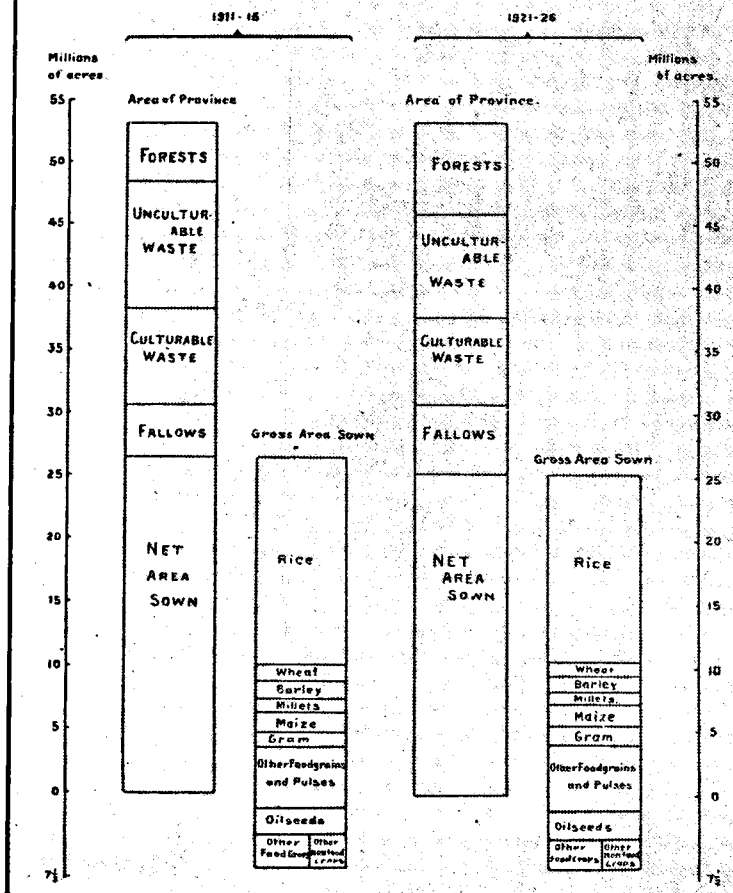
- (i) ascertaining areas under cultivation and crops;
- (ii) estimating the yield of agricultural produce;
- (iii) enumerating livestock and implements;
- (iv) collecting information on land tenure, the incidence of land revenue and the size of the agricultural population;
- (v) arranging and publishing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

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

BIHAR AND ORISSA

CLASSIFICATION OF TOTAL AREA AND AREA UNDER VARIOUS CROPS (5 YEARS AVERAGES)

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



INTRODUCTION

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BIHAR AND ORISSA

1. GENERAL FEATURES AND NATURAL DIVISIONS.

The Province of Bihar and Orissa, which was formed in 1912 from the Patna, Tirhut, Bhagalpur, Chota Nagpur and Orissa divisions of the Bengal Presidency has an area of 71,552,000 acres or nearly twice that of England and Wales. This area, according to the census of 1921, carried a population of 37,961,858, and some of the agricultural land in North Bihar carries a greater number of people than any other agricultural area in India. Of this area, however, no less than 18,334,720 acres are occupied by Feudatory States.

The physical conditions of the province are diverse ; within the oblong of some 450 miles from north to south and 250 miles east to west, which is the general shape of the province, a traveller entering from the State of Nepal, which bounds the province to the north, would traverse the rich alluvial plain of Bihar for the first 150 miles, crossing the Ganges about half way. This plain is succeeded by the thinly peopled areas of Chota Nagpur, also about 150 miles in length, which contains rich deposits of coal, iron, mica and copper, the first three of which are extensively worked. This tract of gneissic rocks forming high undulating plateaux fringed by hills, rocks and jungle is very distinctive in appearance from the alluvial areas which lie to the north and south of it. Jamshedpur, where the Tata Iron and Steel Company, as well as other companies, have their works is the great iron and steel producing centre of India. A third journey of nearly equal length to the first two, through the Feudatory States, where the hills of Chota Nagpur sink towards the Mahanadi delta and the Orissa coast, would bring the traveller to the southern boundary of the province and the Madras Presidency.

There are valuable forests in the Chota Nagpur tract and parts of Orissa are well wooded. Jheels or shallow sheets of water are of frequent occurrence throughout the province, and in Orissa there is the extensive, though very shallow, Chilka Lake [44 miles in length].

The rainfall increases from north to south ; in Bihar it averages 50 inches, in Chota Nagpur 53 and in Orissa 58 inches. The most regular rainfall is in Chota Nagpur. Severe droughts are experienced from time to time in both the Bihar and Orissa divisions. The famine of 1866 in the latter area was one of the worst famines of which we have record. About ninety per cent of the rain throughout the province falls in the monsoon between June and October, the remaining ten per cent falling as light rain in December, January and February, and isolated thunderstorms which occur in May. During the monsoon the littoral districts of Orissa are subject to floods which cause great damage.

The warmest weather occurs in May with a mean temperature ranging between 85° and 94° and a maximum day temperature of 91° to 107°. In some districts, the temperature rises as high as 115°. There is a decided period of cold weather throughout the province, with day temperatures in December and January nowhere exceeding 71° and

falling at night in Bihar and Chota Nagpur to about 51° and in Orissa to 57°. The cold weather in Orissa is very short and less marked than elsewhere. Frost occurs occasionally in the Chota Nagpur plateau of sufficient severity to do considerable damage to plantations of *sal*, etc., but is rare elsewhere in the province.

In regard to the character of the soil, the province has two well defined types: the alluvial tracts, covering practically the whole of Bihar and the coast fringe of Orissa, and the gneissic tracts. Laterite soils are also met with in patches sloping upwards from the alluvium of Orissa towards the interior of the province and forming patches overlying the general gneissic soils of the Chota Nagpur plateau. Except in the Mahanadi delta and the great river beds, practically all the alluvium is of the older type which generally speaking consists of alternating beds of sand and clay and north of the Ganges frequently contains large quantities of *kankar*, that is nodules of carbonate of lime. From the agricultural point of view, the chief interest is the extraordinary range of differences in the surface quality of this older alluvium due partly to differences in level but partly also to general differences in chemical and physical composition. In the district of Tirhut in which the Pusa Research Station is situated, the texture of the soil and its retentiveness of moisture is, so far as is known, unique. The general characteristic of the new alluvium is that it is richer in plant food than the older alluvia particularly in nitrogen. Most crops do well on the alluvial soils; rice is grown extensively whenever the supply of water is adequate and where it is not, fruits and vegetables are extensively grown with the assistance of well irrigation; sugarcane does well on the alluvium with clay and loam surfaces; tobacco and maize are crops especially suited for the lighter loam; and members of the gourd family are extensively grown along the sandy beds of the rivers.

In the gneissic area of the Chota Nagpur plateau with its extension into southern Bihar, the soil has been formed *in situ* from the break down of the crystalline rock composed of quartz, felspar and mica. Terracing has resulted in the formation of much valuable rice land and in the depressions between the ridges a good deal of rice is grown. Other crops are maize, millets, oil-seeds and pulses.

The laterite soils, varying from a conglomerate mass of haematite nodules and coarse quartz sand to loose gravel and sandy clay, are agriculturally of no importance.

The importance of rice as a crop has already been referred to and the place which it takes among the other principal crops of the province is shown by the accompanying diagram; it is grown throughout the province. Of the cereals, maize, barley, wheat and *marua* (*eleusine coracana*) are next in importance to rice in regard to the area which they occupy (which is, however, only some 5,000,000 acres as compared with about 14,000,000 acres under rice). The maize, barley and wheat are grown chiefly in Bihar and in the low hills in the south and east. *Marua* is also grown in Bihar but its especial area is the Chota Nagpur plateau where it is the next most important crop to rice. The pulses and other

food grains occupy about 7,000,000 acres. Oil-seeds are also important not only as a crop, but because half of the harvest keeps 35 oil mills going in the provinces throughout the year. The balance is exported. The total area under oil-seeds (excluding niger) is about 2,000,000 acres, of which linseed occupies forty per cent. Although sugarcane, jute and tobacco occupy only about 700,000 acres they are, with fruits and vegetables which are cultivated on some 600,000 acres, extremely important in the agricultural economy; condiments, chillies, turmeric and ginger are also grown in Bihar and in the case of chillies a valuable export trade is done. The oil-seeds, sugarcane, tobacco, jute (practically confined to the Purnea district) and fruits and vegetables are all grown chiefly in Bihar and very largely in North Bihar. The major part of the cereals, even of rice, is similarly grown in Bihar. The overwhelming importance of Bihar in the agriculture of the province will thus be evident. Cocoanuts and cashewnuts are important local crops in Orissa.

A periodical census of livestock is taken. The last census was taken in 1925 and did not, except in regard to sheep and goats which are dealt with separately, show any appreciable increase over the census taken in 1920. The figures, excluding sheep and goats, were: 1920, 19·7 millions; 1925, 20·6 millions. In the last census, there were 6·9 million bulls and bullocks, 5·7 million cows, 2·4 million buffaloes and 5·7 million young stock, including young buffaloes. There is particular difficulty in securing accuracy in a cattle census in Bihar and Orissa owing to the continual movement of cattle down into Bengal for sale and across the borders into Nepal for grazing, but at any rate the figures of the last two censuses should be strictly comparable as they were both taken at the same time of year (January).

In 1913, the number of sheep and goats was estimated at 6½ millions; in 1920, the number had fallen to a little over 4 millions owing to the high prices obtainable during the War for meat and hides, and also to the scarcity prevailing in 1919 in the breeding areas; by 1925 these losses had been rather more than made good and sheep and goats were returned at 7 millions. Goats are bred throughout Bihar and there is a constant demand for them from the Calcutta market. Sheep breeding is carried on mainly in Bihar towards the United Provinces side. Sheep are also kept in Chota Nagpur.

2. PROVINCIAL INCOME AND EXPENDITURE.

The permanent settlement of land revenue in 1793, if it is not quite so dominating a feature in the income derived from land-revenue as is the case in Bengal, is yet the most important factor in the provincial finances. The incidence per head of land revenue assessment is the lowest of any province in India, lower even than in Bengal. Owing to the fact that the greater part of the Orissa division is temporarily settled some power of expansion exists as the following figures indicate:—

	1901-02	1911-12	1925-26
	Rs. (lakhs)	Rs. (lakhs)	Rs. (lakhs)
Land Revenue	143	157	167

But the growing needs of the province obviously cannot be met from this source. Excise revenue shows a marked elasticity, having risen from 124 lakhs in 1921-22 to 197 lakhs in 1925-26 and the revenue derived from stamps also shows a satisfactory increase in the same period. Still, the revenue of the province compares very poorly with that of a province like Bombay, which raises three times as much revenue from a population about two-thirds that of Bihar and Orissa population. Of any new expenditure permitted by these somewhat meagre resources, the transferred side of Government, which includes the nation building departments of Agriculture, Education, and the Medical and Public Health services, takes a overwhelming proportion. Indeed, in the three years ending 1926-27, the proportion averaged ninety-three per cent.

GOVERNMENT OF BIHAR AND ORISSA

Revenue and Expenditure charged to Revenue

GOVERNMENT OF

(Figures are in

Revenue and

Receipt heads	1921-22	1922-23	1923-24	1924-25	1925-26
<i>Revenue Receipts</i>					
Principal Heads of Revenue—					
Land Revenue	164	165	166	168	167
Excise	124	154	183	176	197
Stamps	87	95	96	100	108
Forest	9	9	10	11	10
Other heads	19	16	17	16	17
Irrigation	18	17	18	18	23
Debt—Interest	3	3	4	5	7
Civil Administration—					
Administration of Justice	3	4	4	5	5
Jails and Convict Settlements.. .. .	5	6	6	5	5
Police	1	3	2	2	2
Education	4	4	5	6	6
Medical	1	1	3	5	8
Public Health .. .. .	..	..	..	1	..
Agriculture	1	1	1	2	2
Other heads .. .. .	..	1	1	1	1
Civil Works	7	6	6	8	7
Miscellaneous	7	9	7	6	14
Miscellaneous adjustments between Central and Provincial Governments.	..	..	..	1	..
Total Revenue Receipts ..	453	494	529	536	579

BIHAR AND ORISSA

lakhs of rupees)

Expenditure charged to Revenue

Expenditure heads	1921-22	1922-23	1923-24	1924-25	1925-26
<i>Expenditure charged to Revenue</i>					
Direct Demands on the Revenue—					
Land Revenue	15	16	19	21	21
Forest	10	7	8	8	7
Other heads	18	17	17½	19	32
Capital outlay on Forest charged to Revenue.	..	..	..	..	1
Irrigation—Revenue account ..	24	23	24	26	26
Irrigation—Capital account charged to Revenue	1	1	½	..	..
Debt Services—Interest	2½	2	3	3½	3½
Civil Administration—					
General Administration	69	72	71	69	70
Administration of Justice	35½	35	35	36½	38
Jails and Convict Settlements	14½	18	16	17	17
Police	81	80	79	81	82
Education	54	54	62	68	77
Medical	17	16	19	26	28
Public Health	3	5	8	9	13
Agriculture	9	9	9	11	11
Industries	3	5	6	7	9
Other departments	2	1	3	1	½
Civil Works	61	59	65	67	74
Miscellaneous	38½	43	40	43	45
Provincial contribution	10	..	..	..	..
Miscellaneous adjustments between Central and Provincial Governments.	..	..	..	..	..
Total Expenditure charged to Revenue ..	468	463	485	513	555

GOVERNMENT OF

(Figures are in

Capital Receipts)

Receipt heads	1921-22	1922-23	1923-24	1924-25	1925-26
<i>Capital receipts</i>					
Revenue Surplus .. .. .	..	31	44	23	24
Famine Insurance Fund	12	14	12	16	19
Appropriation for Reduction or Avoidance of Debt.	..	..	..	..	..
Suspense .. .. .	..	4	4	5	1
Loans and Advances by Provincial Governments.	17	16	7	8	10
Loans between Central and Provincial Governments	..	20	7	5	..
Advances from Provincial Loans Fund	..	..	..	..	..
Total Capital Receipts	29	85	74	57	54
Opening Balance	100	93	143	176	202
Total	129	178	217	233	256

BIHAR AND ORISSA

lakhs of rupees)

and Expenditure

Expenditure heads	1921-22	1922-23	1923-24	1924-25	1925-26
<i>Capital Expenditure</i>					
Revenue Deficit	15	..	..	..	..
Capital Outlay on Forests .. .. .	..	..	..	..	..
Construction of Irrigation works .. .. .	..	..	—½	..	..
Civil works not charged to Revenue .. .. .	..	..	..	..	..
Other works not charged to Revenue .. .. .	..	..	..	..	..
Famine Insurance Fund	9	..	1	8	3
Appropriation for reduction or avoidance of debt. .. .. .	..	..	..	..	..
Suspense .. .. .	..	4	4½	5	..
Loans and Advances by Provincial Governments.	13	26	31½	13	3
Loans between Central and Provincial Governments.	5	5	5	5	..
Provincial Loans Fund .. .. .	..	..	..	..	25½
Total Capital Expenditure	96	35	41	31	31½
Closing Balance	93	143	176	202	224½
Total	129	178	217	233	256

3. REVENUE ADMINISTRATION AND LAND RECORDS.

For purposes of revenue administration the province is divided into five divisions, Patna, Tirhut, Bhagalpur, Chota Nagpur and Orissa, with a commissioner at the head of each, and 21 districts in charge of a magistrate and collector or deputy commissioner. The unit of revenue administration is the district, and revenue questions which cannot be settled finally by the officer in charge of the district go up (except in respect of Excise and Salt for which there is a special commissioner) to the Divisional Commissioner and from him, if necessary, to the Board of Revenue, which consists of one member. The Member not only deals with revenue questions, but has *inter alia* the very important duty of managing estates under the Court of Wards Act.

For the Orissa Feudatory States there is a special administrative officer designated the Political Agent and Commissioner, who has special revenue and judicial powers.

The main sources of provincial revenue in Bihar and Orissa are land revenue, excise and stamps. The main source of revenue for local self-government is a local cess on the land and on profits from mines, forests, etc., this is not included in the Table of Provincial Income and Expenditure.

For the present purpose, only land revenue will be referred to. The marked feature in the land revenue system of Bihar and Orissa is the fact that the revenue is fixed in the divisions of Patna, Tirhut, Bhagalpur and Chota Nagpur under the permanent settlement concluded by Lord Cornwallis in 1793. The incidence of land revenue per head of population ($7\frac{1}{2}$ annas) is lower than that of any other province in India—Bengal being next with $10\frac{1}{2}$ annas.

The conditions of this permanent settlement (which confirmed a "decennial" settlement completed in 1791—the first comprehensive settlement undertaken after the succession of the East India Company in 1765 to the Dewani of Bengal, Bihar and Orissa*) were embodied in a proclamation issued on 22nd March, and now known as Regulation I of 1793. It declared that the zamindars, independent talukdars, and other actual proprietors of land with whom the "decennial" settlement had been concluded would be allowed to hold their estates at the same assessment for ever but that "no claims for remission or suspension of rent were to be admitted on any account and lands of proprietors were to be invariably sold for arrears." Proprietors were also declared to have the privilege of transferring their lands without the sanction of Government and partition of estates was freely allowed.

There has been a long history of attempts on the part of Government to regulate equitably the relations between the zamindars and their tenants. The intention at the time of the permanent settlement was to confer an immunity on the ryots against the enhancement of their rents similar to that which had been granted to the zamindars in respect of their assessment. But this intention was soon lost sight of and, on the contrary, with a view to assisting the zamindars to pay their own fixed

*At that time "Orissa" comprised only a small tract of country now included in the Midnapore district of Bengal.

land revenue to Government, certain powers over the person and crops of a defaulting ryot were given to them in 1799. In 1859, legislation was passed with the object of giving the ryot some measure of protection; this failed, however, of its purpose and the relations between the zamindar and his tenant in the divisions of Patna, Tirhut and Bhagalpur are now regulated by the Bengal Tenancy Act of 1885. The objects of this Act are: (1) to give the settled ryot the same security in his holding as he enjoyed under the old customary law, (2) to ensure to the landlord a fair share of the increased value of the soil and (3) to lay down rules by which all disputed questions between landlord and tenant can be reduced to simple issues and decided upon equitable principles. Of the various amendments of the Act, the most important are those effected by Act III of 1898 in regard to the preparation of the record of rights and the enhancement and reduction of rent, and by Act I of 1907 which conferred greater authority on the record of rights when duly prepared and published, but the principles of the Act of 1885 remain unaltered and, with the amending legislation, it provides a code governing the most important relations between landlord and tenant. It is in force in ten districts of Bihar. The three districts of Angul, Sambalpur and the Santal Parganas have special Tenancy Acts as have also, Chota Nagpur and the three coastal districts of Orissa. All these Acts provide for a record of rights.

It would be impossible and unprofitable within the limits of the present introduction to enumerate the tenures and sub-tenures intervening between the zamindar and the cultivating ryot which are regulated by this legislation. Suffice it to say that while the majority of the bigger estates remain in the possession of the old zamindari families, the landlords have freely used their powers of alienation not only to create subordinate tenures but also to transfer their estates, and that a considerable part of the area which was permanently settled in 1793 is no longer in the direct possession of the descendants of the original owners.

The temporarily settled tracts consist chiefly of territories acquired subsequent to the permanent settlement. Much the most important of them is the tract which constitutes the Orissa division but there are a number of estates held direct by Government in other divisions, of which the Khurda, Palamau, Banki and Angul estates are the principal ones. In 1925-26, 329 estates out of 118,907 were held direct by Government* and contributed thirteen per cent of the total land revenue. Purchases at revenue sales have gradually extended the temporarily settled areas.

The Orissa Tenancy Act of 1913 replaced for the three districts of Cuttack, Puri and Balasore, the Bengal Tenancy Act which had previously been in force. The object of the Act was identical with that of the Act it superseded, *viz.*, to regulate the relations between landlord and tenant.

* These estates directly held by Government constitute only a small fraction of the total number of estates subject to periodical settlement. In Orissa alone the number of these estates runs into several thousands and there are several hundreds scattered about the permanently settled tracts of Bihar.

Chota Nagpur also has a special Tenancy Act of its own (Act VI of 1908 and subsequent amendments). This Act not merely superseded the previous Acts in force in Chota Nagpur but introduced a number of principles adopted from the Bengal Tenancy Act and set the substantive law regarding the customary rights and usages of the aboriginal ryots on a firm basis. It has been successful in allaying the discontent which, as recently as 1900, manifested itself in an armed rising and has protected the rights of the aboriginal population where these have been endangered by the passage of the estates of indigenous landholders into the hands of ryots often of the moneylender class.

There is another Act peculiar to this part of the province (The Chota Nagpur Encumbered States Act VI of 1876 and subsequent amendments) which was enacted to protect the ancestral estates of the aboriginal landlords who have fallen into debt and to prevent them from being put up to sale.

LAND RECORDS AND SURVEY.

A primary object of the framers of the permanent settlement of 1793 was to record all rights in land, but up to the passing of the Land Registration Act in 1876, the law as to registration was not strictly enforced. The object of the Act of 1876 was not to make an inquisition into titles, but to identify all individuals on whom might be imposed certain duties and obligations in virtue of their being in possession of land as proprietors. Consequently every person in possession of land, whether revenue-paying or revenue-free, is required to register full particulars. But such registration does not deal with subordinate rights and interests. For several years after the permanent settlement endeavours were made to maintain a record of these through subordinate officials but without success. At length, however, a procedure was devised under the Bengal Tenancy Act of 1885 for obtaining in a complete form a record of rights of all interests in the land. 1925-26 marked the completion of the record of rights for the whole of Bihar and Orissa, except for a few small isolated areas. The Administration Report of the province for that year observes that "It is difficult to exaggerate the benefit which these operations have brought to landlord and tenant alike, to say nothing of the general public and the administration of the province. . . . District officers report, year by year, that the record is freely used. . . ." The continued value of such a record is dependent on its being kept up to date by successive revisional operations.

4. THE CULTIVATOR.

Bihar and Orissa supports a population slightly larger than the population of England and Wales on an area nearly twice as large.

The total population of Bihar and Orissa, including the Feudatory States, as recorded at the census of 1921, was about 38 millions, of whom some four per cent only lived in towns. At this census, 81 centres of population were classified as towns, but six of these contained a population of under 5,000 and of the remainder no less than 35 have a population of between 5,000 and 10,000 only. The proportion of the urban to the rural population has remained practically stationary since 1891.

How predominantly rural Bihar and Orissa is, notwithstanding the existence of the industrial areas in Dhanbad and Singhbhum, is well illustrated by comparing the percentage of the urban population (3·7) with corresponding percentages for the neighbouring provinces. In the Central Provinces, the percentage is 9·0, in the United Provinces 10·6 and in Madras 12·4. There are, in fact, only four centres in Bihar and Orissa which can be termed cities, viz., Patna, Gaya, Bhagalpur and Jamshedpur.

The total population in 1921 showed a slight decrease over the total returned in the census of 1911, which is accounted for mainly by the terrible visitation of influenza in 1918 which was aggravated by severe scarcity.

The population presses heavily on the land in North Bihar, where the mean density rises as high as 907, 872 and 870 per square mile in the Muzaffarpur, Saran and Darbhanga districts, respectively. In the Patna district of South Bihar and the Cuttack district of Orissa also, the population is very dense, 763 and 565 per square mile. On the other hand, the Chota Nagpur plateau is thinly peopled, the mean density being 221 per square mile, and in the Angul district there are only 109 persons to the square mile. These figures are for British territory only. The sparsity of the population in the Chota Nagpur division brings Bihar and Orissa as a whole down to the third place among the provinces, below Bengal and the United Provinces.

Outside the towns, the people live in 104,239 villages and not in isolated houses on their holdings. The villages vary considerably in population. In Bihar, for example, where, as has been mentioned, the concentration of population is greater than anywhere else in India, 14,160 villages in the Tirhut division accommodate 9,688,892 people or an average population of 680 for a village, whereas in Chota Nagpur the average population of a village falls to 280. Village administration varies in the different parts of the province. In the permanently settled tracts of Bihar there is no village organisation, the real unit being the family, and the landlord and his agent take little interest in the general welfare of the village. In the aboriginal villages of the Chota Nagpur plateau, in the Santal Parganas and in the government estates in Orissa, on the other hand, the village headman is an official of real authority in the village, and manages all its relations with the outside world. In the Santal Parganas, this office is usually but not necessarily hereditary. But whatever the organisation of the village may be, it is generally true to say that there is usually no sanitation. Information regarding the health of the population will be found in the last section of this introduction under Public Health and Sanitation, and information in regard to village roads under Communications and Markets.

Holdings are small, but exhibit a good deal of variation in gross area. Thus, in the two most thickly populated districts of North Bihar, where the population is nearly 900 to the square mile, the average amount of cultivable land per household is estimated to be 5 acres, whereas in Chota Nagpur the average rises to 11½ acres and in Orissa is 9 acres. If, however, account is taken of the fact that double cropping is the rule

rather than the exception in North Bihar, that in Chota Nagpur a large, and in Orissa a smaller but still substantial, proportion of the holding is not sown every year, the net or effective holding throughout Bihar and Orissa is uniform at something between six and seven acres. Fragmentation of these holdings is almost universal. It is worst in the Patna, Saran and Darbhanga districts of Bihar and in Orissa, where the average size of the 'fragments' into which the holdings are divided is no more than two-fifths of an acre and it will commonly take a cultivator an hour merely to go the round of all the fragments which comprise his holding. The waste of time and labour which is the most obvious evil of fragmentation is mitigated by the very general practice of combination among neighbouring cultivators to grow their crops in comparatively large blocks on a basis of payment in shares of the produce.

The actual cultivators of the land were estimated in the census of 1921 to number nearly ten millions and of these about one million were returned as having subsidiary occupations not obviously agricultural. These occupations include peddling, coal, iron and mica mining, weaving, smithery, carpentry and pottery, leather work, fishing and employment as general labourers.

The cultivation in the province varies greatly with the different races, climates and soils of the districts. The best cultivators are to be found in the Saran district of Bihar where the climate is good and the people intelligent, hardy and energetic. Pre-eminent among these are the *koeris* (vegetable gardeners).

The cultivation in Chota Nagpur is, throughout, very inferior to that in Bihar, although there are marked differences within the division itself. But the soil is generally too poor, the population too sparse and the attraction to the industrial centres in the division too great to make practicable even an approximation to the close and careful cultivation which prevails in North Bihar.

The cultivation in the Orissa division falls into two well marked divisions. In the west, in the Sambalpur district, conditions are similar to those in the Central Provinces. The cultivators are fairly prosperous, but the standard of cultivation does not reach so high a level as in Bihar, though it is greatly superior to the average cultivation in Chota Nagpur. In the east of the Orissa division, that is, in Orissa proper, the soil in the inland tracts is rich, the climate favourable and the cultivator intelligent. Excellent crops of rice are accordingly obtained in many parts of the district, and the evidence of good cultivation is seen in the ability of this part of the province to sustain a large population; in the district of Cuttack, the population reaches a density of 565 to the square mile.

This brief description takes no account of certain parts of the province where special conditions prevail, such as the Santal Parganas and the district round Ranchi where there are a fair number of aboriginals. The cultivation in these special districts varies considerably. In some parts, it is extremely good and in others it is little more than occasional cultivation of the jungle type.

Below the peasant cultivators come the landless labourers who number some 2½ millions apart from their dependants. Wages are still moderate, though they have risen very considerably since the War, and the landless labourer is in consequence better off and more independent than he used to be.

In the reports on the last settlements of the Hazaribagh and Palamau districts of Chota Nagpur, unfavourable comment is made on the tendency for these landless labourers to become permanently attached to a master. In return for a loan received, such men bind themselves to perform whatever menial services may be required of them in lieu of paying interest on the loan and in consequence lose their status as free labourers.

Seasonal migration is a striking feature in North Bihar. It begins in November and is at its height after the winter rice crop has been reaped in December; the return begins about March-April. The migrants are often accompanied by their families. Crop cutting in northern Bengal is a special attraction for the family party, as the labour of the women and children is a useful asset. But trade, domestic and factory service, and day labouring and carting absorb many into Calcutta. Many others scatter all over Bengal often plying the business proper to their caste, as cobblers, boatmen, earthworkers, etc. Most of the coolies at the bigger railway stations of western Bengal come from Bihar and Orissa. South Bihar shares in this periodic migration as does also Orissa, migrants from these two areas going mostly to Calcutta. Chota Nagpur also sends large numbers to the coal fields and to the tea gardens in the Duars for periods of from two to six months.

Emigration of a more permanent nature takes place from all three divisions of the province—Bihar, Chota Nagpur and Orissa—largely to the tea gardens in the Duars and in Assam. Emigration from Chota Nagpur to Assam is specially marked, but it is not as a rule permanent, men and their families going for periods of from two to five years.

In the census of 1921, five per cent of the actual population of Bihar and Orissa, or nearly 2,000,000 were enumerated in other parts of India as having been born in the province. The census is taken at a time of year (March) when the seasonal migrants are just beginning to return. The census returns do not distinguish between seasonal migration and the longer periods of emigration. As compared with the census of 1911, emigration (which includes seasonal migration) in 1921 showed a decline in both North and South Bihar, but a very great increase in the case of Orissa which was doubtless a reflexion of the scarcity which occurred in Puri district in 1920. Emigration from the Chota Nagpur plateau had also greatly increased for similar reasons.

The factors which most affect the well-being of the rural population of Bihar and Orissa are, however, after all neither migration, nor access to industrial employment. Those employed in the iron and steel trade, in the 35 oil mills, the 22 tobacco factories and the 15 large sugar mills which the province maintains and the workers in the lac industry are an insignificant fraction of the total population. Agriculture remains

the sole means of livelihood for the greater part of the inhabitants of the province.

Factors of real importance to the cultivator are the sources from which he obtains the finance indispensable for carrying out his cultivation, and his ability intelligently to use that finance. At present, these sources of finance are the *mahajan* and the co-operative credit society. Government also provide facilities for borrowing under the Land Improvement Loans Act of 1883, but little use is made of these facilities. No estimate of the finance annually required to carry on cultivation in the province has, as yet, been made, but it is certain that it must amount to many crores of rupees. It is, therefore, equally clear that land improvement loans which amount on an average to Rs. 40,000 a year and the annual provision of 56 lakhs (the figure for 1925) from co-operative sources do not, between them, make any effective impression on the *mahajan's* monopoly.

If the spread of primary education is the essential preliminary to the wide extension of a sound co-operative credit system, as it is now in fact universally admitted to be, it is certain that education and a sound system of financing the growing and the harvesting of crops are both essential preliminaries to the improvement of marketing on any large scale. Unfortunately, there is still almost everything to do in spreading a knowledge of reading, writing and simple arithmetic among the people. In the census of 1921, only 12·6 of the men and 0·7 per cent of the women of twenty years of age and over were returned as literate and, although literacy had increased to some extent since the census of 1911*, the rate of increase clearly allows no hope whatever of any early general attainment of literacy. The position in regard to literacy is further dealt with in the section on Education below.

5. THE AGRICULTURAL DEPARTMENT.

Since the closing of the Agricultural College at Sabour in 1923, there has been no educational centre in Bihar and Orissa at which the research and experimental work of the Agricultural Department could be prosecuted. The Director of Agriculture has his headquarters at Sabour where one of the five central experimental farms of the province is situated. Here also the botanical and chemical work of the department is carried out under the supervision of the Director and the agricultural engineer is stationed.

The general agricultural policy in the province since 1923 has been one of decentralisation and, for administrative purposes, the province is divided into four ranges, North Bihar, South Bihar, Chota Nagpur and Orissa, each under a deputy director. North Bihar and South Bihar have, however, been found to be too big for a single deputy director's charge and the eastern sections of each of these two ranges have, therefore,

*Literate (aged 20 and over)	1911		1921	
	Males	Females	Males	Females
	11·4	·4	12·6	·7

been placed under an assistant director responsible to the Director. It is contemplated ultimately to have seven ranges and the administrative approval of Government has already been obtained to the establishment of a fifth range for the Santal Parganas in south-east Bihar.

These arrangements are the outcome of the report of an agricultural committee in 1922 which was chiefly composed of members of the Legislative Council and included the Agricultural Adviser to the Government of India. The committee was convened in consequence of the attitude of the legislature towards a scheme for reorganising the department which included the retention of the Agricultural College at Sabour, the development of farms and the establishment of a sugarcane station in North Bihar.

The organisation within each range is based on a central experimental farm. These farms are at Sepaya (379 acres) for North Bihar, Sabour (190 acres) and Gaya (193 acres) for South Bihar, Ranchi (340 acres) for Chota Nagpur and Cuttack (150 acres) for Orissa. Of these, the Cuttack farm, which was started in 1904, is the oldest; the farm at Sabour dates from 1906, the Sepaya and Ranchi farms from 1913-14 and the Gaya farm from 1924. The ranges are necessarily of very considerable extent. The Chota Nagpur range is, for example, 200 miles from north to south and east to west, and if the other ranges are less extensive, the population is far greater. An organisation confined to one farm could not in such circumstances distribute in an effective manner the results of its research work among the cultivators and the agricultural committee of 1922 accordingly recommended the establishment of a small farm in each of the sixty-four sub-divisions as a centre for disseminating improvements in that area. Eight such farms already existed at the date of the committee's report, *viz.* : Jamui and Nawadah in South Bihar; Purulia, Ramgarh and Netarhat in Chota Nagpur; and Sambalpur, Balasore and Khurda in Orissa. Since that date, seven more sub-divisional farms have been started; Sewan and Darbhanga in North Bihar; Birkamganj and Siris in South Bihar; Chaibasa in Chota Nagpur; and Anandpur and Angul in Orissa. With fifteen sub-divisional farms started and three more under construction out of a programme for sixty-four there is clearly much to be done. The proposed provision for five more farms had to be omitted from the budget of 1927-28 owing to lack of funds. The farms vary in size but, with the exception of Netarhat and Nawadah, all of them are under 50 acres. The area of the Netarhat farm is 193 acres and that of Nawadah 67 acres.

While the organisation of the department is thus based on these farms, the methods of work adopted in the different ranges are not quite uniform. In Bihar, where farms are still very few and the cultivation very close, experiments are made on cultivators' fields and there is widespread propaganda, in which the co-operative movement takes its share, based on the results. In Orissa, the five sub-divisional farms provide a surer basis for demonstration on a similar scale and by similar means. In Chota Nagpur, where the area is large, there has been as yet very little propaganda and the sub-divisional farms are only four in number; a start has, however, now been made with propaganda in this area.

The staff of the department consists of officers of the Imperial Agricultural Service, recruitment for which has now ceased, officers of the Provincial Agricultural Service and the Subordinate Service. There are five Imperial Agricultural Service officers, the Director and four deputy directors in charge of the four ranges, and an agricultural engineer recruited on a temporary agreement. There are ten Provincial Service officers; of these six are assistant directors, two of whom are in independent charge of the east-south and east-north Bihar ranges under the Director of Agriculture and four work as assistants to the deputy directors. Of the remaining four provincial officers, two are agricultural chemists, one is an assistant professor of mycology officiating as economic botanist and the fourth is superintendent of the Monghyr dairy farm. The Subordinate Service is divided into three grades, a small upper grade on Rs. 150—10—200, with two posts on Rs. 225 and one on Rs. 250 consisting of managers of the central farms and probationers for the Provincial Service, a middle grade on Rs. 60—5—150 and a lower grade on Rs. 30—2—60—4—100. Recruits who have passed the intermediate university standard start on Rs. 45 and ordinary matriculates start on Rs. 35. Staff is undoubtedly the greatest difficulty at present in the way of developing the activities of the Agricultural Department. There is now no agricultural chemist or economic botanist belonging to the Imperial Agricultural Service. The work of the agricultural chemist is now being done by the former assistant professor of chemistry and that of the economic botanist by the former assistant professor of mycology at the Sabour College. Both these officers worked under the supervision of the Director. All entomological and mycological problems have to be referred to Pusa. The Government of Bihar and Orissa propose to make provision for an agricultural chemist and an economic botanist in the new Superior Provincial Service which is to replace the Imperial Agricultural Service, but it is intended to continue to rely on Pusa in the sphere of entomology and mycology. As regards provincial staff, the intention at present is to recruit men who have taken degrees with honours in science from the universities and to give them a practical agricultural training at the central farms at Sabour, Cuttack, Ranchi and Sepaya under the deputy directors. A graduate who took honours in science at the University of Patna was recruited in this way in 1924. The subordinate staff are trained on the agricultural farms, mainly at the four central farms, but training in agriculture is necessarily slow, and the work at the central and existing sub-divisional farms is being carried on under serious disabilities, so much so that the Director in his report for 1925-26 stated that it had become "necessary to check the expansion of the work outside the central and existing sub-divisional farms in order to give more attention to the training of the subordinate staff on these farms and to the work in progress on them."

The work done on crops by the Agricultural Department for the cultivator may best be shown by a brief summary of the principal activities of the four central farms :

Sabour.—Here the crops under study are chiefly sugarcane, potatoes and vegetables. The farm is run by recruits on probation. The installation of two tube wells in addition to percolation wells enables the greater part of the farm to be irrigated.

Cuttack.—Although the work of the department has been longer established here than elsewhere in the province, the only considerable success so far attained has been with paddy. The seed of two prolific and early yielding varieties and one prolific and late yielding variety is now in process of distribution. Ten thousand pounds of seed were distributed free by co-operative societies in 1925-26 for demonstration purposes. Green manuring has also spread in the Orissa delta. Of one important problem in the delta, *viz.*, the crops which can best be grown in the cold weather on land where paddy has been destroyed by floods, no decisive solution has been found but the experiments with linseed and *juar* are hopeful.

Ranchi.—Apart from cattle breeding which will be described later, the work on this farm and the small sub-divisional farms linked with it consists chiefly in varietal experiments with paddy and the growing of groundnuts for distribution and of sugarcane on drained paddy land for experimental and demonstration purposes.

Sepaya.—Apart from cattle breeding, useful work is being done in popularising Coimbatore cane No. 210, while tobacco growing experiments have resulted in the rapid spread of the crop in the Saran district where it was almost unknown before.

The greatest success so far achieved with the introduction of an improved variety is not, however, connected with any one farm. It is the introduction of *dahia* paddy, which is an early and heavy yielder, and by 1924-25 had spread over about 23,000 acres in South Bhagalpur, South Monghyr and the Santal Parganas in South-East Bihar. The cultivation of groundnut has also been taken up on a considerable scale in the Patna division as the result of departmental demonstration.

Attention is being paid in all four ranges to manuring; in particular, the use of gypsum has been introduced on a considerable scale in South Bihar. Experiments are also being conducted on the farms to determine the value of different types of phosphatic manure and the possibility of a great demand in the near future for this and other kinds of fertilisers is foreseen as the result of the tests already made by the Agricultural Department and of the organised propaganda which has now been begun by sellers of artificial manures on the basis of these tests.

Important experiments have also begun at the Purnea* farm in North-East Bihar into the relative values of different varieties of jute for local cropping.

Agricultural engineering.—The Agricultural Engineer has a workshop at Sabour which is also his headquarters. Research on water lifts is

* This farm of 190 acres is privately owned, by the Tournament Trust Committee, but is controlled by the department.

conducted there and there is so great a demand for the Rahat pumps (iron Persian wheels) that arrangements are being made to have them manufactured by private firms, as the workshop cannot meet the demand and it is also hoped that manufacture by private agency will enable the pump to be sold cheaper. Repairs to farm implements, machinery and boring plant are also carried out at the workshop at which, as far as possible, all boring appliances are also manufactured. Experiments are also being made with *gur* furnaces and cane mills. But the main duty of the Agricultural Engineer is well boring. There is a considerable demand from cultivators for borings in ordinary wells and orders for tube wells with strainers are now being received. There were in all 215 such applications in 1925-26. The staff of the Agricultural Engineer has been strengthened by the appointment of an assistant engineer and three separate sections have been constituted for the three alluvial tracts, each under a supervisor, *viz.*, one in North and one in South Bihar and a third in Orissa.

The Agricultural Engineer is also responsible for small *bunds* in South Bhagalpur division. A typical scheme is the one carried out at Koilwa in 1925-26 which will control 200 acres. These *bunds* combined with drainage are of especial importance in Chota Nagpur. It is, as the Report of the Agricultural Department for 1925-26 remarks, "the one direction in which a really great advance seems possible in Chota Nagpur—the retention of the monsoon rainfall at a high elevation above the paddy land and the drainage of the lowest paddy land for sugarcane and garden crops."

6. LIVESTOCK WORK AND THE VETERINARY DEPARTMENT.

Both oxen and buffaloes, especially the former, are a very important feature of agriculture in Bihar and Orissa, as not only are they required in large numbers for agricultural operations within the province but, with the assistance derived from the neighbouring pastures of Nepal, there is a large annual export to Bengal. A comparison of the census of 1920 with that of 1925 yields the following results:—

	1920	1925	Increase or decrease
Bullocks	6,256,310	6,826,415	570,105
Cows	5,617,449	5,751,480	134,031
Young stock	4,482,405	4,653,065	170,660
Male buffaloes	802,570	826,599	24,029
Cow "	1,615,301	1,565,441	40,140
Young stock	1,038,138	1,022,221	— 15,947
	19,712,203	20,635,221	923,018

Various attempts have been made in the past, notably at the Sepaya farm, to improve the breeds of cattle, but so far with little result. Continuity of policy has been lacking and as the distribution of bulls and male buffaloes has been made on no settled plan, any good that might

have been effected has been dissipated. Although dairy herds have been maintained at the Sabour and Ranchi farms and a third herd has recently been established at the Monghyr farm on the advice of the Agricultural Committee of 1922, nothing has been done to improve draught cattle since the abolition of the breeding herd at Sepaya in 1922. A cattle committee was appointed in 1925 to consider the state of cattle breeding in the province generally. The committee reported in favour of breeding a dual purpose animal and their recommendations that a large breeding farm should be established at Patna under the Veterinary Department, that a breeding herd should be attached to the Cuttack farm in Orissa and that a herd of Murra buffaloes should be maintained at Sepaya farm have all been approved. The Veterinary Department will, therefore, henceforward, have an interest in breeding. Hitherto, breeding operations have been entirely conducted by the Agricultural Department, but the local Government are now disposed to think that livestock and dairying work should be brought as far as possible under the control of the Veterinary Department and they have decided that the present Director, Civil Veterinary Department, should combine the duties of livestock officer with that of director. Sheep and goats are both important elements in the livestock of the province, numbering, as they do, 1,239,000 and 5,765,000 respectively, but so far no attempt has been made to improve their breeds.

The Civil Veterinary Department was separated from the Agricultural Department in 1920. For the purpose of administration, the whole province is divided into three ranges, North, Central and South. The first is in charge of a deputy director, who, like the Director, is a member of the Imperial Veterinary Service, recruitment for which has now ceased. The third was also in charge of an officer of the Imperial Veterinary Service but the vacancy which arose on his death has been filled by the appointment of an officer of the Provincial Veterinary Service. As the Director has now taken up the additional duty of livestock officer, it is necessary to relieve him of the Central range which is at present under his direct charge and to appoint a third deputy director. At present, there are only three officers in the Bihar and Orissa Provincial Veterinary Service, two assistant directors on Rs. 250—50—750 per month and an officer who, after obtaining a veterinary degree in England, is now taking a post-graduate course at Muktesar and has been appointed temporarily for a year on a special rate of pay of Rs. 300 per month pending a decision as to the formation of the new Superior Provincial Service to take the place of the Imperial Veterinary Service.

Owing to the comparatively recent origin of the department and the shortage of staff, its activities have in the past been chiefly concentrated on the control of contagious diseases. The charge of the new breeding centre at Patna and still more the decision to create a veterinary college, with its opportunities for prosecuting research, will greatly widen its outlook. At present, any investigation beyond the resources of the three small laboratories, one for each range, has to be referred to Muktesar.

Hitherto, the subordinate veterinary officers have been trained at the Bengal Veterinary College. The new college, which will be at Patna, will be run in connection with the proposed cattle breeding and dairy farm there. The students will thus have an opportunity of getting an insight into animal husbandry and dairying which no other veterinary college in India provides. It is intended to start with a three years' course only, in view of present financial conditions, but the advantages of a four years' course and of affiliation to Patna University which the extra year will make possible will not be lost sight of. The college will not supply recruits for the new Superior Provincial Veterinary Service. The intention at present is to obtain these recruits from among students sent to England who return with a veterinary degree.

The subordinate staff consists of 124 veterinary assistant surgeons, 13 inspectors of the work of these assistants, 18 staff and reserve inspectors, 4 laboratory assistants and 1 cruelty inspector employed by the Patna Municipality. The veterinary assistant surgeons are on a scale of Rs. 50—10—125 with certain allowances; three of the laboratory assistants receive Rs. 100-125 per month and the fourth is on Rs. 60-80 per month. The cruelty inspector is on a special scale of Rs. 100 per month and is appointed temporarily for three years in the first instance.

The veterinary assistants are government servants but work under the district boards. They are paid by Government, the district boards making a contribution to Government in respect of their pay (five-sixths in the case of the stationary and one-half in the case of the touring assistants). The assistants are partly touring and partly stationary. The intention is to have one fixed hospital, in charge of an assistant in each sub-division and two touring assistants. As there are 63 sub-divisions and only 27 stationary and 97 touring assistants, the staff is by no means complete, but many district boards are reported to be genuinely unable to do more than they do at present. But undoubtedly the proportion of their expenditure on veterinary matters to their total receipts and to their expenditure on education and medicine is disappointingly low. Thus, no district board in 1925-26 spent more than two per cent of its total receipts on veterinary work (including the cost of sera and vaccine) and no fewer than nine out of the twenty boards which sent in returns spent less than one per cent. On education, on the other hand, no board spent less than ten per cent or on medicine less than four per cent of its total receipts.

Inoculation against rinderpest, hæmorrhagic septicæmia, anthrax and black quarter are carried out. In 1926-27, the total inoculations were 147,731 and in the preceding year, 170,153. The marked difference between the two years was due to the abnormally low incidence of rinderpest in 1926-27. Inoculation by the simultaneous method has not so far been employed. In 1926-27, 3,915 in-cases and 42,421 out-patients were treated in the veterinary hospitals. In the same year, the travelling dispensaries performed 1,119 castrations and treated 38,821 animals for contagious, and 69,247 animals for non-contagious, diseases.

7. IRRIGATION.

In 1926-27, the area irrigated from all sources amounted to 5,301,835 acres, or about eighteen per cent of the total area sown. Of this area, no less than 3,584,000 acres were under rice and practically all the remaining acreage irrigated was under foodcrops of one kind or another.

The sources of irrigation are various ; 1,832,576 acres are irrigated by canals nearly half of which are privately owned, 1,591,171 acres and 620,197 acres are irrigated by tanks and wells respectively and 1,257,391 acres derive their water from various sources, the chief of which is the impounding of flood water by temporary bunds.

The major part of the large area irrigated by private owned works is situated in the Gaya district and in the southern portion of the Patna district. These irrigation works are maintained by the landlords, and, as a rule, the rents are paid in kind and not in cash. This brings in a large return to the landlord on the capital which he expends on irrigation. The tenants as a class tend to apply for a commutation of their produce rents into cash rents. This commutation it is within the power of Government to grant. But Government have to consider that the tenants owing to their inability to combine among themselves are, as a class, unable to keep up the irrigation works, so that general commutation throughout the district would result in extensive deterioration in cultivation.

The government canals are in the north and south-east of the province. In the north are the Son, Tribeni, Dhaka and Teur canals ; in the south-east are the Orissa canals and the Orissa Coast Canal, the latter being for navigation only. There is a separate department for irrigation with a Secretary who is also Chief Engineer at the head of it. There are two local circles of administration—the Son and Orissa, each in charge of a superintending engineer.

The Son canals, which were opened in 1875, take off in two main branches from the river Son, one on the east and one on the west bank of the river. They irrigate an average area of 564,441 acres on the south bank of the Ganges at a capital outlay per acre irrigated of Rs. 48. The interest earned averaged 5·89 per cent for the three years ending 1925-26. The Tribeni, Teur and Dhaka canals all lie to the north of the Ganges and close to the Nepal boundary. The Tribeni Canal was completed in 1912 and irrigates 66,588 acres from the river Gaudak at a capital outlay per acre irrigated of Rs. 122. The revenue earned averaged only 0·62 per cent on this outlay for the three years ending 1925-26. The Dhaka Canal was opened in 1907 and provides water for 14,345 acres at a capital outlay of Rs. 42 per acre irrigated and gave a return of 1·01 per cent over the same period. The Teur Canal irrigates an average area of just over 2,000 acres. It was originally a private irrigation system. Both the Tribeni and the Dhaka canals were constructed as protective works.

The Orissa canals in the south-east date from 1865. Their main function is to protect portions of the Mahanadi delta against flooding.

The area protected is 562,114 acres and the cost Rs. 48 per acre. The average area irrigated is only 247,224 acres. For the three years ending 1925-26, these canals returned only 0·48 per cent as interest on capital outlay.

On all these canals, the cultivator is charged for water on an acreage basis and he can enter into a long term lease at reduced rates or pay for the water by the season and the crop. The details of the arrangements for long leases differ for the different canals, but in no case does the lease cover watering for the whole year. In the case of the Orissa and Son canals it covers watering from June to March. Waterings required in April, May and part of June for such crops as sugarcane, cotton, indigo have to be paid for as extras. On the Orissa canals only some 260 acres are not irrigated on the long lease system. Two-thirds of the acreage irrigated by the Son Canal and nearly one-half of the acreage irrigated by the Dhaka Canal are under this system. Long leases are less popular on the Tribeni Canal and cover only three-tenths of the area irrigated. The long lease system shows signs of falling into disfavour on the Son canals.

No schemes for new canals are under consideration and, as will have been remarked, there has been no construction since 1912. Extensive additions could advantageously be made to the areas irrigated in Bihar north of the Ganges and such works would incidentally be of service in drainage but there is little likelihood of development as the head waters of all available rivers lie within Nepal and the necessary control is, therefore, lacking.

The Son and Orissa main canals are open to navigation. Including the Orissa Coast Canal, there are 500 miles of navigable canals in the province.

Of the total area under tanks (1,591,000 acres) and wells (620,197 acres) more than one-half in each case is located in the Patna division.

Wells are a great feature in the cultivation of South Bihar. In this district, the rainfall is too light to admit of rice cultivation on an important scale but wells make it possible to grow vegetables (including potatoes and onions) and spices. Well irrigation is also utilised for sugarcane and even for wheat. It has been found that the supply from a percolation well can often be greatly increased by driving a 3" tube into lower water bearing strata. There is a demand for these borings and an even greater demand from zamindars and others for tube wells proper. The engineering section of the Agricultural Department has recently acquired plant for making tube wells. Well irrigation is not as yet practised in Orissa, though a demand for tube wells is now arising and the Agricultural Department have posted a well boring supervisor to this area. Well irrigation is practised in Chota Nagpur but is unimportant. Where well irrigation is practised on such an extensive scale as it already is in the Patna and Tirhut divisions, the efficiency of water lift appliances becomes important and there is an increasing demand for iron Persian water wheels.

Outside the Patna division, the largest area irrigated by tanks lies within the Chota Nagpur plateau. The future expansion of irrigation

in the province undoubtedly lies with small schemes and, more particularly, with wells, the responsibility for which rests with the Agricultural Department. The engineering section of that department has recently been reorganised and the field work distributed into three sections, North Bihar, South Bihar and Orissa. The iron Persian wheel is being adapted at Sabour to meet local requirements in the way of water lift as motor water lift is not considered economical where the capacity of the well is less than 12,000 gallons a day.

River conservancy is confined to the Ganges and is devoted to keeping the river open for navigation during the period of low water from October to May.

8. FORESTRY IN RELATION TO AGRICULTURE.

7,514,743 acres are shown in the Season and Crop Report for 1926-27 as under forests. Of this area, only 2,373,533 acres are under the management of the Forest Department. The forest areas are situated chiefly in the Chota Nagpur division, in the Angul, Puri and Sambalpur districts of Orissa, in the Santal Parganas and in the Champaran district of the Tirhut division.

In 1925-26, grazing was provided in the forests under State management for—

62,100 buffaloes,
281,654 cows and bullocks,
55,980 sheep and goats,
10 camels,
10 other animals.

This is, of course, the merest fraction of the total livestock of the province, since the total number of cattle alone in Bihar and Orissa is estimated at 21 millions. The value of free grazing or grazing at reduced rates was, in 1925-26, Rs. 1,09,693. In the same year persons with rights in the forests took away forest produce valued at Rs. 1,50,078. The total grazing and forest concessions in 1925-26 were, therefore, valued at Rs. 2,59,771.

9. GENERAL EDUCATION.

The total expenditure on education at recognised institutions in the province in 1925-26 was 153 lakhs of rupees as compared with 114 lakhs in 1920-21 and 63 lakhs in 1912-13. Of the expenditure in 1925-26, 37·60 was contributed by Government, 28·50 came from funds of the local boards, 19·20 from fees, and 14·70 from other sources such as endowments and private subscriptions. The cost per enrolled student was Rs. 10-8-11. The average cost per pupil at different types of institutions is stated in the table of figures given below.

In 1926, there was in Bihar and Orissa excluding the Feudatory States a population of some 16,765,000 males and 17,239,000 females. Of the former 964,288 or 5·75 per cent and of the latter 120,091 or 0·69 per cent were under instruction.

Of the male pupils, about 925,600 were attending institutions recognised by the Education Department. In the following table are given particulars of the institutions for males, scholars in attendance and cost per head of each pupil :—

Kind and number of Institutions	Number of pupils	Percentage at each Institution	Cost per pupil		
			Rs.	s.	p.
1 University .. .. .	.....	.....	.....	.....	.....
9 Arts Colleges	3,211	0·33	277	15	1
5 Professional Colleges	887	0·09	452	8	5
130 High Schools	35,108	3·63	46	4	3
516 Middle Schools	51,662	5·34	20	14	0
27,689* Primary Schools	861,172	89·00	5	9	10
452 Special Schools	15,567	1·61	87	7	4

*Includes 1,007 night schools.

The University of Patna, which was founded in 1917, is of the examining type. In Bihar and Orissa, as elsewhere, the recommendations of the Calcutta University Commission of 1917 attracted widespread interest in educational circles. The provision of facilities for education up to the intermediate standard before the student proceeds to the degree stage has taken the form of adding in preference to that of two additional classes to certain high schools and not by establishing Intermediate colleges.

An important step in the education of the medical and health services of the province was taken in July 1925, when the Prince of Wales Medical College was opened. The college teaches up to the M.B., B.S. standard and a Faculty of Medicine has been added to Patna University.

The policy of Government in regard to high schools is to maintain one such school in each district in order to set an example to high schools maintained by private agency. At present, Government have 24 such schools. All government schools will teach elementary science and also manual training. Drawing is already compulsory.

In this policy and in other plans for improving secondary education, the Government receive assistance from the Board of Secondary Education, the chairman of which is the Director of Public Instruction. All educational interests, from the university downwards, are fully represented on the board which includes a representative of female education. The board meets three times a year.

English is taught in 283 of the 516 middle schools. Almost all the 233 vernacular schools and most of the 283 English schools are now under the control of district boards and municipalities. There is a tendency for vernacular schools to develop into English schools. There is a distinct cleavage of opinion in regard to this tendency. The demand of public men and many experienced teachers is for education in the vernacular at least up to the matriculation stage, and in response to this demand

experiments are being made in using the vernacular as the medium of instruction in the upper classes of high schools. Parents on the other hand almost invariably desire their children to be taught English as soon as possible.

No specific instruction in agriculture has so far been given in secondary schools, but an experiment is about to be tried of attaching to certain schools a garden of about one-quarter of an acre. A teacher from each of the selected schools will be sent for a short course of training under the supervision of the Director of Agriculture at Sabour. Teachers will be encouraged to associate the work done in the garden with the teaching of other subjects.

Illiteracy is as great a problem in Bihar and Orissa as in other parts of India. The percentage of literates of 20 years of age and over returned in the census of 1921 was 12·6 for males and 0·7 for females. The steps that must be taken to improve the position in regard to males are known, viz., improvement in the quality of teaching, the stoppage of wastage after the completion of the first year at the primary school and the bringing of the total boy population under instruction. As regards the quality of teaching, the pay of teachers in vernacular middle schools and in primary schools is very low, ranging as it does from Rs. 30 to Rs. 50 in a middle school for a certificated teacher to Rs. 5 rising to Rs. 10 for an untrained teacher in a primary school. As regards wastage the fact that in 1925-26, seventy-eight per cent of the pupils in all schools (primary and secondary) were in the two lowest classes of the primary schools speaks for itself. As regards the third point, there has, it is true, been a rapid increase under the present voluntary system in the number of boys attending school—some 159,000 in the three years 1923-24—1925-26 but the percentage of boys of school-going age actually at school is still only 39·1.

An exhaustive investigation into the whole situation in regard to primary education was made by Government in 1925. It was based on programmes for the education of eighty per cent of the male school-going population submitted by local authorities. Orders were issued separately on each programme in accordance with certain general principles as to the action to be taken, chief among which is the abolition as soon as possible of the single teacher school and direct management by each district board of the primary schools in its area except where really satisfactory local committees can be formed. The extra expenditure in carrying out all the programmes was estimated to amount to Rs. 74 lakhs. Free education in the lower primary stage would cost another Rs. 19½ lakhs. Owing to the difficulty of finding funds for this heavy increase in expenditure, the Government had to decide in 1925 against the introduction of any comprehensive scheme of compulsion in rural areas although the necessary statutory provision for this already exists under the provisions of the Act passed in 1919. Certain local bodies are, however, anxious to try the experiment of compulsion in limited areas and the Government have stated that they will be prepared to consider sympathetically any proposals to this end, the more especially as such experiments should be valuable for future guidance. So far, one rural

area only has introduced compulsion, the Banki Union in Cuttack. It is too early yet to draw any conclusions from this experiment. Three more rural areas have begun recently to introduce compulsory primary education, but it is not yet effective.

In addition to the ordinary primary schools, there were, in 1925-26, 1,007 night schools for males with an attendance of 21,701 pupils. The co-operative organisation is not specially identified with the movement for adult education, but it is in a special way identified with a forward policy in education as it is expected of co-operative banks and unions that they shall foster primary education in the areas in which they operate. The attention of the local authorities has again been drawn by the Government, as part of their orders on the 1925 programmes referred to above, to the advantages to be derived from making block grants to these banks and unions in view of the opportunities which they possess through the local co-operative officials for supervising the proper expenditure of such grants.

Female education in Bihar and Orissa, as elsewhere, presents very special problems and, as the figure of literacy returned at the 1921 census all too clearly shows, the results so far have been meagre. Moreover, over ninety per cent of the 120,091 girls who, in 1925-26, attended some place of instruction were in primary classes and with the wastage prevalent in these classes comparatively few of these pupils can be expected to become literate. There has been an unfortunate period of actual retrogression in the movement for female education in the province from which recovery is only now being made. A special enquiry was made into the cause of this but no more tangible reason for the decline in the number of girls attending educational institutions could be discovered which at no time has been large than the complete indifference of both men and women to the education of their daughters. However, within the last two years the figures of attendance have risen and now exceed the previous maximum which was reached in 1915-16. Expenditure by local boards on girls' schools is also showing an upward tendency and the supply of trained teachers, though still far short of the demand, is steadily increasing. These are encouraging signs, but with an attendance figure which still only amounts to 4·6 of the total number of girls of school-going age in the province, it is obvious that almost everything still remains to do.

10. CO-OPERATION.

At the end of 1925, there were 6,608 credit agricultural societies, 86 of which were on a limited liability basis. The total membership of 177,136 gives an average of 27 only for each society. In 1912, there were 491 agricultural societies and 39 non-agricultural societies with a total membership of 27,207 or an average of 51 persons for each society.

The total working capital of the agricultural societies at the end of 1925 amounted to Rs. 1,62,64,536 : to this amount share capital contributed 4·5 per cent and deposits five lakhs or 3·1 per cent of which over three lakhs represented deposits by members in their societies. The reserve fund amounted to seventeen lakhs or 10·5 per cent. The bulk of the working capital was borrowed from provincial or central banks,

advances from which at the end of the year amounted to Rs. 133 lakhs or eighty-two per cent of the total working capital of the societies. The amount borrowed from Government was practically negligible, the outstandings at the end of the year being only Rs. 114. Fifty-six lakhs were given out to members in loans during 1925. The average loan worked out to Rs. 32 a head. Thirty per cent of the loans were in relief of debt and only forty-three per cent can be described as given for productive purposes. As much as thirteen per cent was borrowed for payment of rent (three rent-paying societies having just been started) and four per cent was lent to defray the cost of marriage and other ceremonies.

The movement is especially strong in South Bihar, around Ranchi and in the Cuttack and Puri districts of the Orissa division. It has gained no foothold in the Feudatory States. Elsewhere it is fairly well represented in every part of the province except in the south part of the Chota Nagpur division and the Santal Parganas where it is very weak.

Government exercise a general supervision over the movement through the Co-operative Department which consists of one registrar, one deputy registrar and nine assistant registrars and one chief auditor. The actual audit is carried out by the Bihar and Orissa Co-operative Federation which is subsidised by Government and employs a staff of seven divisional auditors each in charge of a circle and seventy-one local auditors. The aim is to audit each society once a year. Test audits are also carried out by the nine assistant registrars and the divisional auditors. The classification of the 5,403 societies audited in 1925 was as follows :—

A (model)	..	5	per cent.
B (good)	..	15	„
C (average)	..	68	„
D (bad)	..	10·3	„
E (hopeless)	..	1·7	„

At present there are 198 guarantee unions to which 1,684 primary societies are affiliated.

In addition to audit, the federation makes itself responsible for training managers, local auditors, inspecting and bank clerks, etc. It employs a development officer who is responsible for propaganda and the production of the Federation Gazette. The federation draws its funds for these and other purposes mainly from the societies, but Government also makes a contribution. The federation holds an annual congress.

A divisional board has been set up in each of the five civil divisions to act as a centre of co-operative activity. On the average, two meetings a year are held for discussions, etc.

The fifty-eight central banks keep in close touch with the Agricultural Department and introduce new and profitable crops—eighteen banks in 1925 promoted the extension of groundnut cultivation and fifteen interested themselves in the spread of sugarcane cultivation. Ploughs and sugarcane crushers are bought and it has recently been decided on the advice of the Government Development Board* that these banks can

*This board advises Government on important questions concerning the departments in charge of the members of the board, viz., the Agricultural, Industries, Civil Veterinary, Co-operative and Forest departments.

properly take up the purchase of manures. Grants are obtained from district boards for the development of agriculture and the promotion of primary education. In times of epidemics the banks employ doctors and distribute medicines to primary societies.

At the apex of the credit side of the movement stands the Provincial Bank, which has a working capital of Rs. 47 lakhs and made a profit of over Rs. 40,000 in 1925. It has an overdraft of Rs. 2,85,000 with the Imperial Bank against government securities.

Societies formed specifically for purchase and sale are unimportant. There are, however, eighty-four grain storage societies (*golas*) with a total membership of 22,410 which, together with the two central grain banks started at Sambalpur and Bargarh, made a net profit in 1925 of over Rs. 12,000. Their object is to give loans of paddy to their members at reasonable rates and to create a reserve stock of paddy for use in times of scarcity and famine.

There is only one dairy society—the Mayaganj Goala Society. It is making a profit, but its operations are unimportant.

11. COMMUNICATIONS AND MARKETING.

Three main line railways pass through Bihar and Orissa—the Bengal and North-Western Railway in North Bihar, the East Indian in South Bihar and the Bengal Nagpur Railway in Chota Nagpur and Orissa. The mileage has increased from about 3,000 miles in 1911-12 to about 3,500 at the present time. Recently, lines of great importance to the coal fields of the province have been constructed or sanctioned for construction—notably the Central India Coal Fields Railway, the Chandil Barkakhana Chord, which will open up the Karanpura field, and a line linking the Talcher field to the Bengal Nagpur main line to Madras. Except in the south of the province, where the Feudatory States have yet to be opened up, the railway communications of the province are good, when due allowance is made for conditions in the hilly tract of Chota Nagpur.

There are over 28,000 miles of roads, of which 3,600 are metalled and 24,600 unmetalled. Local authorities are responsible for some 26,000 miles of these roads. The Grand Trunk road and the Orissa Trunk road and other arterial communications are in charge of the Public Works Department. The Grand Trunk road is the great thoroughfare for cattle from up-country.

The district boards spend about one-third of their income. The Government do not ordinarily make grants to the boards for public works, although such grants are freely given for the expansion of education and of the medical services and for the improvement of sanitation. A rough track which is apt to be under water during the monsoon if the village site is low lying, or a water course if it is not, connects the village with the nearest district board road. But during the dry season from December to June these tracks are as a rule quite passable for bullock transport.

A very large proportion of the foodstuffs, grown especially in the rice growing tracts, is consumed locally. Bihar imports from Nepal and in

the Chota Nagpur division also there is always a net import. The Orissa division alone has always a surplus. The net export of foodstuffs is, therefore, not large. Where it takes place, the cultivator usually disposes of the grain on the threshing floor to a middleman, if he is in a small way. If he is a bigger man or of the landlord class, he may both store and subsequently market his surplus but very often even the bigger men will have disposed of their grain direct to some big exporting agency which may be financing them. Each village will usually have one large cultivator who stores more grain than he requires and will lend it out if there is a shortage of seed at sowing time.

Among the regular exports, oil-seeds, sugar, tobacco, jute and other fibres and lac are the most important. Vegetables and fruit are exported to Bengal and the United Provinces and the trade in *ghi* is considerable.

For the disposal of these products (except fruit and vegetables which find their way direct to the railway) as well as for general local trade there are 432 principal and 2,464 minor markets which are maintained by the landlords or their lessees, the cost being met by tolls or a rent charge. The frequency of these markets (they are held once or twice a week) and the fact that the cultivator is seldom more than from five to six miles from a market and is usually much nearer are noteworthy. There is a brisk trade in cattle, especially in buffalo-bullocks, at the big cattle fairs. There is also a large trade in these buffalo bullocks between Bihar, where milch buffaloes are kept in great numbers, and Chota Nagpur where the home bred cattle tend to become too small for local cultivation requirements owing partly to deficiencies of bone growing material in the soil and partly to the pressure of the cattle population on the available grazing areas. There is also a considerable export, chiefly to Bengal, of bullocks and cows from Bihar.

12. LOCAL SELF-GOVERNMENT.

Provincial government in Bihar and Orissa is on the same pattern as in other Indian provinces. The Governor acting with two Ministers administers the "transferred" departments, *viz.*, Education, Agriculture, Veterinary, Industries, Co-operative Societies, Registration, Local Self-Government, Medical, Public Health, Excise, and Roads and Buildings. The "reserved" subjects are dealt with by the Governor acting with two Members of his Executive Council.

Local self-government in rural areas within the province is regulated by the Bihar and Orissa Local Self-Government Act of 1885 with subsequent amendments and the Village Administration Act of 1922.* The various local authorities are (1) district boards, (2) local boards and (3) union boards and panchayats under the new Village Administration Act which are rapidly superseding union committees.

* Except in the Santal Parganas where the Bengal Cess Act is in force and Sambalpur where the Central Provinces Local Self-Government Act is in force. There are also special arrangements for the local self-government of the district of Angul.

Under the first-mentioned Act, a district board is set up in 18 out of each of the 21 districts of the province. These district boards have a maximum membership of 40 persons. Three-fourths of the members are elected and hold office for three years. Not less than one-third of the remainder are required to be persons who are not salaried servants of Government. The chairmen of all the district boards except those in the Chota Nagpur division are elected. Their main duties are in regard to education and the Act prescribes that every district board shall be responsible for the maintenance and management of all primary and middle schools under public management within the district and also of medical relief, roads and bridges, sanitation, water supply and vaccination. A district board may also, *inter alia*, incur expenditure on irrigation works for the relief of famine or scarcity, offer rewards for the destruction of noxious animals within the district, hold fairs and exhibitions of cattle, country produce and agricultural implements, establish and maintain veterinary dispensaries and veterinary staff, make provision for the improved breeding of animals, make grants in aid of measures for improving agriculture and undertake any other local work likely to promote the health, comfort or convenience of the public. The road cess, which is fixed annually by each district board, provides about fifty per cent of the finance required and Government grants-in-aid about twenty-nine per cent. A board may raise loans for the purpose of carrying out any of the provisions laid down in the Local Self-Government Act. The provincial Government exercise a certain amount of supervision over the finance, budget estimates and the auditing of accounts of the district boards and its hands have been much strengthened in the last respect by the passing of the Local Fund Audit Act in 1925-26.

Apart from government grants, the income of the boards has remained almost stationary for several years and the increased expenditure on education and public health—the two subjects in which the boards take the keenest interest—has been met largely from government grants and partly by incurring less expenditure on communications.

The local boards are agents of the district board. There is one local board for each sub-division* of which there are two to four in each district. The members of the local board are the members of the district board elected in the particular sub-division together with such number of additional persons not exceeding one-third of the elected members as the local Government may allow. The district boards appoint these additional members. The local boards seldom contain any officials. They are entirely dependent on the district board for funds.

Union committees are elected bodies charged with certain administrative duties in a village or group of villages. These committees are agents of the district board and are in charge of less important roads, wells, primary schools, local conservancy and sanitation and generally of

* Except in three districts in Chota Nagpur and in Angul and the Santal Parganas, where there are no local boards, and in Hazaribagh and Manbhum, where there is only one.

dispensaries. They have power to raise local taxation ; but in most cases their funds are derived mainly from grants. These committees are now being superseded by the union boards constituted by the Village Administration Act of 1922. Union boards are elected bodies, the members of which hold office for three years. The minimum number of members is fixed at three and the maximum at twenty. Each union board, subject to the control of the district board and to such rules as the local Government may prescribe, is ordinarily responsible for primary education, medical aid, conservancy, sanitation, pounds, water supply and village roads. The union board may also, with the sanction of Government, be made responsible for the maintenance of the village police. It may also undertake "any other local work of public utility likely to promote the health, comfort, convenience or material prosperity of the public, including the development of agriculture and village industries. . . ." (Section 41 (i) of Village Administration Act.) So far this provision has proved of little practical importance.

The union board may impose a tax upon the owners and occupiers of buildings within the union provided that the amount assessed on any person in any one year shall not exceed Rs. 30 and any person who in the opinion of the union board is too poor to pay the tax may be exempted altogether from assessment. The proceeds of this tax, of fines, fees or costs levied by panchayats and contributions from the district board are paid into a union fund. In fact, however, union boards are largely financed by district boards. For the first two years after a union board has come into existence, its district board must make a suitable grant in aid and must also contribute not less than the amount of any tax imposed by the union board. By the end of 1925-26, 153 union boards had been created. But, on the whole, they have so far been a disappointment. The members of the union board are averse to imposing taxation and the creation of union boards is not popular with district boards which take the view that it is impracticable without crippling their own finances to divert to these small local areas more money than was previously being spent on them. As was truly remarked in the Bihar and Orissa Administration Report for 1925-26 :

"The progress of local self-government in every unit from the highest to the lowest will depend on the willingness of the people to tax themselves and to devote themselves to the service of the public without remuneration."

To complete this sketch of local self-government, it should be mentioned that a certain measure of judicial decentralisation has been attempted by the formation of panchayats with power to try petty criminal and civil cases. The area covered by a panchayat may be the whole of the area covered by a union board or it may be any number of 'circles' or sub-divisions of the union board area. The members of such panchayats are elected by union boards from among their own members and their period of office is also limited to three years. The local Government has power to direct the establishment of panchayats in any area where no union board exists.

13. PUBLIC HEALTH AND SANITATION.

Of the epidemic diseases, cholera is the most dreaded especially in the densely populated division of Bihar. The mortality rate from cholera is 2·4 in an average (ten-year) mortality rate from all causes of 34·2 per thousand. The climatic conditions are favourable to the spread of the disease for many months in the year and the average mortality from this cause is nearly 90,000 annually. A special corps of ten medical officers is kept at headquarters for dispatch to epidemic centres and one hundred vaccinators are kept in reserve during the danger period which lasts from the beginning of April to the end of September.

As elsewhere, fever is the greatest single factor in the mortality rate, but it is certain that the proportion of deaths attributed to this cause—23·3 per thousand as against a general mortality rate of 34·2 per thousand—is made too high. Few of the deaths ascribed to fever are due to malaria, but should rather be put down to pneumonia, enteric fever, phthisis, *kala-azar* and other fevers. Nevertheless, throughout the province malarial outbreaks on a serious scale do occur especially from March to the beginning of May and again from July to October. Quinine treatments are placed on sale chiefly through the agency of postmasters and, during the epidemic outbreak of 1925-26 in Orissa, 1,090 lb. of cinchona febrifuge were distributed free.

In Orissa, diarrhoea and dysentery are very prevalent and filariasis (elephantiasis) is common. The treatment of the latter disease by injections of antimony has been found to be beneficial.

Hookworm is widespread throughout the province. Leprosy is also prevalent, but the work of Sir Leonard Rogers and others has resulted in definite hope of cure in cases taken early and improvement in more advanced cases. Eight leper asylums are maintained and in spite of the prejudices of local authorities the treatment of lepers at hospitals and dispensaries is increasing—some 5,600 cases being treated in 1925-26 as compared with 3,700 in 1924-25. Plague is mildly endemic in certain parts of Bihar and the first quarter of each year shows a rise in mortality from it, with a more marked outbreak every four years or so, but on the whole there has been a steady decline in the mortality from this cause since 1905.

The average provincial death rate for the period 1915-16—1925-26 is 34·2 per thousand, but the figures for the last three years have been markedly below the average :—

1923-24	1924-25	1925-26
25·0	29·1	23·7

Up to March 1926, the Public Health Department consisted of four permanent officers only, the Director and three assistant directors in charge, respectively of the North Bihar Circle, the South Bihar Circle and the Chota Nagpur and Orissa Circle. From March 1926, the department has been much strengthened by the inclusion in it of the following :—

Ten medical officers of health for special duties in cholera and other epidemics,

Three medical officers of health for the three important municipalities of Puri, Gaya and Patna,

Five school medical officers of health (assistant surgeons),

Five assistant medical officers of health (sub-assistant surgeons),

One lady school medical officer,

One officer in charge of the Public Health Bureau,

One chemical analyst,

One superintendent, vaccine lymph depôt.

The officer in charge of the public health bureau is also personal assistant to the Director.

The duties which this central Public Health Department undertakes will be sufficiently indicated by the titles of the posts. The assistant directors are inspecting officers who spend much of their time touring.

There is also a central Public Health Engineering Branch which prepares schemes for water supply and drainage for both the provincial Government and local bodies. Particular attention has recently been devoted to the necessity of improving the supply of drinking water in rural areas. Capital grants of the following amounts have been allotted to district boards :

1923-24	1924-25	1925-26
Rs.	Rs.	Rs.
86,700	45,000	3,95,000

The grants are made on the basis of a percentage of the estimated cost of constructing a certain number of new wells in each police station of every district. A sanitary school of instruction is maintained at Gulzarbagh where sanitary and health inspectors are given elementary training.

In addition to this central organisation, five district boards have adopted the scale of local public health organisation suggested by Government, *viz.* :—

1 medical officer of health,

4 sanitary or health inspectors,

12 sanitary gangs.

Government defrays half the cost of such organisation up to Rs. 10,000 in each district.

But it is not easy to get district boards to realise their responsibilities and the percentage of the boards' expenditure on sanitation to their total income shows no tendency to increase. In 1924-25, their expenditure was 5.70 lakhs or 4.38 per cent of their total expenditure.

The provision of medical relief in rural areas has proved to be a matter of great difficulty, but a good deal of progress has now been made by the district boards (on whom the duty of providing medical relief primarily falls) towards the aim set before them by Government, *viz.*, that there should be at least one out-door dispensary with a sub-assistant surgeon, or an officer of similar qualifications, in charge in each of the 539 thanas or police stations in the province. So far, 476 such dispensaries have been established at which treatment for the commoner illnesses and injuries is obtainable. But only 19 of these dispensaries are in

charge of Government sub-assistant surgeons. The rest are staffed by medical officers recruited by the district boards. For the year ending 31st December 1925, 3,442,894 patients were treated in these dispensaries. But, as yet, only a comparatively small proportion of the rural population has as yet reasonable access to medical relief, as the fact that one dispensary has at present to serve an area of 194 square miles and 77,133 people only too clearly shows. Special medical facilities for women (in particular the provision of trained midwives) in rural districts are still unfortunately almost entirely absent.

There is some tendency for local bodies to establish dispensaries in which the indigenous systems of medicine are practised; at present, it is the policy of Government to earmark its grants in aid of dispensaries for those at which the western system of medicine (allopathic) is practised. These grants in aid have been on a considerable scale and are being continued. Up to March 1925, 3½ lakhs recurring and 12½ lakhs non-recurring had been distributed among the district boards and, in 1925-26, a further sum of 2½ lakhs recurring and 3½ lakhs non-recurring was distributed.

The higher forms of medical and surgical aid are provided by hospitals at district and sub-divisional head-quarters under the management either of the municipality or of the district board. These, unlike the dispensaries, contain wards for the reception of in-patients. They are chiefly staffed by government assistant surgeons whose pay is borne by Government.

In urban areas, there are important hospitals including a large hospital for women at Patna. There are also special hospitals for women at Gaya and Bettiah in charge of doctors belonging to the Women's Medical Service. But these institutions can contribute but little to the medical relief of the rural population.

A great advance has recently been made in the facilities for medical education available in the province by the establishment of the Prince of Wales Medical College at the Patna General Hospital. The college is affiliated to the University of Patna and students can obtain the degree of M.B., B.S. The first year class was opened in July, 1925. This new college has first class equipment, and should be a most important factor in providing trained medical men for the country side. In addition, the province maintains two medical schools for the training of sub-assistant surgeons. One of these is at Cuttack in Orissa and the second is now at Darbhanga in Bihar (where it was moved from Patna in 1925 in order to make room for the new medical college).

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Freights should be reduced, *Roy, S. K.* (459) (463).

Freights for agricultural requisites should be reduced, *Khan* (444).

Fruit, difficulty of distance from, *Arikshan Sinha* (270).

Livestock, reduction of freights recommended, *Roy, N. K.* (487).

Passenger trains lose time, *Dobbs* (58).

Perishable produce, prompt dispatch necessary, *Arikshan Sinha* (260-1).

Pilfering excessive, *Dobbs* (58) 65554-5.

Roster system does not work, *Atkins*, 65195-6.

not Satisfactory, *Dobbs* (58), *Arikshan Sinha* (260-1).

Wagons, distribution haphazard, *Atkins* (17).

Roads :

Agricultural Department should be consulted as to, *Ghose* (377).

Agricultural development hampered by, *Sinha, D. P.* (202).

Bullock carts excluded from part of the road in some areas, *Heycock*, 66795-6. (*See* *Main Roads below*).

Central road board recommended, *Ghose* (377) 67690-1.

Cess :

District boards receive, *Heycock*, 66797-8. (*See* *Tax below*).

Village roads, larger proportion of, should be spent on, *Atkins* (18) 65179-82.

Condition disgracefully bad, *Atkins* (17-18).

not Deteriorating, *Ghose*, 67829-31.

Extension advocated, *Henry* (2) (5).

Fodder, better transport facilities necessary, *Roy, N. K.* (488) (490).

Irrigation : roads can be utilised as embankments for storing water, *Ghose* (377).

ADMINISTRATION—contd.**TRANSPORT—contd.****Roads—contd.****Main roads :**

- District boards control, *Atkins* (18) 65118-26, 65141-7.
- Exclusion of cultivators' cart from better portion, *Atkins* (18) 65117-26, 65254. *Heycock*, 66795-6.
- Extortion by district board peons, *Atkins* (18).
- Maintenance should be better, *Dobbs* (58); fairly good, *Henry*, 64953-6.
- Marketing hampered by lack of, *Sinha, D. P.* (202).
- Metal, very little, *Henry*, 64953-6.
- Milk collection, good roads essential for, *Quinlan* (126).
- More, required for marketing, *Ghose* (377) 67688-9.
- Perishable produce, prompt despatch necessary, *Arikshan Sinha* (260 1).
- Private estates, roads through, maintained by district boards, *Atkins*, 65141-7.
- Public Works Department should control more inter-district roads, *Roy, S. K.* (459).

Rural, for cart traffic necessary, *Khan* (444).

Tax : (*See also Cess above*).

on Bullock carts and should be earmarked for roads, suggestion, *Heycock*, 66780-1, 66793-6.

Provincial suggested, *Heycock*, 66785-92.

Village roads :

- Cess, larger proportion should be spent on, *Atkins* (18) 65179-82.
- Neglect of by district boards, *Prasad* (161) 66459-60.
- Steamers : (*See also under TARIFFS AND SEA FREIGHTS.*)
- Freights should be reduced, *Roy, S. K.* (459).
- Freights for agricultural requisites should be reduced, *Khan* (444) (451).
- Subsidiary industries : transport difficulty, *Sinha, D. P.* (206).
- Tramways :
- Extension advocated, *Henry* (3) (5).
- Private, attitude of local authorities to, *Henry* (2) (5) 64936-41.
- Prohibitive terms, *Henry* (2) (5) 64938-40.
- Union boards recommended, *Phillips* (336-7).

ADULTERATION, see under MARKETING.**AGRICULTURAL ASSOCIATIONS, see under DEMONSTRATION AND PROPAGANDA.****AGRICULTURAL DEPARTMENT (see also under DEMONSTRATION AND PROPAGANDA).**

Agricultural associations, control by Department, recommended, *Khan* (443).

Assistant Directors :

- Qualification : B.Sc. with Honours, *Dobbs*, 65564-5, 65674-81 (114-7), farm Training, *Dobbs*, 65463-6, 65519, 65587-94, 65674-81.
- Botanical Section : should be transferred from Sabour to Patna, *Dobbs* (49) (114-6).
- Botanist : failure to fill the post, a retrograde policy, *Heycock* (219). (*See Economic Botanist below*).
- Cattle farms, *Quinlan*, 65764-6.
- Chemical Section :
 - Expenditure, considerable increase, not advocated, *Dobbs* (53).
 - should be Transferred from Sabour to Patna, *Dobbs* (49) (115).
 - Staff inadequate, *Dobbs* (53).
- Chemist : failure to fill the post, a retrograde policy, *Heycock* (219).
- Civil administration : in touch with, *Dobbs*, 65623-5.
- Co-operation, *see AGRICULTURAL DEPARTMENT under CO-OPERATION.*
- Cultivators, insufficient touch with, *Dobbs*, 65623-5.
- Deputy Directors, Duties of, *Sethi*, 67569-80.
- Development Officer should control Veterinary, Agricultural and Co-operative departments, *Heycock* (222) 66583-7, 66662.

AGRICULTURAL DEPARTMENT—contd.

DIRECTOR OF AGRICULTURE :

- Appointment of outsider suggested, *Dobbs* (50-1) 65379-82.
 Statistics, is in charge of, *Dobbs*, 65708-16.
- Economic Botanist :
 Appointment might be abolished, *Dobbs* (115).
 should be Replaced by Plant breeding specialist, *Sethi* (356).
- Expansion :
 Urgently necessary, *Sethi* (349).
 too Slow, *Heycock* (219).
- Expenditure, inelasticity of rules, *Sinha, D. P.* (198) (202) 66486-8.
 Experiments by, have led to great improvement, *Khan* (443).
 Extension recommended, *Arikshan Sinha* (260).
 Farms, see under DEMONSTRATION AND PROPAGANDA and EDUCATION.
 Finance, *Dobbs* (50); inadequate, *Khan* (444).
 Forestry Department, question of co-operation with; has not arisen, *Dobbs*, 65445.
 Functions, *Heycock*, 66693.
 Irrigation, special section recommended, *Roy, S. K.* (462).
 Legislative Council : hostile attitude of, *Dobbs*, 65682-9.
 Marketing of produce, with assistance of co-operative societies, recommended, *Heycock* (219).
 North Bihar, practically not touched, *Dobbs*, 65702-7.
 Organisation, *Dobbs* (49-53).
 Partition of Bengal, effect on, of, *Dobbs*, 65682-9.
 Policy in some respects retrograde, *Heycock* (219) 66740.
 Profits resulting from improved implements and materials should be examined, *Narendra* (408).
 Province limitation of appointments to, deprecated, *Sinha, D. P.* (202) 66491-3.
 Pusa doing some of the work, *Meyrick*, 68084-9.
 Red tape, *Sinha, D. P.* (198) (202) 66486-8.
 Representatives required, one in each thana, *Ganga Vishnu* (37) 65278-9.
 Scientific work might be controlled by University, *Dobbs*, 65475-7 (114-7).

SERVICES :

- does not Benefit cultivators, *Arikshan Sinha* (260).
 Efficient but ineffective for lack of staff, *Henry* (2).
 Inadequate, *Khan* (444).
 a Paper fiction, *Ganga Vishnu*, 65269.
 should be Restricted to field, steading and workshop, *Dobbs* (49).
 not Satisfactory, *Narendra* (408); not entirely satisfactory, *Atkins* (17).
 not Sufficiently useful, *Sinha, D. P.* (202).
 South of Province, work in, *Heycock*, 66772-3.

STAFF :

- Agricultural College to train recruits, question of, *Dobbs* (55) 65396.
 Inadequate, *Henry* (2) 64934-5, *Atkins*, 65050-2, *Dobbs* (51-2) 65532-46, 65623-5, 65686-9, *Heycock* (219), *Sethi* (349) (355-6) 67603-4, 67617-21, *Ghose* (376-7), *Khan* (440).
 Lower grades should be considerably increased, *Roy, S. K.* (459).
- Recruitment :
 Difficulty, *Dobbs* (110).
 in the Province, *Dobbs*, 65563-4.
 Subordinate Service, see below.
- Sympathy with cultivators necessary, *Khan* (440).
 Training : *Heycock*, 66638-42, *Sethi* (350) 67538-44, 67574-8, 67628-9.
 Visits to Pusa and other Provinces recommended, *Sethi* (352) 67514-6.
- Subordinate Service :
 Pay, *Dobbs*, 65595.
 Recruitment :
 from Cultivating classes advised, *Dobbs* (56).
 Difficulty, *Dobbs*, 65398.
 Trained on central farms, *Dobbs*, 65598-600 (115).
 Training at Sabour Farm, *Dobbs* (116).

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- Sugar Bureau at Pusa, relations with, *Dobbs*, 65661.
 Sugarcane work inadequate, *Meyrick* (429) 68102-9. (See SUGARCANE under RESEARCH.)
 Superior Provincial Agricultural Service :
 training of probationary Assistant Directors, *Dobbs*, 65383-9.
 Transfers of officers not too frequent, *Dobbs*, 65610.
 Wells, is responsible for sinking, *Bery*, 67096-8.
 Work done, *Dobbs*, 65601, 65615.

AGRICULTURAL INDEBTEDNESS.

Bengal Tenancy Act, *Lal*, 67041-3.

CAUSES OF BORROWING :

- Agriculture, uncertainty of, *Dobbs* (58-9), *Sinha*, *D. P.* (203), *Tuckey* (282).
 Calamities, *Khan* (444).
 Capital, need of, *Arikshan Sinha* (261).
 Cattle, loss of, *Prasad* (161-2), *Lal* (302) 67047-9, *Sethi* (353), *Ghose* (378).
 Ceremonies, *Henry* (3) 65015-6, *Ganga Vishnu* (38), *Sinha*, *D. P.* (203), *Heycock* (220),
Arikshan Sinha (261), *Tuckey* (282), *Lal* (302).
 Cost of living, increase in, *Narendra* (408).
 Cottage industries, decay of, *Tuckey* (282), *Sethi* (353).
 Crop failures, *Henry* (3) 65015-6, *Lal* (302), *Ghose* (378), *Sethi* (353), *Khan* (444).
 Debts old and inherited, *Sinha*, *D. P.* (203), *Heycock* (220).
 Diseased minds of village people, *Ghose* (389-90).
 Extravagance, *Atkins* (18), *Khan* (444).
 Families, large, *Sinha*, *D. P.* (203), *Narendra* (408).
 Family, joint, system, *Heycock* (220).
 Holdings, uneconomic size of, *Sethi* (353).
 Illiteracy, *Sethi* (353).
 Improvidence, *Tuckey* (282).
 Inadequate income, *Sinha*, *D. P.* (203).
 Land purchase, *Henry* (3).
 Laziness, *Sethi* (353).
 Litigation, *Henry* (3) 65015-6, *Ganga Vishnu* (38), *Prasad* (161-2) 66454-7, *Sinha*,
D. P. (203), *Tuckey* (282), *Lal* (302), *Ghose* (378).
 Personal expenditure, increased, *Dobbs* (58-9).
 Population, pressure of, *Prasad* (161-2) 66454-7.
 Rent demanded in advance, *Sinha*, *D. P.* (203).
 Social aspirations, *Sinha*, *D. P.* (203).
 Spendthrift ways, *Ganga Vishnu* (38).
 Standard of life, higher, *Ganga Vishnu* (38).
 Subsidiary industries, lack of, *Tuckey* (282), *Sethi* (353).
 Thriftlessness, *Atkins* (18), *Ganga Vishnu* (38), *Sethi* (353).
 Unproductive expenses mainly, *Roy, S. K.* (461).
 Usury, *Prasad* (161-2) 66454-7.
 Yield from land, decreasing, *Narendra* (408).
 Chota Nagpur Tenancy Act, sections prohibiting sale, transfer or mortgage of holdings,
 a failure, *Foley* (225).
 Contracts relating to land or buildings, suggestions as to, *Dobbs* (59) 65695-700.
 Courts should have power to go behind documents and take accounts, *Tuckey* (282).
 Creditors, "close-fisted" treatment of, deprecated, *Narendra* (408).
 Damdopat : *Tuckey* (280) 66906-8, 66948-9; should be adopted, *Lal* (302)
 67051.
 Debtors become serfs, *Tuckey* (280-1) (285-6).
 Extent of :
 75 per cent. of cultivators, *Henry* (3).
 not very General, *Ganga Vishnu* (38) 65314-5.
 Small holders largely affected, *Ganga Vishnu* (38).
 Grain loans :
 Interest 50 per cent, *Prasad*, 66364-8.
 Preferable to cash, *Prasad* (162) 66369-70.
 Insolvency, special measures to deal with, advocated, *Ganga Vishnu* (38); not necessary.
Sinha, *D. P.* (204).

AGRICULTURAL INDEBTEDNESS—contd.

INTEREST :

- Co-operative, *see under CO-OPERATION*.
 Disallowance by law over 12 per cent. recommended, *Sinha, D. P.* (203-4) 66533-4.
 cannot Exceed principal in Santal Parganas, *Tuckey* (280) 66906-8, 66948-9.
 High, *Heycock* (220).
 Legislation to reduce, suggested, *Heycock* (220) 66568-73.
 Rates, *Prasad* (165) 66364-8, 66461-4, 66468-70, *Lal*, 67020-5.
 Restriction recommended, *Lal* (302); to 25 per cent suggested, *Tuckey* (282).
 Usury should be made penal, *Tuckey* (282).
 Kist Kothis (loan offices), *Prasad* (162).
 Land passing out of the hands of cultivators, *Ganga Vishnu*, 65331-3, 65368-70.
 Landlords, loans by, *Lal*, 67057-60.
 Landlords make grain loans which are beneficial, *Prasad* (162).
 Land mortgage banks recommended, *Roy S. K.* (461) (465). *See BANKS under FINANCE*.
 Legislation not recommended, *Ghose* (379).

MEASURES FOR LIGHTENING AGRICULTURE'S BURDEN OF DEBT :

- Banks, agricultural, *Sinha, D. P.* (204), co-operative, *Tuckey* (282-3).
 Compulsory repayment at threshing time, *Lal* (302).
 Co-operation :
 only, *Prasad* (162).
 the only Practical method, *Heycock* (220).
 Co-operative banks, *Tuckey* (282-3).
 Dampopat, adoption of principle of, *Lal* (302).
 Development funds, *Dobbs* (59) 65422-6, 65525-6.
 Economy, administrative, *Narendra* (408-9) 67861-9, 67889-94.
 Education, *Sethi* (353).
 Exports and imports, control of, *Sethi* (408-9) 67861-9, 67889-94.
 Interest restriction, *Sinha, D. P.* (204), *Lal* (302).
 Public borrowing, cessation of, *Dobbs* (59).
 Publicity as to interest restriction, *Lal* (302).
 Remedies other than co-operation not advocated, *Prasad* (162).
 Usurious Loans Act (*which see below*), *Tuckey* (282-3), *Lal* (302).
 Usury, penalisation of, *Tuckey* (282-3).

MONEYLENDERS :

- Accounts, complicated, *Henry* (3) 65012.
 not the Cause of indebtedness, *Ghose* (389-90).
 Control indebted cultivators, *Heycock* (220) 66712-3, 66733.
 Co-operative societies seldom controlled by, *Atkins*, 65064.
 Debt, does not decrease, *Henry* (3).
 Dishonest, usurious and relentless, *Prasad* (162) 66364-8.
 Exorbitant interest and inhuman conditions, *Sethi* (353) 67524.
 do not Harass, unless a quarrel arises, *Henry* (3) 65013.
 Interest rates :
 have been Reduced below those of co-operative societies, *Prasad* (165) 66461-4, 66468-70.
 Twenty-four per cent and on grain loans fifty per cent, *Prasad*, 66364-8, 66461-4.
 Mahajan, dominates the village where there is no co-operative society, *Atkins*, 65190.
 Middlemen, *see under MARKETING*.
 Punjabis, relentless, *Prasad* (162) 66382-4.
 do not Seize land, *Henry* (3).
 Thikidari system, *Tuckey* (286-7). (*See under LAND TENURE*).
 Unscrupulous, *Tuckey* (282-3), *Sinha, D. P.* (204).

MORTGAGES :

- Non-terminable, should be prohibited, *Khan* (444), *Roy, S. K.* (461); should not be prohibited, *Atkins* (18), *Lal* (302).
 Redemption :
 Facilities for, of doubtful benefit, *Sethi* (353).
 Special measures to deal with, advocated, *Ganga Vishnu* (38); not necessary, *Sinha, D. P.* (204).

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MORTGAGES—contd.

- Restriction, as to :
 not Desirable unless holdings are made non-transferable, *Lal* (302) 67041-3.
 Discussed, *Tuckey* (283) 66904-5, 66937-9.
 to some extent recommended, *Sinha, D. P.* (204).
 Right of tenants to mortgage :
 should be Conferred, *Arikshan Sinha* (261).
 should be Limited, *Khan* (444).

REPAYMENT :

- Compulsion recommended, *Lal* (302) 67089-91.
 Prevented by :
 Accumulated old debts, *Tuckey* (282), *Lal* (302) 67020-9.
 Accumulation of high interest, *Heycock* (220).
 Apathy of borrowers, *Prasad* (162).
 Ceremonies, *Henry* (3).
 Crop failures, *Henry* (3), *Ganga Vishnu* (38), *Arikshan Sinha* (261), *Ghose* (379).
 Earnestness, lack of, *Tuckey* (282).
 Excessive amount of loans, *Heycock* (220).
 Extravagance, *Khan* (444).
 Ganja, not by excessive use of, *Atkins*, 65256.
 Illness, *Ghose* (379).
 Improvidence, *Ganga Vishnu* (38).
 Inability to liquidate by instalments, *Atkins* (18) 65199-202.
 Income, smallness of, *Roy, S. K.* (461).
 Interest, exorbitant, *Tuckey* (282), *Sethi* (353).
 Interest, high, *Sinha, D. P.* (203), *Heycock* (220), *Lal* (302) 67020-9, *Khan* (444).
 Keeping grain for better prices, *Lal* (302) 67020-9.
 Limited resources, *Tuckey* (282).
 Litigation, *Henry* (3), *Ghose* (379).
 Soil, reduced productive capacity of, *Arikshan Sinha* (261).
 Storage, bad arrangements, *Lal* (302) 67020-9.
 Thriftlessness, *Sethi* (353).
 Unproductive expenditure, *Sethi* (353), *Roy, S. K.* (461).
 Usury, *Henry* (3).

RESTRICTION OR CONTROL OF CREDIT OF CULTIVATORS :

- Central Provinces Land Revenue Act largely a failure in Sambalpur, *Foley* (225).
 by Limiting right of mortgage and sale, deprecated, *Roy, S. K.* (461) 68266-8,
 68297-306 ; recommended, *Khan* (444).
 Suggestions as to, *Lal* (302) 67041-3.
 not Recommended, *Henry* (3) 65014, *Atkins* (18), *Ganga Vishnu* (38-9), *Sinha,*
D. P. (but restriction of mortgages to some extent recommended) (204),
Arikshan Sinha (261), *Ghose* (379).

SOURCES OF CREDIT :

- Agricultural produce, *Arikshan Sinha* (261).
 Cattle, *Arikshan Sinha* (261).
 Co-operative societies, *Prasad* (162), *Heycock* (220), *Ghose* (379), *Roy, S. K.*
 (461).
 prosperous Cultivators, *Khan* (444).
 Land, *Henry* (3), *Atkins* (18), *Ganga Vishnu* (38), *Arikshan Sinha* (261).
 Landlords, *Prasad* (162).
 Moneylenders, *Prasad* (162), *Heycock* (220), *Lal* (302), *Sethi* (353), *Ghose* (379), *Khan*
 (444), *Roy, S. K.* (461).
 movable valuable property, *Ganga Vishnu* (38).
 Towns drain away rural wealth, *Dobbs* (59).
 Transfer of land should be facilitated, *Dobbs* (59).
 Transfer right should be conferred on tenants, *Arikshan Sinha* (261).

AGRICULTURAL INDEBTEDNESS—conold.**USURIOUS LOANS ACT :**

- Application recommended, *Ganga Vishnu* (38), *Sinha, D. P.* (204) 66533-4, *Arikshan Sinha* (261), *Tuckey* (282), *Lal* (302) 67030, *Khan* (444), *Roy, S. K.* (461).
- of Doubtful benefit, *Sethi* (353).
- Ignorance of, among cultivators, *Ganga Vishnu*, 65321-5, *Tuckey*, 66906-8, *Lal*, 67031, 67050-1.
- Interest reduction by co-operative societies should precede application of Act, *Arikshan Sinha* (261).
- Useful as to previous debts of members of co-operative societies, *Heycock* (220) 66568-73, 66712-3.

AGRICULTURAL INDUSTRIES :

- Advice, Government should supply scientific but not technical, *Dobbs* (64).

BASKET MAKING :

- Carried on, *Lal* (304), *Prasad* (163).
- a Caste occupation, *Roy, N. K.* (491).
- Improvement necessary, *Prasad* (163).
- Recommended, *Ghose* (387).

Bee-keeping :

- Ignorance of methods, *Lal* (304).
- Interest may be taken in, by villagers, *Lal* (304).
- Blacksmiths, *Sinha, D. P.* (205).
- Cardboard, utilisation of wheat straw for, will cause scarcity of fodder, *Arikshan Sinha* (268).
- Catalogue of economic products suggested, *Dobbs* (64).

CHARKA SPINNING :

- being Adopted, *Ganga Vishnu* (40) 65334-43.
- Advocated, *Ganga Vishnu* (40).
- Profits : about 1 anna for 3 or 4 hours' work, *Ganga Vishnu*, 65338-40.
- for Women recommended, *Lal* (304).
- Co-operation recommended, *Sinha, D. P.* (206), *Sethi* (359), *Ghose* (391), *Khan* (449), *Roy, N. K.* (493) (495).
- Co-operative supply of implements, raw material and marketing recommended, *Prasad* (163) 66306-11.

COTTAGE INDUSTRIES :

- to Decrease fragmentation of holdings, recommended, *Sethi* (353).
- Government aid suggested, *Atkins* (20).
- organisation of, by Industries Department recommended, *Khan* (450).
- Recommended, *Narendra* (411).
- not Requiring valuable machinery recommended, *Lal* (304) 67040.
- Demonstration recommended, *Sethi* (359).
- Domestic service in towns, *Sinha, D. P.* (205).
- Education in agricultural schools recommended, *Prasad*, 66377-9.

EMPLOYMENT, MEASURES FOR INCREASING IN RURAL AREAS :

- Construction of roads, *bunds*, tanks, canals and wells, recommended, *Ghose* (387).
- of Educated persons (*See Careers, under EDUCATION: AGRICULTURAL.*)
- Industrial concerns, large scale, would not increase rural employment, *Lal* (304).
- Industrialism, the only means, *Arikshan Sinha* (268).
- Market organisation recommended, *Sinha, D. P.* (206).
- Transport facilities recommended, *Sinha, D. P.* (206).
- Extension advised, *Dobbs* (64) 65527.

Finance :

- Government help recommended, *Prasad* (163).
- by Government on debentures advised, *Dobbs* (64).

AGRICULTURAL INDUSTRIES—contd.

FRUIT GROWING :

- Agricultural Department should devote more attention to, *Ganga Vishnu* (40).
 is Carried on, *Arikshan Sinha* (268).
 Government aid suggested, *Sinha, D. P.* (206).
 an Important agricultural pursuit, *Ganga Vishnu* (40).
 Recommended, *Sethi* (359), (360), *Ghose* (387).
 Research necessary, *Khan* (441).
 Suggested, *Sinha, D. P.* (206).
 Ghi-making carried on, *Prasad* (163) 66360-3.
 Government aid suggested, *Sinha, D. P.* (206).
 Gur :
 (See also SUGAR MANUFACTURE below).
 Indigenous methods of production, wasteful, *Dobbs* (70).
 Price has fallen, *Dobbs*, 65529-31, 65626-30.
 not Purchased by Lohat Sugar Works, *Henry*, 64958-60, 64985-6, 65,000.
 Societies for production of, recommended, *Sethi* (360).

HEALTH CONDITIONS, DEVOTION OF SPARE TIME TO IMPROVING :

- See also under WELFARE OF RURAL POPULATION.
 Boy scouts, organisation of, recommended, *Roy, N. K.* (491).
 Clubs, rural, recommended, *Sinha, D. P.* (206).
 Co-operative societies recommended, *Ghose* (387).
 Gymnasias recommended, *Sinha, D. P.* (206).
 Lectures recommended, *Roy, N. K.* (491).
 Organisation under expert supervision necessary, *Ganga Vishnu* (40).
 Progress considerable, *Ganga Vishnu* (40).
 Propaganda recommended, *Khan* (450).
 Sanitary education recommended, *Ghose* (387).
 village Societies recommended, *Arikshan Sinha* (268), *Khan* (450).
 formation of Unions under Village Administration Act, 1892, recommended,
Prasad (164) 66380-1.
 Implements :
 Co-operative manufacture recommended, *Khan* (450) made by Village carpenter,
Sethi, 67637-8.
 Importance of, *Sethi* (359).

INDUSTRIAL CONCERNS, MOVING OF, INTO RURAL AREAS :

- Catechu (Kuth) industry might be moved to rural areas, *Sinha, D. P.* (206).
 Markets, distance from, difficulties of, *Sinha, D. P.* (206).
 Recommended, *Khan* (450); not recommended, *Prasad* (164) 66343-5, *Tuckey* (285),
Ghose (387), *Roy, N. K.* (491).
 Shellac industry might be moved to rural areas, *Sinha, D. P.* (206).
 Shortage of agricultural labour would result, *Arikshan Sinha* (268).
 Transport difficulties, *Sinha, D. P.* (206).
 Industries Department should assist, *Prasad* (163) (171-2), *Sethi* (359), *Ghose* (391).
 Instruction necessary, *Lal* (304).
 Jungle products, sale of, *Sinha, D. P.* (205).
 Jute spinning and weaving recommended, *Roy, N. K.* (490-1).
 Knitting for women recommended, *Prasad* (163).
 Lac Association, *Dobbs*, 65495-500. (See also under NORRIS)

LAC-CULTURE :

- (See also under NORRIS).
 in Chota Nagpur would be profitable, *Prasad* (163).
 Ignorance of methods, *Lal* (304).
 Interest may be taken in, by villagers, *Lal* (304).
Lyall, 67962, 67976.
 Recommended, *Ghose* (387).
 Lace-making for women recommended, *Prasad* (163).
 LEISURE PERIOD, extent of, *Atkins* (20) 65203, *Prasad* (163), *Sinha, D. P.* (205),
Arikshan Sinha (268), *Tuckey* (285), *Lal* (304), *Sethi* (359), *Ghose* (387), *Narendra* (411),
Khan (449), *Roy, N. K.* (490).

AGRICULTURAL INDUSTRIES—contd.

MACHINERY :

- Hire purchase system recommended, *Roy, N. K.* (491).
- Long term loans for purchase of, at low interest recommended, *Roy, N. K.* (491).
- Marketing, *see* SUBSIDIARY INDUSTRIES under **MARKETING**.
- Matches, manufacture of :
 - Government aid suggested, *Sinha, D. P.* (206).
 - Suggested, *Sinha, D. P.* (206) 66532.
- Milk industry recommended, *Prasad* (163).
- Mining work, *Sinha, D. P.* (205).

Obstacles :

- Conservation of cultivators, *Sinha, D. P.* (206), *Arikshan Sinha* (268).
- Ignorance of methods, *Lal* (304), *Sethi* (359), *Roy, N. K.* (491).
- Laziness, *Sethi* (359).
- Marketing, *see above*.
- Prejudice, *Tuckey* (285) 66951-4, *Sethi* (359), *Ghose* (387).
- Training, lack of, *Ghose* (387), *Narendra* (411).
- Transport difficulty, *Sinha, D. P.* (206).

OIL-PRESSING :

- (*See also* OILCAKE under **FERTILISERS**).
- Industry should be encouraged by loans under State Aid to Industries Act, *Roy, N. K.* (488).
- Recommended, *Prasad* (164), *Sethi* (360).

ORGANISATION :

- Lack of, *Prasad* (163).
- of Supply of raw materials and marketing recommended, *Lal* (304).

PAPER MANUFACTURE :

- From Rice straw :
 - Fodder scarcity would result, *Arikshan Sinha* (268).
 - Industry should be established, *Prasad* (164).
 - Suggested, *Lal* (304) 67052-3.
 - Sabai grass used, *Lyall*, 68012-4.

PISCICULTURE :

- Recommended as a preventive of Malaria, *Sethi*, 67507-8.
- Recommended, *Sethi* (359) 67507-8, *Ghose* (387).
- Villagers would not take interest in, *Lal* (304).
- Population, pressure of, subsidiary occupations necessary to relieve, *Prasad* (161-2).
- Sethi* (353) (359) 67633-8. (*See also* under **WELFARE OF RURAL POPULATION**).

POULTRY REARING :

- at Dairies, recommended, *Roy, S. K.* (463).
- Government should give information but not financial assistance, *Dobbs*, 65719-20.
- Recommended, *Sethi* (358-9), *Ghose* (387).
- Religious prejudice, *Prasad* (163), *Khan* (450), *Roy, N. K.* (491).
- Villagers would not take interest in, *Lal* (304).

PREPARATION OF AGRICULTURAL PRODUCE FOR CONSUMPTION, INDUSTRIES CONNECTED WITH :

- Government action not recommended, *Tuckey* (285).
- Government assistance recommended, *Ghose* (387), *Khan* (450) 68228-31.
- Government encouragement recommended, *Prasad* (164), *Roy, N. K.* (491).
- Private enterprise recommended, *Tuckey* (285).
- Recommended, *Sethi* (360).
- Protection by import tariffs recommended, *Narendra* (411) 67845-60.
- Railway work, *Sinha, D. P.* (205).
- Rice hulling recommended, *Prasad* (164), *Sethi* (360) 67634-5.

AGRICULTURAL INDUSTRIES—contd.

ROPE-MAKING :

- Carried on, *Prasad* (163), *Lal* (304).
- Grass used, *Lyall*, 67909-10.
- Recommended, *Ghose* (387).
- Schools to teach carpentry, furniture manufacture, rope-making, etc., recommended, *Roy, N. K.* (491).

SERICULTURE :

- a Caste occupation, *Roy, N. K.* (491).
- Ignorance of methods, *Lal* (304).
- Interest may be taken in, by villagers, *Lal* (304).
- Recommended, *Sethi* (359-60), *Ghose* (387).
- Soybeans should be investigated, *Dobbs* (64).
- Black season, method of spending, *Sinha, D. P.* (205).

SPINNING :

- (See also Charks above.)
- Recommended, *Prasad* (163), *Lal* (304), *Sethi* (359-60) 67633-8.
- Splints, manufacture of, Government aid suggested, *Sinha, D. P.* (206).
- Standard of life, improvement necessary, *Sinha, D. P.* (206) 66502-3.

STUDY, INTENSIVE, OF EACH RURAL INDUSTRY :

- Necessary, *Ghose* (387).
- not Necessary, *Sinha, D. P.* (206), *Arikshan Sinha* (268).
- Recommended, *Khan* (450).
- Urgently called for, *Prasad* (164).

SUGAR MANUFACTURE :

- (See also under RESEARCH, and HENRY and see GUR above).
- Government factories not recommended, *Meyrick*, 68074-9.
- Recommended, *Prasad* (164).
- White, manufacture, *Dobbs* (70-9) 65690-4, 65717-8.

Training :

- by Government experts necessary, *Ghose* (387).
- Necessary, *Narendra* (411).

WEAVING :

- Dobbs*, 65528.
- by Hand, of cotton :
 - Finance, co-operative suggested, *Roy, N. K.* (490).
 - Recommended, *Roy, N. K.* (490).
 - Spinning mills for supplying yarn should be started by Government, *Roy, N. K.* (490).
 - Teachers necessary, *Roy, N. K.* (490).
- by Jolahas, *Sinha, D. P.* (205).
- Recommended, *Prasad* (163) 66214-23, 66348-55, *Sethi* (359).

AGRICULTURAL LABOUR :

ATTRACTING LABOUR TO AREAS WHERE THERE IS A SHORTAGE :

- improved Communications, *Dobbs* (64-5).
- very Difficult, *Sinha, D. P.* (206).
- Experimental farms to determine most profitable crops, *Dobbs* (64-5).
- labour Unions recommended, *Sinha, D. P.* (206).
- Wages :
 - (See also WAGES below).
 - good, effective, *Ganga Vishnu* (40).
 - Higher, discussed, *Arikshan Sinha* (268-9).
- Cost increasing owing to scarcity, *Narendra* (411).

CULTIVATION OF UNOCCUPIED LAND :

- (See also DEVELOPMENT below).
- very difficult, *Sinha, D. P.* (206).
- Uncultivated land in Chota Nagpur should be developed by surplus labour assisted by grants of land, free railway travelling, housing arrangements and loans, *Ghose* (388).
- labour Unions recommended, *Sinha, D. P.* (206).

AGRICULTURAL LABOUR—contd.

DEVELOPMENT OF UNCULTIVATED LAND :

- (See also CULTIVATION above).
- Cattle breeding, *Dobbs* (65).
- Cultivation, demonstration of methods, *Dobbs* (65)
- Gaya, uncultivated land, *Dobbs*, 65444.
- Grants of land recommended, *Khan* (450).
- Labour colonies recommended, *Khan* (450).
- Scope for, *Dobbs*, 65400.
- Wages, good, recommended, *Khan* (450).
- Diseases decrease efficiency of labour, *Tuckey* (285).
- Emigration, *Heycock*, 66622-32, 66754, *Ghose* (387-8) 67699-703.
See also Migration below.
- Forced labour, *Arikshan Sinha* (268-9), *Tuckey* (280) (287).
- Kamai system :
should be Revived, *Khan* (450).
is not Serfdom, *Khan*, 68198-202.
- Kamauti Agreements Act, ineffective, *Heycock*, 66680-5, 66700.
- Labour colonies recommended, *Khan* (450).
- Labour-saving machinery recommended, *Ghose* (374).
- Manual labour, prejudice against, *Arikshan Sinha* (268-9) 66863-6.

MIGRATION :

- (See also EMIGRATION above and Recruitment below).
- to Bengal during rice harvesting season, *Ganga Vishnu* (40).
- Prosperity of emigrants, *Ganga Vishnu*, 65332-3.
to Purnea District, *Ganga Vishnu* (40).
- Shortage caused by, *Khan* (450).
in the Slack season to Calcutta, Jamshedpur, etc., *Sethi* (359).
to Towns causing scarcity, *Narendra* (411).
- Population, see under WELFARE OF RURAL POPULATION.
- Recruitment for tea gardens of Assam, etc., from Chota Nagpur should be prohibited by law, *Ghose* (387-8) 67692-4.

SHORTAGE :

- Caused by migration to industries, poor return from the soil and disinclination for hard labour, *Ganga Vishnu* (40).
- in Chota Nagpur owing to very thin population and emigration, *Ghose* (387-8).
- Existence of, *Arikshan Sinha* (268-9).
- is General, *Ganga Vishnu* (40).
- Migration causes, *Khan* (450).
- none in Patna Division, *Heycock* (223).
- Seasonal only, *Tuckey* (285).
- Subsidiary industries would not aggravate, *Khan*, 68228-31.
- Supply :
Organisation necessary, *Sinha, D. P.* (206).
Spasmodic, *Sinha, D. P.* (206).

WAGES :

- in Kind, *Lal*, 67054-62.
- Rates, *Ganga Vishnu* (40), *Arikshan Sinha* (268-9).
should be Systematised, *Khan* (450).
- Uneconomic, *Heycock*, 66680-5, 66700.

ALKALI LAND, see under SOILS.

ANIMAL HUSBANDRY. (See also under QUINLAN.)

- Buffalo breeding : Cattle Committee recommended that Sipaya should be used, *Dobbs*, 65662-3.

BULLS :

- Brahmini : *Arikshan Sinha* (267) 66817-9 ; of no use, *Sethi* (358) 67648-50.
- Co-operative maintenance advised, *Atkins* (20).

ANIMAL HUSBANDRY—contd.

BULLS—contd. :

District boards should maintain, *Arikshan Sinha* (267), *Narendra* (408) (410).
 Free use recommended, *Arikshan Sinha* (267).
 Municipalities should maintain, *Narendra* (408) (410).
 at Village farms recommended, *Sethi* (358).

Bullocks :

Feeding, *Atkins*, 65249-51.
 Tractors do not supplant, *Atkins*, 65246-8.

CATTLE :

Condition :

Miserable, *Sinha*, *D. P.* (205).
 in Orissa appalling, *Sethi* (357).

Export, see below.

Manure, see **COWDUNG** under **FERTILISERS**.

Mortality, see below.

Number excessive, *Lyall*, 67963-5. Heavy decrease in number, *Arikshan Sinha* (264-5); has decreased supply of dung, *Arikshan Sinha* (264-5).

Straying, see under **CROPS AND CROP PROTECTION**.

Uneconomic: reduction recommended, *Sethi* (359) 67545-6, 67651.

CATTLE BREEDING :

not Commercially profitable, *Dobbs*, 65562.

Co-operative, see under **CO-OPERATION**.

Cross-breeding with cattle from Punjab recommended, *Khan* (449).

Dual purpose recommended, *Sethi* (358) 67606, *Khan* (449).

in an Experimental stage, *Heycock* (220).

for Export, *Dobbs*, 65491-4.

Farms :

at Cuttack, proposed, *Heycock* (220).

at Patna being established, *Heycock* (220).

Government farms should be increased, *Roy*, *N. K.* (487).

Herds kept, *Sethi* (358).

Halatam bulls, cross-breeding with Indian Stock advised, *Dobbs* (63) 65486-8.

for Milk chiefly, *Dobbs*, 65664-7.

Profitable, *Ganga Vishnu*, 65351-6.

Propaganda :

Co-operative, recommended, *Roy*, *N. K.* (487-8).

Finance by Government and district boards, *Roy*, *N. K.* (488).

Lectures, magic lantern, recommended, *Roy*, *N. K.* (487-8).

Mortality, see below.

Police should assist, *Roy*, *N. K.* (488).

Shows recommended, *Roy*, *N. K.* (488).

Pusa :

Cross-bred bullocks commended, *Meyrick*, 68096-9.

Successful work, *Khan* (449).

Railway freights on breeding stock should be reduced, *Roy*, *N. K.* (487).

Staff, Government, should be increased, *Khan* (449).

Stock should be distributed at reduced prices, *Roy*, *N. K.* (487).

Uneconomic, see below.

Cattle insurance co-operative societies recommended, *Khan* (452).

Census, see under **STATISTICS**.

Co-operative assistance recommended, *Roy*, *S. K.* (463).

Cows, feeding of, *Dobbs*, 65489-90.

DAIRYING :

Co-operative, recommended, *Sinha*, *D. P.* (205) (207), *Sethi* (358), *Khan* (449).

Farms recommended, *Sinha*, *D. P.* (205).

Government aid suggested, *Sinha*, *D. P.* (206).

Middle class youths should be encouraged to take up, *Sethi* (358).

Milk :

(see also under **CO-OPERATION**.)

Market for, in towns, *Ghose* (383) (386).

ANIMAL HUSBANDRY—contd.

DAIRYING—contd.

Model farms :

- Mixed, Government aided, co-operative, recommended, *Roy, N. K.* (488-90).
- with Poultry recommended, *Roy, S. K.* (463).
- Recommended, *Sethi* (358) 67622-8, *Ghose* (387).
- Schools recommended, *Khan* (449).

Disease, *see under VETERINARY.*

Draught cattle, cost of hiring, *Prasad*, 66463.

Education, *see under EDUCATION : AGRICULTURAL.*

EXPORT OF CATTLE :

- to Bengal, etc., from Muzaffarpore, *Ganga Vishnu* (40) 65294, 65351-2.
- should be Discouraged, *Narendra* (408).

FODDER :

(*See also under FORESTS.*)

Barley straw recommended, *Arikshan Sinha* (267).

Crops : *see under CROPS AND CROP PROTECTION.*

Dry, shortage of, *Ganga Vishnu* (40) 65289-2, 65354-7.

Green :

Absence of, from March to June, *Arikshan Sinha* (267).

Supply in July to September, *Arikshan Sinha* (267).

Importation suggested, *Ghose* (386-7).

Leaves used, *Dobbs*, 65561-2.

Makai, *Arikshan Sinha* (267).

Oil-pressing industry should be encouraged by loans under State Aid to Industries Act, *Roy, N. K.* (488).

Rice dust as cattle food recommended, *Sethi* (358).

Rice Straw :

Good, *Lal*, 67073-80.

Paper making from, effect upon supply, *Lal*, 67052-3.

Reservation for cattle recommended, *Sethi* (359).

used for Thatching, *Sethi* (358-9).

Shortage period, *Atkins* (20) 65243-5, *Sinha, M. S.*, 66979-80, *Sinha, D. P.* (205),

Heycock (223), *Arikshan Sinha* (265) (268), *Sethi* (359), *Ghose* (387), *Narendra* (410) 67870-2, *Khan* (449), *Roy, N. K.* (490).

Silage, *see below.*

Supply must be increased, *Roy, N. K.* (488) (490).

Transport facilities necessary, *Ghose* (386), *Roy, N. K.* (488).

Varieties used, *Khan* (449).

Wheat and barley straw best, *Arikshan Sinha* (267).

Goats recommended, *Sethi* (358).

GRAZING :

(*See also under FORESTS and see PASTURES below.*)

Common grounds :

Adequate provision of, impossible, *Heycock* (223).

Dwindling, *Dobbs* (63).

of no real Help, *Heycock* (223).

Overstocked by uneconomic cattle, *Foley* (227).

Price of bullocks increasing because of scarcity of grazing grounds, *Dobbs*, 65668-9.

Shortage of, *Arikshan Sinha* (264-5).

Uneconomic cattle, breeding of, encouraged by, *Heycock* (223).

Waste lands, very little in Patna Division, *Heycock* (223).

IMPLEMENTS, IMPROVED :

better Cattle necessary for, *Ganga Vishnu*, 65294.

Cattle unsuitable to draw heavy ploughs, *Henry* (5), *Heycock* (222), *Narendra*, 67881-5.

IMPROVEMENT :

by District boards necessary, *Sinha, D. P.* (205).

by influential villagers necessary, *Sinha, D. P.* (205).

Inadequacy of livestock, *Ganga Vishnu* (40).

ANIMAL HUSBANDRY—concl'd.

LANDLORDS :

(See also under LAND TENURE.)

- Encouragement to take interest in, necessary, *Sethi* (359).
- cannot be induced to take interest in unless forced by law, *Sinha, D. P.* (205).
- not interested in, *Heycock* (223).
- have done Nothing to improve, *Sethi* (359) 67526-8, 67654-6.
- Propaganda to lead to greater interest, recommended, *Khan* (449).
- Local conditions : breeding must be adapted to, *Dobbs* (64).
- Military Department's experience and breeding work should be utilised, *Dobbs* (63-4).

MORTALITY OF CATTLE :

- Heavy, *Prasad* (162).
- Indebtedness caused by, *Prasad* (161-2).

PASTURES : (See also GRAZING above.)

Common :

- Emaciated cattle, *Atkins* (20).
- Extension recommended, *Arikshan Sinha* (267) 66843-4.
- Fencing recommended, *Roy, N. K.* (489-90).
- Legislation necessary, *Sinha, D. P.* (205).
- None in Dowlatpore, *Atkins* (20).
- Overstocked, *Sinha, D. P.* (205), *Arikshan Sinha* (264-5) (267), *Ghose* (386), *Narendra* (410), *Roy, N. K.* (489).
- Ploughing recommended, *Ghose* (386), *Roy, N. K.* (489-90).
- Shortage of, *Narendra* (408) (410), due to pressure on the land, *Ganga Vishnu* (4) 65354-7.

Co-operative societies recommended, *Sethi* (358).

Enclosed :

- Absence of, *Ghose* (386), *Khan* (449), *Roy, N. K.* (489).
- on Paddy fields, *Arikshan Sinha* (267).
- Fees should be charged, *Sethi* (358).
- Legislation necessary, *Arikshan Sinha* (268).
- Shortage of, *Sethi* (358).
- Patna cattle giving good milk yield, *Ganga Vishnu*, 65303.
- Pinjrapoles, *Sethi*, 67566-8.

PLOWH CATTLE :

- Improvement of, necessary, *Gibson* (418).
- Prices :
 - better in Bengal, *Ganga Vishnu*, 65351-3.
 - very High, *Ghose* (378).
 - Increasing, *Dobbs*, 65668-9.
- Propaganda recommended, *Sethi* (357-8) 67651-6.
- Pusa sales, *Ganga Vishnu*, 65301-2.

ROOT CROPS :

- Encouragement by Government recommended, *Roy, N. K.* (488).
- Food tests recommended, *Roy, N. K.* (488).
- Sheep recommended, *Sethi* (358).

SILAGE :

- by Co-operative societies recommended, *Sinha, D. P.* (205).
- Crops recommended for, *Quinlan* (128).
- Recommended, *Sethi* (358-9), *Ghose* (386), *Narendra* (408) (410), *Khan* (446) (449), *Roy, N. K.* (489).
- not Used by cultivators, *Khan*, 68196-7.

STALL-FEEDING :

- Good results of, *Foley* (227).
- Recommended, *Dobbs* (63) 65493-4, *Heycock* (223), *Sethi* (358-60) 67609-11, *Lyall*, 68015, *Gibson* (418).

ANIMAL HUSBANDRY—concl'd.**UNECONOMIC CATTLE :**

- Adverse effect of, *Foley* (227).
- Elimination necessary, *Heycock* (223).
- Hindu religion prevents destruction of, *Foley* (227).

ARBITRATION, see under LITIGATION under WELFARE OF RURAL POPULATION.

ATKINS, C. G., the Dowlatpore Agricultural Concern, Rusera Ghat, Bengal and North Western Railway (15-36).

ADMINISTRATION :

Pusa Research Institute : should do local demonstration and propaganda work, 65148-53.

Transport :**Railways :****Corruption :**

- Appalling (17).
- Complaints ignored, 65109-16.
- Roster system does not work, 65195-6.
- Wagons, distribution haphazard (17).

Roads :

Condition disgracefully bad (17-18).

Main roads :

- District boards control (18) 65118-26, 65141-7, 65260.
- Exclusion of cultivators' cart from better portion (18) 65117-26, 65254.
- Extortion by district board peons (18).
- Private estates, roads through, maintained by district boards, 65141-7.
- Village roads : cess, larger proportion of, should be spent on (18) 65179-82.

AGRICULTURAL DEPARTMENT :

Services : not entirely satisfactory (17).

Staff, inadequate, 65050-2.

AGRICULTURAL INDEBTEDNESS :

- Causes of borrowing : thriftlessness and extravagance (18).
- Mahajan : dominates the village where there is no co-operative society, 65190.
- Mortgages, non-terminable : should not be prohibited (18).
- Repayment, prevention of :
 - not due to excessive use of *Ganja*, 65256.
 - Inability to liquidate by instalments (18) 65199-202.
- Restrictions on credit of cultivators not advisable (18).
- Source of credit : land (18).

AGRICULTURAL INDUSTRIES :

Cottage industries, Government aid suggested (20).

Leisure period : cultivator has work for 200 days in year on holding (20) ; is unemployed during slack season (20) 65203.

ANIMAL HUSBANDRY :**Bullocks :**

- Feeding, 65249-51.
- Tractors do not supplant, 65246-8.
- Bulls, pedigree : co-operative maintenance advised (20).

Fodder :

- Difficulty of growing fodder crops, 65097-9.
- Shortage from December to middle of March (20) 65243-5.

Pastures, common : None in Dowlatpore (20).

ATKINS, C. G.—contd.

Co-OPERATION :

Audit :

more Organisation required, 65068-9.

Satisfactory, 65068.

Confidence in, extending, 65066-7.

Consolidation of holdings societies : impossible (22).

Credit societies :

Interest : too heavy (21) 65054-9.

Repayment instalments should be relaxed (21),

Reserves should be used, 65057-9, 65204-9.

a partial Success (21) 65053-4.

Education : inadequate, 65070-3, 65183-4, 65178.

Guaranteeing unions : next grade above primary societies, 65074.

Improvements, societies for effecting :

in Flooded areas should be organised (21).

Legislation : Act should be amended (21-2).

Loans to societies should be at bank rate (21).

Malfaisance : occurs occasionally, 65065.

Management :

is by the People, 65172-5.

Satisfactory, 65060-2.

Meetings :

well Conducted, 65078.

Monthly, 65074-5.

in Vernacular, 65076.

Moneylenders : seldom control societies, 65064.

Non-officials : Government encouragement advised (20).

Objects : partially achieved (22) 65079, 65176.

Purchase societies :

for Implements, co-operative use of (22).

Necessary (21).

Sale societies :

Advocated (21).

Central organisation at first, advised (21).

None exist, 65177.

Scope : should be narrow at first (21).

Staff : inadequate (20).

Supervision, necessary as to accounts, 65063.

Rural betterment societies advocated, 65100-1.

CROPS AND CROP PROTECTION :

Improvement : better cultivation and manuring advised (19).

Introduction of new crops : Central Co-operative Banks should undertake (19).

Seed distribution : Central Co-operative Banks should undertake (19).

Sugarcane, Coimbatore, supplanting indigenous varieties (19) 65045-9.

Wheats, Pusa :

Cultivation of, advised (19).

Soils must first be improved (19) 65238-42.

DEMONSTRATION AND PROPAGANDA :

Cultivators not conservative, 65047-9, 65154-5.

on Cultivators' own fields advocated (17).

Expert advice : should be free and given in villages (17).

Farms, co-operative, advocated (15).

Fertilisers, demonstration and propaganda advised (19).

Meetings, found successful (16-17) 65156-7.

Pamphlets, found successful (17) 65156-60.

Planters, European : useful example, 65152-7.

Pusa Research Institute : should do local demonstration and propaganda, 65148-52, 65161.

Sugarcane, successful propaganda of improved varieties, 65153, 65161-2.

DOWLATPORE AGRICULTURAL CONCERN : Loans made to cultivators of cane sets by, 65187-9.

ATKINS, C. G.—contd.

EDUCATION :

Adult : demonstration farms advocated (16) 65183-4.

Agricultural :

Administration, by Central Co-operative Banks advocated (16) 65193-4.

Demand :

None, 65170 ; should be stimulated, 65170-1.

Farms, co-operative demonstration, advocated (15).

Incentive, hope of Government posts (16).

Institutions, absence of, in Begusarai and Samastipore (15).

Teachers :

Absence of, in Begusarai and Samastipore (15).

Agricultural classes, should be drawn from (15).

Teaching facilities, urgent need of in Begusarai and Samastipore (15).

Co-operative schools :

Finance : funds derived from profits of societies, 65138-40.

Primary, 65136-7, 65178.

Finance, co-operative, advocated (16).

Middle class youths, could be attracted to agriculture by :

Financial assistance in developing uncultivated land (16) 65210-37,

Grants of land (16) 65210-37.

Training in agriculture (16) 65210-37.

School farms, useful if properly controlled (16).

School plots, useful if properly controlled (16).

FERTILISERS :

Cowdung :

the Best fertiliser (19) 65088-92, 65164-6.

Fuel, use of as, should be discouraged (19) 65093-6.

Fuel, wood : impossible to ensure adequate supply, 65127-31.

Price : an anna a maund, 65087.

Dowlatpore, considerably increased use of manures in (19).

Farms, demonstration, advised (19).

Propaganda advised (19).

FINANCE :

Taccavi :

through Co-operative societies advocated (18) 65197-8.

fuller Use by cultivators not advocated (18).

HOLDINGS, consolidation quite impossible (18).

IMPLEMENTS :

Blacksmiths' shops necessary (20).

Carpenters' shops necessary (20).

Hire-purchase system necessary (20).

Hoe, Indian : the only implement for sale in bazaar (20).

Ploughs : Iron mould-board :

Advised (19).

being Adopted, 65167-9.

no Selling agency exists (20).

Spare parts, selling agencies necessary (20).

Tractors : bullocks not supplanted by, 65246-8.

IRRIGATION :

Pumping stations with pipe lines from rivers in North Bihar suggested (18).

Scope for, great, 65185.

Wells, tanks, etc., not feasible in North Bihar (18) 65185-6.

MARKETING, moneylender as a middleman employs questionable methods (21)
65261-3.

ATKINS, C. G.—contd.

PANCHAYATS :

- Arbitration by, advised (20).
- Village panches : should have status of panchayats (20).

RENTS, 65264-7.

Rotation, improvement (19) 65163.

SOILS :

- Floods :
 - Erosion causes marked deterioration (19).
 - Silt deposit causes marked improvement (19).
- Improvement : better methods of cultivation, farmyard manure and drainage advised (18).
- Reclamation :
 - Drainage of lakes advised (19).
 - Middle classes youths should be given financial assistance to develop uncultivated land (19).

VETERINARY :

- Contagious diseases :
 - Legislation advocated (20).
 - Obstacle to dealing with : superstition (20).
- Departmental Staff :
 - inadequate (17).
 - more Touring advised (20).
- Dispensaries :
 - District boards control (20).
 - Services : system works well (20).
 - Staff insufficient (20).
 - Touring, practically do not exist (20).
 - Use of, by agriculturists, not full (20).

WELFARE OF RURAL POPULATION :

- Dispensaries :
 - Inadequate, 65133-5.
 - Municipal control, 65133-5.
- Drinking water :
 - very Bad, 65102.
 - Legislation necessary, 65106-8.
 - Wells, contaminated, 65103-5.

BANKS, *see under* CO-OPERATION and FINANCE.

BASKET-MAKING, *see under* AGRICULTURAL INDUSTRIES.

BEE-KEEPING, *see under* AGRICULTURAL INDUSTRIES.

BERY, K. R., Superintending Engineer, Irrigation, Orissa Circle (309-15). (*See also* SARUP (*witness*)).

AGRICULTURAL DEPARTMENT : Responsible for sinking of wells, 67096-8.

IRRIGATION :

- Distribution : in Orissa very wasteful, 67105-8.
- Extension, little scope for, 67093-5, 67165-71, 67181-4.
- Floods :
 - Committee of enquiry, 67123-9.
 - Drainage, 67130-4.

BERY, K. R.—contd.

IRRIGATION—contd.

Floods—contd.

Rivers:

Beds, raising of, 67114-29.

Bunds, 67109-29, 67142-3.

Changing course, 67135-43.

Water hyacinth, none in canals and rivers, 67144-7.

Minor works:

Bihar, 67172-3.

Irrigation Department responsible only for schemes referred to it by civil authorities, 67099.

Propaganda, 67099-104.

Orissa, a loss being incurred, 67157-8.

Permanent settlement, in relation to irrigation, 67185-91.

Private, 67176-7.

Rainfall, 67165-70.

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Son Canal, 67185-91.

Survey, 67179-80.

Tribeni Canal, no scope for extension, 67192-4.

Wells: Agricultural Department responsible for sinking, 67096-8.

LAND TENURE: Permanent settlement, 67185-91.

WATER HYACINTH, none in canals or rivers, 67144-7.

BIHAR PLANTERS ASSOCIATION, *see under MEYRICK.*

BOARDS OF AGRICULTURE, *see under ADMINISTRATION.*

BLAIR (*witness*), *see under LAMBERT AND BLAIR.*

BOY SCOUTS, *see under EDUCATION.*

CAPITAL, ATTRACTING OF, TO AGRICULTURE:

Advertisement recommended, *Sinha, D. P.* (208).

Agricultural Association, all-India, recommended, *Khan* (453).

Capitalist land monopoly, danger of, *Arikshan Sinha* (262) (271-2) 66840.

Decorations (honours) for capitalist agriculturists, recommended, *Khan* (453).

Demonstration, practical, that farming can be made to pay, recommended, *Ghose* (395).

Difficulty of making farming profitable when paying for labour, *Dobbs* (53-5) 65399.

Facilities:

for Capitalist acquisition of land necessary, *Arikshan Sinha* (271).

Special, recommended, *Sinha, D. P.* (208).

IMPROVEMENTS DISCOURAGED BY:

Education, landlords' lack of, *Tuckey* (286-7) 66890-1, 66898, 66921-3.

Factors discouraging, *Arikshan Sinha* (272).

Ignorance of cheap methods, *Sinha, D. P.* (208).

Interest, landlords' lack of, *Tuckey* (286-7) 66890-1, 66898, 66921-3.

Law of resumption by superior landlord in the event of failure of heirs, *Roy, S. K.* (469).

Litigation, *Tuckey* (286-7) 66890-1, 66898, 66921-3.

Oppression of landlords, *Tuckey* (286-7) 66890-1, 66898, 66921-3.

Rent restriction, *Ghose* (395).

Restrictions of tenancy legislation, *Tuckey* (286-7) 66890-1, 66898, 66921-3.

Return on capital invested, lack of confidence as to, *Ghose* (395), *Khan* (453).

Sub-division of proprietary rights in land, *Tuckey* (286-7) 66890-1, 66898, 66921-3.

Tenure: (*See also under LAND TENURE.*)

Insecurity of, *Tuckey* (286-7) 66890-1, 66898, 66921-3.

System, *D.P. Sinha* (208).

Thikidari system of leasing villages to temporary tenure holders (*see under LAND TENURE.*)

Transfer of tenancies, prohibition of, in Chota Nagpur, *Ghose* (395) (*See also under LAND TENURE.*)

CAPITAL, ATTRACTING OF, TO AGRICULTURE—contd.

Landlords' lack of capital, *Meyrick*, 68046-50.

Need of capital, *Ghose*, 67715-9.

Planters' capital requirements, 3 lakhs, *Meyrick*, 68064-70, 68134-5, 68143, 68151-8, 68168-70, 68184-9. (See also SUGARCANE under CROPS AND CROP PROTECTION.)

CHATTERJI, B. M., Assistant Director of Agriculture in North Bhagalpur, on Co-operation (65-6).

CHOTA NAGPUR :

Intensive development advocated, *Roy, S. K.* (470).

Tenancy Act, *Foley* (225).

COMMUNICATIONS, see under TRANSPORT under ADMINISTRATION.**CO-OPERATION : (See also under PRASAD and GHOSE.)**

Adult education, movement must be a system of, *Roy, N. K.* (492).

Agricultural Associations, see under DEMONSTRATION AND PROPAGANDA.

AGRICULTURAL DEPARTMENT :

not much Assistance from, *Roy, N. K.*, 68368, 68385-99.

Co-operation with, suggested, *Arikshan Sinha* (271).

close Touch with, in Orissa, *Sethi*, 67605.

should work in close Touch with Registrar, *Heycock* (220) 66741.

Arbitration, see under LITIGATION under WELFARE OF RURAL POPULATION.**Audit :**

Essential, *Heycock* (223) 66565, 66742.

Government should control and pay for, *Roy, S. K.* (466) 68265.

more Organisation required, *Atkins*, 65068-9.

Satisfactory, *Atkins*, 65068.

Bank, All-India Reserve or State, co-operative movement should be linked with, *Roy, S. K.* (459-60) 68236-42, 68293-6.

Banking: not successfully managed, *Sinha, D. P.* (203) 66494-6. (See under FINANCE.)

Banks, Central, see below.

Bhadralog class alone benefited, *Sinha, D. P.* (207).

Boy Scout movement, *Roy, S. K.* (466); recommended, *Roy, N. K.* (491) (497) (499).

CATTLE BREEDING CO-OPERATIVE SOCIETIES : (See also under ANIMAL HUSBANDRY.)

Bulls, co-operative societies should distribute, *Quinlan*, 66020.

Encouragement by Government and district boards recommended, *Roy, N. K.* (498).

not Feasible, *Arikshan Sinha* (271).

Popularisation recommended, *Sinha, D. P.* (207).

very Rare, *Sinha, D. P.* (207).

should Receive breeding stock free from Government farms, *Ghose* (386) (394),

Recommended, *Sethi* (358); *Khan* (452) 68219-21; *Roy, S. K.* (463); *Roy, N. K.* (498).

Cattle insurance societies recommended, *Khan* (452).

CENTRAL BANKS :

Criticism of finance policy, *Roy, S. K.*, 68238-41.

District boards :

Connection with, necessary, *Roy, N. K.* (496).

should Deposit funds with, *Roy, N. K.* (497).

Education, agricultural, should be administered by, *Atkins* (16) 65193-4.

Good work of, *Roy, N. K.*, 68366.

merely cheap Moneylenders, *Sethi* (360-1) 67523-5, 67529-32.

New crops, should undertake introduction of, *Atkins* (19).

CO-OPERATION—contd.

CENTRAL BANKS—contd.

- Seed distribution, should undertake, *Atkins* (19).
- Statistics, should undertake, *Roy, S. K.* (469).
- Supervision of primary societies necessary, *Roy, N. K.*, 68366-7, 68400-3.
- Cheque, use of, should be encouraged, *Sinha, D. P.* (207).
- Chota Nagpur, intensive co-operative development advocated, *Roy, S. K.* (470).
- Confidence, extending, *Atkins*, 65066-7.

CONSOLIDATION OF HOLDINGS SOCIETIES : (*See also under HOLDINGS.*)

- Impossible, *Atkins* (22).
- Popularisation recommended, *Sinha, D. P.* (207).
- very Rare, *Sinha, D. P.* (207).
- Recommended, *Arikshan Sinha Prasad* (162-3) (271); *Sethi* (353); *Roy, S. K.* (462); *Khan* (452).

CREDIT SOCIETIES :

- Banks, in place of, recommended, *Sinha, D. P.* (203) 66494-6.
- Best means of financing and teaching ryots, *Henry* (3) (5-6) 65020-1.
- Borrowing by members excessive, *Dobbs* (65) 65452.
- Business morality of members, importance of, *Sinha, D. P.* (207).
- Deposits, landlords and bankers should be persuaded to make, *Khan* (452).
- Difficulties of, *Ross* (339).
- Extension necessary, *Tuckey* (281).
- Imperial Bank should lend to Provincial Bank at 3 per cent., *Roy, N. K.* (498).
- Indebtedness of members increasing, *Dobbs* (65).
- Interest, *see below*.
- merely Lend at lower rates of interest than moneylenders, *Dobbs* (65).

Loans :

- for Ceremonies should not be given, *Tuckey* (281).
- Cheque payment recommended, *Sinha, D. P.* (207).
- insufficiently Controlled, *Sethi* (360) 67611-6,
- from Government, free of interest, recommended, *Khan* (451).
- Long term :
 - Government financial assistance to Provincial Bank recommended, *Roy, N. K.* (486) (498).
 - Tuckey* (281) 66877-80.
- For Manure should not be in cash but in kind, *Sethi* (355) 67519-25.
- Multiplication of societies as at present organised not recommended, *Roy, N. K.* (498).
- Restriction of activities of societies to credit, deprecated, *Roy, N. K.* (484-5).
- Use of, importance of, *Sinha, D. P.* (207).
- Main co-operative activity, *Sethi* (360).
- Members often go to moneylenders, *Heycock* (220).
- Objects not achieved in Orissa, *Sethi* (361).
- the most Popular, *Sinha, D. P.* (207).
- Repayment instalments should be relaxed, *Atkins* (21).
- Reserves should be used, *Atkins*, 65057-9, 65204-9.
- Short term credit recommended, *Roy, S. K.* (460-1).
- a partial Success, *Atkins* (21) 65053-4.
- State Co-operative bank :
 - Branch in every village recommended, *Khan* (444).
 - Recommended, *Khan* (444).
 - Working well, *Arikshan Sinha* (270).
- Criticism of movement, *Ganga Vishnu*, 65313-20.

DAIRIES : (*See also under ANIMAL HUSBANDRY.*)

- Farms recommended, *Sinha, D. P.* (205) (207).
- Milk, *see below*.
- Mixed model farms recommended, *Roy, N. K.* (488-9).
- Recommended, *Sethi* (358).
- Danger of over-expansion without adequate inspecting agency, *Heycock* (223-4).
- Demonstration, *see Co-OPERATIVE under DEMONSTRATION AND PROPAGANDA.*

CO-OPERATION—contd.

Department : activities diffused, *Sinha, D. P.* (203).
 Development Officer should control Co-operative, Veterinary and Agricultural departments, *Heycock* (222) 66583-7, 66662.

DISTRICT BOARDS :

Assistance received from, *Roy, N. K.*, 68369.
 Connection with Central Banks necessary, *Roy, N. K.* (496).
 Connection with movement, *Roy, S. K.* (466).
 Contracts should be placed with co-operative societies, *Roy, N. K.* (498).
 Deposit of funds with Central Banks suggested, *Roy, N. K.* (497).
 Favoured-village policy recommended, *Roy, N. K.* (498).
 Drainage recommended, *Arikshan Sinha* (271).

EDUCATION :

Adult, recommended, *Prasad* (160) 66306-11, *Ghose* (374) (385).
 Agricultural, Central Banks should administer, *Atkins* (16) 65193-4.
 as to Credit, necessary, *Roy, S. K.* (460) (465) 68240.
 Department, no relationship with, *Roy, N. K.*, 68369.
 Inadequate, *Atkins*, 65070-3, 65183-4, 65178.
 Lack of, *Henry*, 65022-3.
 should be the Main object of co-operation, *Roy, N. K.* (492-3).
 Managing committees, Department should be represented upon, *Prasad* (160) 66376.
 of Members :
 Neglected, *Sethi*, 67611-6.
 Recommended, *Roy, N. K.* (493).
 Recommended, *Ghose* (374) (385) (391) 67826 : *Roy, S. K.* (369) ; *Roy, N. K.* (493) (495) 68369.
 Schools, *Atkins*, 65136-40, 65178, *Roy, N. K.* (493) (495) 68369.
 School teachers, *see below*.
 Training, of workers, *see below*.
 Work very small, *Lambert and Blair*, 67246.
 Embezzlement, danger of, *Heycock* (220) (223) 66565.
 Federation : Subsidies from Government and district boards recommended, *Roy, N. K.* (494-5) 68358, 68377-81, 68388-90, 68396-403.
 Fencing recommended, *Sethi* (356) 67643.
 Fertilisers, *see CO-OPERATIVE under FERTILISERS*.
 Finance, large advances from Government recommended, *Arikshan Sinha* (270).
 Godowns, *Roy, N. K.* (487).
 Government policy suggested, *Roy, S. K.* (465-6) 68249-50, 68286-8, *Khan* (451).
 Grain golas, *Sethi* (360).
 Guaranteeing unions : next grade above primary societies, *Atkins*, 65074.

Health societies, *see under WELFARE OF RURAL POPULATION*.
 Hospitals suggested, *Sinha, D. P.* (207) 66506-7.

Hospitals, *see under WELFARE OF RURAL POPULATION*.

IMPLEMENTS :

Distribution of, recommended, *Khan* (447-8) (402) ; suggested, *Heycock* (222) ; *Ghose* (384-5) ; *Narendra* (408).
 Hiring to members and non-members recommended, *Sinha, D. P.* (205) ; *Sethi*, 357 ; *Arikshan Sinha* (266) (271).
 Loans for purchase of, recommended, *Khan* (447-8).
 Machinery, *see below*.
 Popularisation by societies recommended, *Henry* (5).
 Purchase societies necessary, *Atkins* (21-2) ; *Sinha, D. P.* (207) ; *Sethi* (357) ; *Khan* (452).

IMPROVEMENTS :

Large, finance by land mortgage banks, *Roy, S. K.* (465).
 Minor, by individuals with co-operative assistance, *Roy, S. K.* (465).
 Work recommended, *Roy, N. K.* (483-4) (487-8) (493) 68382-91.

CO-OPERATION—contd.

IMPROVEMENTS, SOCIETIES FOR EFFECTING :

- in Flooded areas should be organised, *Atkins* (21).
- Legislation : Act should be amended, *Atkins* (21-2).
- Loans to societies should be at bank rate, *Atkins* (21).
- Popularisation recommended, *Sinha, D. P.* (207).
- very Rare, *Sinha, D. P.* (207).
- Recommended, *Arikshan Sinha* (270 1), *Khan* (452).
- Interest : Reduction recommended, *Atkins* (21) 65054-9 ; *Arikshan Sinha* (261) (270) ; *Khan* (441) (452) ; *Roy, S. K.* (460) ; *Roy, N. K.* (485).

IRRIGATION :

- Difficulty of, *Heycock*, 66617.
- Government assistance necessary, *Dobbs* (66).
- Recommended, *Roy, N. K.* (485-6).
- Schemes suggested, *Sinha, M. S.* 66981-5.
- Societies recommended, *Sethi* (354).
- Tank construction recommended, *Ghose* (380).

JOINT FARMING SOCIETIES :

- not Feasible, *Arikshan Sinha* (271).
- Government financial help recommended, *Roy, S. K.* (458) (464-5).
- Limited liability recommended, *Roy, S. K.* (458) (464-5).
- Popularisation recommended, *Sinha, D. P.* (207).
- very Rare, *Sinha, D. P.* (207).
- Recommended, *Prasad* (163) (167) ; *Ghose* (379) ; *Khan* (452) ; *Roy, S. K.* (458) (464-5).
- Lac central marketing agencies suggested, *Norris* (479) 68314-5.
- Landholders' inertia an obstacle, *Ganga Vishnu* (38).
- Liquidation : *Heycock*, 66565-7, 66665-8.
- Livestock societies recommended, *Sethi* (358) (*See CATTLE BREEDING CO-OPERATIVE SOCIETIES above*).
- Machinery utilisation societies :
 - Popularisation recommended, *Sinha, D. P.* (207).
 - very Rare, *Sinha, D. P.* (207).
- Malfaisance : occurs occasionally, *Atkins*, 65065.
- Management :
 - is by the People, *Atkins*, 65172-5.
 - Satisfactory, *Atkins*, 65060-2.

MARKETING : (*See also SALE SOCIETIES below.*)

- Recommended, *Sinha, D. P.* (206-7) ; *Heycock* (219-20) (223) ; *Khan* (451) ; *Roy, S. K.* (464) 68249-50, 68255-60.
- Markets recommended, *Sinha, D. P.* (206-7).

Meetings :

- well Conducted, *Atkins*, 65078.
- Monthly, *Atkins*, 65074-5.
- in Vernacular, *Atkins*, 65076.
- Utilisation for demonstration and propaganda, agricultural, recommended, *Roy, N. K.* (483).

MEMBERS :

- cannot Control their societies, *Heycock* (223) 66678-9.
- Education of, *see EDUCATION above*.
- Middle class youths, attracting of, to agriculture, *see under EDUCATION*.

MILK :

- Co-operative collection of, *Quinlan*, 66020.
- Supply societies recommended, *Khan* (449).

- MINORITIES, compulsion on, to come into schemes for joint improvement, recommended, *Sinha, D. P.* (207) ; *Arikshan Sinha* (271) ; *Sethi* (361) ; *Khan* (452) ; *Roy, S. K.* (466) ; *Roy, N. K.* (498).

CO-OPERATION—contd.

Moneylenders : seldom control societies, *Atkins*, 65064.
 Municipalities should encourage co-operative societies, *Roy, N. K.* (498).
 Non-credit societies :
 Recommended, *Sethi* (360-1).
 not generally Successful in the past, *Sethi* (360).

NON-OFFICIALS :

Government encouragement advised, *Atkins* (20).
 Importance of, *Henry* (5) ; *Sethi* (360) ; *Roy, S. K.* (466) 68281-8.
 Interest taken by, not sufficient, *Dobbs* (65).
 Landlords should help, *Sethi* (360).
 Organisers, honorary, *see below*.

OBJECTS :

Extent of achievement of :
 Deterioration in recent years, *Heycock* (220) 66565.
 to a Great extent achieved, *Khan* (452).
 Not much Success, *Sinha, D. P.* (207).
 Not achieved, *Dobbs* (66) 65452-6 ; *Sethi* (361) 67611-6.
 Partial Success, *Atkins* (22) 65079, 65176 ; *Arikshan Sinha* (271).
 Societies Successful only as loans institutions, *Roy, S. K.* (466).
 should be mainly moral and educational, *Roy, N. K.* (492-3).
 Officials : have not sufficient Time, *Dobbs* (65-6).
 Organisation too narrow, *Roy, N. K.* (484-5) (491-9) 68364.

ORGANISERS :

Honorary :
 not Satisfactory, *Roy, N. K.* (495-6).
 Work of, *Henry* (5) 64963-7.
 Non-officials, *see above*.
 Paid, necessary, *Roy, N. K.* (493-4) (496) 68357-65.
 Panchayats : inclined to look to their own advantage, *Heycock* (223).
 Pasture societies recommended, *Sethi* (358).
 Poorest class should be included, *Sinha, D. P.* (207).
 Primary societies :
 Condition not satisfactory, *Roy, N. K.*, 68354-6, 68364-5.
 Numbers increasing, *Henry*, 65001-5.
 Supervision by Central Banks necessary, *Roy, N. K.*, 68366-7, 68400-3.
 Progress, *see OBJECTS above*.
 Propaganda, idealistic, necessary, *Roy, S. K.*, 68281-8.
 Public Demands Recovery Act, *Heycock*, 66665-8.

PURCHASE SOCIETIES :

Extension recommended, *Sinha, D. P.* (207), *Khan* (452).
 Implements, *see above*.
 Rural betterment societies advocated, *Atkins*, 65100-1.

SALE SOCIETIES : (See also MARKETING above.)

Central organisation at first, advised, *Atkins* (21).
 Extension recommended, *Sinha, D. P.* (207), *Heycock* (224).
 Mismanagement in the past, *Khan* (452).
 None exist, *Atkins*, 65177.
 Potato society in Bihar a great success, *Heycock* (223) 66591-3.
 Scope : should be narrow at first, *Atkins* (21).
 Recommended, *Atkins* (21), *Sethi* (358) (360), *Khan* (451).
 Schools, *see under EDUCATION above*.

SCHOOL TEACHERS :

Assistance of, *Roy, S. K.* (466) (468).
 should be Trained to assist the movement, *Roy, N. K.* (497) (499).
 Seed distribution recommended.
 Seed distribution, *see under CROPS AND CROP PROTECTION*.

CO-OPERATION—conold.

Silos recommended, *Sinha, D. P.* (205).
 Staff : inadequate, *Atkins* (20), *Sethi* (360).
 Subsidiary industries, *see* CO-OPERATION under **AGRICULTURAL INDUSTRIES**.
 Subsidies from Government recommended, *Khan* (451). (*See* Government above.)

SUPERVISION :

by Central Banks of primary societies necessary, *Roy, N. K.*, 68366-7, 68400-3.
 Importance of, emphasised, *Heycock* (220) (223-4) 66565, 66742.
 Inadequate, *Khan* (452), *Roy, N. K.*, 68365-7.
 Necessary, *Henry* (6) 64966-71, 65001, 65022-3.
 Necessary as to accounts, *Atkins*, 65063.
 Taccavi and co-operation, *see* under **FINANCE**.
 Tenants, effect upon, of co-operative movement, *Tuckey*, 66896-7.
 Terrorism by smaller landlords : co-operative movement should help ryots to be more independent, *Dobbs* (66).
 Thrift should be taught, *Roy, N. K.* (493).

TRAINING :

Demonstrators, *Roy, N. K.* (483-4).
 Institutions for training co-operative workers should be maintained by Government, *Roy, N. K.* (493-4) 68357-63, 68368, 68371, 68377-81, 68388-90, 68396-403.
 of Officials, etc. by Government recommended, *Roy, S. K.* (466).
 Veterinary relief :
 Expansion should be undertaken by department, *Quinlan* (121) (123) 65945-7.
 Work recommended, *Ghose* (385).
 Welfare work in villages recommended, *Atkins*, 65100-1, *Roy, N. K.* (493).
 Whole village societies recommended, *Roy, N. K.* (484-5) (491-9) 48357-8, 68382-4.

COTTAGE INDUSTRIES, see under AGRICULTURAL INDUSTRIES.**COURT OF WARDS, see under DEMONSTRATION AND PROPAGANDA and EDUCATION.****CROPS AND CROP PROTECTION :**

Cattle, straying :
 Damage to crops serious, *Sethi* (356) 67643.
 Fencing, co-operative, recommended, *Sethi* (356) 67643.
 Crops recommended, *Khan* (447).
 Expert advice necessary, *Arikshan Sinha* (266).
 Flood-resisting crops necessary, *Narendra* (409).

FODDER CROPS :

Demonstration recommended, *Sethi* (356).
 Difficulty, *Atkins*, 65097-9.
 Farms recommended, *Quinlan* (129).
 Grass, local perennial (*Anihistiria ciliata*) successfully grown in Chota Nagpur, *Dobbs* (63).
 Janera grown, *Arikshan Sinha* (265-6).
 Lucerne, a failure at Kanke, *Dobbs*, 65606.
 a Promising line of investigation, *Dobbs* (63).
 Recommended, *Quinlan* (128), *Heycock* (223), *Arikshan Sinha* (269-70), *Sethi* (356), (358-9) 67607-8, *Ghose* (381-3) (386-7), *Narendra* (409), *Gibson* (418), *Khan* (449), *Roy, N. K.* (487-90).
 for Silage recommended, *Quinlan* (128), *Ganga Vishnu*, 65364.
 Fuel : rahar, cotton and castor recommended, *Arikshan Sinha* (269-70).
 Gram, improved variety introduced in South Bihar, *Dobbs*, 65601.
 Groundnut : (*see also* under **DEMONSTRATION AND PROPAGANDA**).
 Market, no difficulty as to, *Dobbs*, 65437.
 for Reclamation of land, recommended, *Lal* (303).
 Recommended, *Ghose* (375-6) (384).
 large Scope for extension, *Sethi* (356-7).
 Successfully demonstrated, *Dobbs* (66) (63).

CROPS AND CROP PROTECTION—contd.

IMPROVEMENT OF CROPS :

- Hemp, sisal : grown at Samabalpur by one cultivator on 1,500 acres, *Dobbs*, 65647-8.
 Breeding and selection advocated, *Dobbs* (63).
 better Cultivation and manuring advised, *Atkins* (19).
 Demonstration, *see under DEMONSTRATION AND PROPAGANDA*.
 by Experimental farms, *Heycock* (222).
 Local investigation necessary, *Dobbs* (63).
 Successful efforts, *Sethi* (357).
 Indigo, *see under MEYRICK*.
 Maize under irrigation on early paddy lands recommended, *Sethi* (357).
 Market facilities for improved crops necessary, *Ghose* (383), *Roy, N. K.* (487).
 New crops :
 Central Co-operative Banks should undertake introduction of, *Atkins* (19).
 Marketing arrangements necessary, *Roy, N. K.* (487).
 Output has decreased, *Arikshan Sinha* (258-9) 66820-1, 66823-4.

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- Borer causes great damage to sugarcane, *Henry* (4).
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- Failure, *Arikshan Sinha* (258) (260) (266) 66832-3.
- Soils must first be improved, *Atkins* (19) 65238-42.

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- Imperial research recommended, *Sethi* (356-7).
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- Methods of ryots give poor but constant return, *Henry* (4).
- Ploughing of common pastures recommended, *Ghose* (386), *Roy, N. K.* (489-90).
- Poverty leads to poor results, *Henry* (4) 64951-2.

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- in uplands in Chota Nagpur, *Ghose* (384).
- Demonstration recommended, *Sethi* (357).
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- Improvement, *Atkins* (19) 65163.
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- Adult education, should be conterminous with, *Roy, S. K.* (458).

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- Comparative demonstrations of improved and old methods recommended, *Roy, N. K.* (483).
- Continuous demonstration, advocated, *Henry* (2).

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Co-OPERATIVE :

- of Fertilisers recommended, *Ghose* (383).
- Farms, recommended, *Atkins* (15).
- Institutions, important work of, *Prasad* (160) 66306-11, 66371-4, 66426-30.
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- Recommended, *Sethi* (351) 67563, *Ghose* (375-6), *Khan* (440), *Roy, S. K.* (458-9), *Roy, N. K.* (483-4) (493) 68382-99.
- Subsidies from Government, recommended, *Roy, N. K.* (483-4).
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- Estates should be used for demonstration and education, *Sethi* (159) (351).
- Model farm at Bettiah, *Heycock*, 66703.

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- Adopting improved methods, *Dobbs* (56) 65546, 65553, 65613.
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- Conservative, *Henry* (2) 64930, 65039-40; not conservative, *Atkins*, 65047-9, 65154-5.
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- Suspicious of innovations, *Heycock* (219).
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- Willing to accept advice, *Heycock* (219), *Ganga Vishnu* (38).
- on Cultivators' own fields recommended, *Henry* (2), *Atkins* (17), *Dobbs* (56), *Ganga Vishnu* (38), *Prasad* (160), *Sinha, D. P.* (201-2), *Heycock* (219) 66647, 66711, *Sethi* (351-2) 67563, *Ghose* (375), *Roy, N. K.* (483-4).
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- Recommended, *Quinlan* (129) 65813-5, *Heycock*, 66563, 66718-20.
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- Experts, in each sub-division, recommended, *Arikshan Sinha* (258).
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- Cultivators will accept if it is simple and demonstrably effective, *Dobbs* (56).
- should be Free and given in villages, *Atkins* (17).
- Exhibitions recommended, *Sinha, D. P.* (202).

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- Instances of, *Ghose* (376).
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- Fairs, propaganda at, unsuccessful, *Sinha, D. P.* (202).

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- Control by Agricultural Department assisted by private agencies and co-operative societies, *Sethi* (351).
- Co-operative, advocated, *Atkins* (15).
- Cultivator demonstrators should be in charge, *Sethi* (351).
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 - Extension recommended, *Dobbs*, 65543-6.
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 Fodder crops, demonstration of, recommended, *Sethi* (356).
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 of Little avail, *Prasad* (160).
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 Wheat:
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- Extension advised (64) 65527.
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 - Indigenous methods of production, wasteful (70).
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- Lac Association, 65495-500.
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- Price of bullocks increasing, 65668-9.
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Sugarcane :

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Ten tons of cane per acre as compared with 50 or 60 in Java (70).
Testing of improved varieties by Farnell's method, 65621-2.

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Cultivators :

Adopting improved methods (56) 65546, 65553, 65613.
Department has not sufficient touch with, 65623-5.
on Cultivators own land, successful (56).
Demonstration among zamindars and non-official co-operative workers (56).
Expert advice : cultivators will accept if it is simple and demonstrably effective (56).
Farms, departmental :
Extension recommended, 65543-6.
Successful (56).
Field demonstrations : strict control necessary (56).
Funds, sufficient, 65398.
Kanke Farm : cultivators have taken small quantities of paddy from, 65656.
North Bihar, practically not touched, 65702-7.
Obstacles : Cultivators' fear (56).

Sipaya farm :

Cattle Committee recommended that it should be used for buffalo breeding,
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should preferably be drawn from Agricultural classes, (55).
Shortage if agricultural college is started (55).
Technical training (56).
in Vernacular advised (66) 65393-4.

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 - might be Transferred from Patna to Sabour (116).
- English education generally a failure (66) 65393-4, 65467-9.
- Medical College, 65586.
- Middle class youths, attracting to agriculture :
 - Difficulties (53-4) 65547-52.
 - Income from agriculture must be increased (55), 65399.
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- Patna University :
 - Chemical research advocated (115).
 - Correlation with Veterinary College farm advised (115).
 - should be Equipped to assist territorial officers (49) (52) 65373-5.
 - Progress, 65580-6.
 - Rural education faculty advised (116).
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 - was not Affiliated to University, 65393-4, 65467-9, 65573, 65670-1.
 - Attendance in second year was not full (55).
 - Closed (55) 65392, 65467-9, 65503, 65573-86, 65670-2 (117).
- Sabour Farm :
 - Facilities (116).
 - Subordinate staff training advised (116).
- University, all-India, proposed (111).

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- Ammo-phos introduced, 65601-2.
- Ammonium phosphate :
 - Good for paddy (62).
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- Experiments advised (62-3).
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- Improvements should be financed from revenue (59) 65422-6.
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- Registration of contracts as to real property suggested (58).
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FORESTS : grazing : a difficult question, 65447,**HOLDINGS :**

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 - Advances might be made to purchasers of fragments (60).
 - Legislation suggested (60).

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 - Inheritance laws (60).
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- Mass production, difficulties of, 65439-41.
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- Kanke *bundhs* advocated (60-2).
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 - inter-Provincial, instance of lack of, 65435-6.
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- Oil, research into transport difficulties would be valuable (53).
- Patna University : should be Equipped to assist territorial officers (49) (52) 65373-5.
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 - Provincial Specialist officers not sent to, 6535-6.
 - Research side should be emphasised, 65569-70.
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- Recruitment : difficult to get men of proved ability (110-1).
- Scientific Commissioner suggested (50-1) 65376-8.
- University, all-India, proposed (111-2).
- Vegetable protein, research as to digestibility recommended (53).
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 Checking by sampling necessary (68).
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 Diet : investigation suggested (67-8).
 Officer of Provincial Civil Service should be posted to each thana to act as a focus for
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 Poverty :
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 Cumulative (48).
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DOWLATPORE AGRICULTURAL CONCERN : see under ATKINS.**DRAINAGE see under SOILS.****EDUCATION : (see also under LAMBERT AND BLAIR).****ADULT :**

Cinema recommended, *Ghose* (374).
 Co-operative agency recommended, *Prasad* (160) 66306-11 ; *Ghose* (374) (385).
 Demonstration farms advocated, *Atkins* (16) 65183-4, *Ganga Vishnu* (38).
 Difficulty of, *Prasad* (160).
 Evening Schools :
 District boards should manage, *Sinha, D. P.* (201).
 Recommended, *Sinha, D. P.* (201), *Khan* (442).
 Finance, from district boards, recommended, *Prasad* (160).
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 Object, to remove illiteracy, *Prasad*, 66453.
 Peripatetic lectures recommended, *Khan* (442-3).
 Practical agricultural demonstration recommended, *Sethi* (351).
 Practical training by short courses on farms recommended, *Heycock* (218).
 Propaganda recommended, *Khan* (442).

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AGRICULTURAL :—contd.

ADMINISTRATION OF :

by Central Co-operative Banks advocated, *Atkins* (16) 65193-4.
 by Managing committees representing district boards, Agricultural and Co-operative Departments and the peasant class, recommended, *Prasad* (160) 66376.
 Agricultural classes, small percentage of, in schools and colleges *Dobbs* (56), *Heycock* (218), *Sethi* (350), *Khan* (442), *Ghose* (394), *Roy, S. K.* (457).
 Attendance disappointing, *Khan* (442) (453). (See also below).
 Bias recommended, *Prasad* (168), *Sinha, D. P.* (199) (207).

Careers, of students :

Employment, scope for, of educated persons on the land should be enlarged, *Dobbs* (67).

Farming, often, *Ganga Vishnu* (37).

Farming, none, *Sethi* (350), not as a rule, *Foley* (225).

Few openings for, *Khan* (442).

Government service, *Heycock* (217-8) 66554-7, 66638-42, 66727, *Dobbs* (55-6), *Sethi* (350), *Khan* (442).

not on the Land, *Narendra*, 67873.

Private proprietors, service with, *Dobbs* (55-6).

Agricultural College, provincial, question of re-opening of :

Affiliation to University, *Heycock*, 66725-6.

Entrance qualification, *Heycock*, 66728-30.

Location of, etc., *Dobbs*, (55), 65395, 65566-7.

Necessary, *Khan* (442) 68193-5.

Not recommended, *Sinha, D. P.* (200).

Colleges :

Practical training advised, *Dobbs*, 65457-62, 65673.

of little use, *Dobbs*, 65372, 65504-21, 65568, 65670-81.

Co-operative management recommended, *Prasad*, 66376.

Demand :

Great, *Ganga Vishnu* (38).

Greater than supply, *Roy, S. K.* (457).

None, *Atkins*, 65170.

should be Stimulated, *Atkins*, 65170-1.

Employment, scope for, of educated persons on the land should be enlarged, *Dobbs* (67) (See also Careers above.)

Experiments to be made, *Fawcus* (316).

Extension advocated, *Roy, S. K.* (457).

Farms :

Co-operative demonstration, advocated; *Atkins* (15), *Ganga Vishnu* (41).

Provincial, should undertake agricultural education, *D. P. Sinha* (200).

Field excursions recommended, *Sinha, D. P.* (199).

Government recognition necessary, *Sinha D. P.* (207).

Importance of, *Roy, S. K.* (467-8.)

Incentive :

Agricultural Department, hope of employment in, *Sinha, D. P.* (200).

Employment, hope of obtaining, *Heycock* (217).

Government service, hope of obtaining employment in, *Atkins* (16), *Dobbs* (55), *Foley* (225), *Sethi* (350), *Roy, S. K.* (457).

Indigenous methods recommended, *Narendra* (407).

Institutions :

Absence of, in Begusarai and Samastipore, *Atkins* (15).

Insufficient, *Ganga Vishnu* (37), *Arikshan Sinha* (259), *Khan* (441-2), *Roy, S. K.* (457).

not Popular, *Sinha D. P.* (201).

in Middle schools, recommended, *Ganga Vishnu* (41), *Arikshan Sinha* (271), *Sethi* (350), *Khan* (452), *Roy, S. K.* (468).

Post-graduate training :

Bangalore preferable to Pusa in view of climate, *Dobbs*, 65384-9 (116-7).

at Pusa, America or Denmark, recommended, *Sinha, D. P.* (200).

Practical, recommended, *Dobbs* (66-7) 65395, *Narendra* (407), *Khan* (442), *Roy, S. K.* (468).

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AGRICULTURAL—conclld.

in Primary schools :

as a Compulsory subject, recommended, *Khan* (452).
Recommended, *Ganga Vishnu* (41), *D. P. Sinha* (199), *Arikshan Sinha* (271).
Revenue officers, training in technical agriculture suggested, *Heycock*, 66556-7, 66638-42.

Sabour Agricultural College, *see below*.

not Satisfactory, *Dobbs*, 65390-1 (114-5).

in Secondary schools should be an optional subject, *Sinha, D. P.* (200).

Schools : (*See also below*.)

Costly and unpopular, *Sinha, D. P.* (199).

None exist, *Prasad*, 66376, *Roy, S. K.* (457).

Recommended, *Prasad*, (159-60) 66376-9.

Required in every sub-division, *Arikshan Sinha* (259).

in Schools recommended, *Ghose* (394-5), *Khan* (442-3).

Short courses for sons of landlords recommended, *Khan* (442).

Stipends, etc., for boys of agricultural classes recommended, *Khan* (442).

Subsidiary industries should be taught, *Prasad*, 66377-9.

Teachers : (*See also below*.)

Absence of, in Begusarai and Samastipore, *Atkins* (15).

Agricultural classes, should be drawn from, *Atkins* (15), *Ganga Vishnu* (37), *Dobbs* (55), *Arikshan Sinha* (259), *Khan* (442).

Agricultural Department should supply, *Khan* (443).

Itinerant, recommended, *Khan* (452-3).

Shortage of, if agricultural college is started, *Dobbs* (55).

Supply insufficient, *Ganga Vishnu* (37), *Khan* (442), *Roy, S. K.* (457).

Teaching facilities :

Inadequate, *Ganga Vishnu* (37).

Urgent need of, in Begusari and Samastipore, *Atkins* (15).

Technical training, *Dobbs* (56).

Text books, should be used with caution, *Narendra* (407).

Theoretical, advocated, *Ganga Vishnu* (41).

University, faculty of agriculture recommended, *Sinha, D. P.* (200) 66525, *Roy, S. K.* (457) (468) 68234-5.

in Vernacular advised, *Dobbs* (66) 65393-4.

Vocational teaching, only provision for, is the taking of apprentices at Government demonstration farms, *Roy, S. K.* (457).

Zamindars' sons not attracted owing to land tenure system, *Heycock* (217-8) 66559-62, 66701-7.

ANIMAL HUSBANDRY :

Extension of facilities for training in, advised, *Quinlan*, 66033.

education of villagers in the general Hygiene of livestock, necessary, *Quinlan* (127) 65725.

Assistant Directors of agriculture : farm training, *Dobbs*, 65463-6, 65519, 65587-94, 65674-81,

Attendance :

in Primary schools, *Faucus* (317-8).

at Sabour Agricultural College : *Dobbs* (55).

in Upper class of schools, poor, owing to :

Compulsion, lack of, *Arikshan Sinha* (271).

early Marriage, *Sinha, D. P.* (208).

Nervous troubles, *Roy, S. K.* (469) 68269-75.

Teachers, inefficiency of, *Roy, N. K.* (499).

boys having to Work, *Sinha, D. P.* (200), *Khan* (442) (453).

Banki Union, compulsory education in, *Faucus* (317).

Boy scout movement approved, *Roy, S. K.* (466), *Roy, N. K.* (491) (497) (499).

Children : sent to school too young, *Faucus* (318).

COLLEGE, provincial agricultural : (*See also under AGRICULTURAL above*.)

Affiliation to University necessary, *Sethi*, 67543-4.

Required, *Sethi* (350) 67536-44, 67549-52.

Veterinary college, should be linked with, *Sethi*, 67549.

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COLLEGES :

- Agriculture should be taught as a science subject, *Sinha, D. P.* (200) 66525.
 Sabour, *see below*.
 Compulsory agricultural education, attendance bad owing to lack of, *Arikshan Sinha* (271).
 Compulsory education of Zamindars recommended, *Roy, S. K.*, 68251-4.

COMPULSORY PRIMARY EDUCATION :

- Act, permissive, in force, *Heycock*, 66595.
 Banki Union have adopted, *Heycock*, 66596-7.
 Difficulty of enforcing, *Fawcus* (317).
 Financial difficulty, *Sinha, D. P.*, 66546-50, *Heycock*, 66595-9.
 Necessary, *Sinha, D. P.* (208).
 Public opinion re, *Sinha, D. P.*, 66644-50.
 Recommended, *Arikshan Sinha* (271), *Narendra* (411), *Khan* (453), *Roy, S. K.* (469), 68251-4; not recommended, *Heycock*, 66594-9, *Ghose* (395) 67697-8, 67740, *Roy N. K.* (499).

Co-operative *see under* CO-OPERATION.

- Court of Wards encourages training of minors, *Heycock*, 66701-7.
 Demonstrators of Agricultural Department should be trained at provincial farms, *Sinha, D. P.* (200).
 District boards in favour of building schools, to the detriment of other activities, *Heycock*, 66749, 66755-6.

ELEMENTARY : (*See also* PRIMARY *below*.)

- Course, not long enough, *Heycock* (224).
 Finance : funds inadequate, *Heycock* (224).
 Illiteracy, relapse into, *Heycock* (224).
 Management, committees difficult to find, *Heycock* (224).
 Quality, poor, *Heycock* (224).
 Schools not adequately supervised, *Heycock* (224).
 Teachers :
 not very Competent, *Heycock* (224) 66597.
 Supply inadequate, *Heycock* (224) 66597.
 Urgently needed, *Sethi* (350).
 not sufficiently Widespread, *Heycock* (224).
 Engineering College :
 Affiliated to University, *Dobbs*, 65585.
 might be Transferred from Patna to Sabour, *Dobbs* (116).
 English necessary for scientific training, *Ross* (339).
 English education generally a failure, *Dobbs* (66) 65393-4, 65467-9.
 Farms, *see under* AGRICULTURAL *above*.

FINANCE :

- Co-operative, advocated, *Atkins* (16).
 District boards should contribute, *Prasad* (160).
 from Government recommended, *Khan* (443).
 Inadequate, *Heycock* (224).
 Garjat State, experience of, *Fawcus* (318).
 Hygiene : in schools, teaching recommended, *Phillips* (335).
 Kamdars should be educated for demonstration at provincial farms, *D. P. Sinha* (200).
 Medical College, *Dobbs*, 65586.
 Methods, useless for agriculture or trade, *Arikshan Sinha* (271).

MIDDLE CLASS YOUTHS : attracting of, to agriculture :

- is the Central agricultural problem in India, *Roy, S. K.* (457).
 Colonies recommended, *Prasad* (159-60) 66189-204,
 are being Compelled by economic pressure to work on the land, *Ganga Vishnu* (37) 65307-13.
 Co-operative :
 Farming societies, with Government help, recommended, *Ghose* (374) 67664-76 67732-5.

EDUCATION—contd.

MIDDLE CLASS YOUTHS—contd.

- Limited liability farming with Government financial help recommended, *Roy, S. K.* (458) 464-5).
- Organisation recommended, *Prasad* (159).
- Court of Wards, land of, should be utilised, *Prasad* (159) (351).
- Demonstration that agriculture can be made profitable, recommended, *Ghose* (374) 67664-76, 67732-5, *Roy, S. K.* (458).
- Difficulties, *Dobbs* (53-4) 65547-52.
- Financial assistance in developing uncultivated land, *Atkins* (16) 65210-37, *Prasad* (159), *Ghose* (374) 67664-76, 67732-5.
- Government estates should be utilised, *Prasad* (159).
- Grants of land, *Atkins* (16), 65210-37.
- Income from agriculture must be increased, *Dobbs* (55) 65399.
- Labour-saving machinery, *Ghose* (374) 67664-76, 67732-5.
- Land Acquisition Act necessary, *Roy, S. K.* (458).
- Obstacle: lack of employment, *Heycock* (218).
- Planters' capital requirements, *See under CAPITAL, ATTRACTING OF, TO AGRICULTURE.*
- Preference for Government appointments should be given to applicants trained in agriculture, *Sinha, D. P.* (200-1) 66519, *Khan* (442).
- School gardens advocated, *Dobbs* (55).
- Schools, agricultural recommended, *Prasad* (159-60).
- Towns drain the villages, *Roy, S. K.* (457).
- Training in agriculture, *Atkins* (16) 65210-37.
- improving Village life, educational institutions, model farms, land, financial help and advice, *Sethi* (350-1) (356) (358) 67510-3, 67533-5, 67622-7.
- Moral teaching, importance of, *Ghose* (374) (389-94) 67740, 67778-86, 67801-2.

NATURE STUDY :

- as a Compulsory subject, recommended, *Roy, S. K.* (469).
- as at present Organised, is useless, *Narendra* (407).
- Recommended, *Sethi* (350), *Ghose* (395), *Khan* (442); not recommended, *Heycock* (218).

PATNA UNIVERSITY :

- Chemical research advocated, *Dobbs* (115).
- Correlation with Veterinary College farm advised, *Dobbs* (115).
- should be Equipped to assist territorial officers, *Dobbs* (49) (52) 65373-5.
- Progress, *Dobbs*, 65580-6.
- Rural education faculty advised, *Dobbs* (116).
- Pay of graduates, *Ganga Vishnu*, 65334-7.
- Population, excessive growth of, would be checked by education, *D. P. Sinha*, 66508-10.

PRIMARY : *See also* ELEMENTARY above.

- Classes too large, *Fawcus* (318).
- vast Extension necessary, *Ross* (339).
- Schools, *See also under AGRICULTURAL above.*
- Attendance in, *Fawcus* (317-4).
- Farms and plots at, unnecessary, *Sinha, D. P.* (199).
- Project method recommended, *Roy, S. K.* (468).
- Propaganda necessary, *Roy, N. K.* (499).
- Results of : makes agriculture a discredited profession *Sinha, D. P.* (207).
- Rural economy, universities have aroused very little interest in, *Khan* (452).

SABOUR AGRICULTURAL COLLEGE :

- was not Affiliated to University, *Dobbs*, 65393-4, 65467-9, 65573, 65670-1.
- after, Careers of students : *Foley* (225), *Heycock* (217-8) 66554-7, 66638-42, 66727.
- Attendance in second year was not full, *Dobbs* (55).
- Closed, *Dobbs* (55) 65392, 65467-9, 65503, 65573-86, 65670-2 (117).
- Closed by recommendation of Agricultural Committee, *Sinha, D. P.* (198) 66520-5.
- Closing of, a retrograde policy, *Heycock* (217-9) 66552-8, 66564, 66633-4, 66638-42, 66740; regrettable, *Khan*, 68193-5, 68211.

EDUCATION—conold.

SABOUR AGRICULTURAL COLLEGE—*contd.*

- Incentive of students : Government employment, *Foley* (225).
- Research section still working, *Sinha, D. P.*, 66523.
- Short courses at, were not Popular, *Heycock* (217).
- Students :
 - were not of Agricultural classes, *Heycock* (218).
 - insufficient number attracted to 3 years' course, *Heycock* (217) 66725-7.

Sabour Farm :

- Facilities, *Dobbs* (116).
- Public school for sons of zamindars advised, *Quinlan* (128).
- Subordinate staff, training at, advised, *Dobbs* (116).

SCHOOLS :

- Agricultural, *see above*.
- Co-operative, *see under EDUCATION under CO-OPERATION*.
- Elementary, not adequately supervised, *Heycock* (224).
- Evening, *see under ADULT above*.
- Primary, *see above*.
- should be Village community centres, *Roy, N. K.* (498-9).
- School boards, district, recommended, *Roy, S. K.* (469).

SCHOOL FARMS :

- District boards should control, *Ganga Vishnu* (37).
- should form part of Middle vernacular schools, *Ganga Vishnu* (37).
- as at present Organised, are useless, *Narendra* (407).
- Practical training necessary, *Ganga Vishnu* (37).
- in Primary schools unnecessary, *Sinha, D. P.* (199).
- Recommended, *Ganga Vishnu* (37); *Arikshan Sinha* (271); *Sethi* (350); *Ghose* (395); *Khan* (442); *not recommended*; *Heycock* (218).
- Useful if properly controlled, *Atkins* (16).
- Vocational instruction advocated, *Ganga Vishnu* (37).
- School gardens recommended, *Dobbs* (55).

SCHOOL PLOTS

- Essential, *Roy, S. K.* (469).
- in Primary schools, unnecessary, *Sinha, D. P.* (199).
- as at present Organised, are useless, *Narendra* (407).
- Recommended, *D. P. Sinha* (199); *Sethi* (350) 67509; *Khan* (442).
- Useful if properly controlled, *Atkins* (16).
- Secondary schools : agriculture should be an optional subject, *D. P. Sinha* (200).
- St. John's Ambulance Association : methods of education recommended as an example, *Sinha, D. P.* (200).

SYSTEM

- Criticised, *Narendra* (407) 67873.
- does not increase agricultural efficiency, *Ghose* (394).

TEACHERS : (*See also under AGRICULTURAL above.*)

- should be drawn from agricultural classes, *Sethi* (350).
- Elementary not, very competent, *Heycock* (224) 66597.
- Inefficient, *Fawcus* (318); *Roy, N. K.* (499).
- Negligence and dishonesty of, *Roy, S. K.* (469).
- Pay inadequate, *Roy, N. K.* (499) *Fawcus* (317).
- Supply for elementary education inadequate, *Heycock* (224) 66597.
- Training to act as local organisers recommended, *Roy, N. K.* (497) (499).
- Training schools, intimate touch with village schools recommended, *Roy, S. K.* (468).
- should play an important part in Village life, *Roy, S. K.* (468).
- Text books : *Quinlan*, 65955.
- University, all India, proposed, *Dobbs* (111).

FERTILISERS—concl'd.

Export :

- of Bones, causes great loss, *Henry* (4).
- of Bones, oilcakes and fish refuse, should be stopped, *Sethi* (355).
- of Oilseeds, makes oilcake unavailable, *Ghose* (383).
- Financial difficulty, *Henry* (4) 64948-50.
- Forest grazing causes enormous loss of manure, *Gibson* (419).

GREEN MANURING :

- Dhaincha*, recommended for paddy lands, *Sinha, M. S.* (299) 67002-3.
- Difficulty, *Dobbs*, 65580.
- Sann*, for paddy lands recommended, *Sinha, M. S.* (299) 67002-3 ; *Lal*, 67086-91.
- Sethi*, 67581-2.

GYPSUM :

- great Demand for, in Bihar, *Khan* (446).
- Successful, *Dobbs* (63) 65611-2, *Ghose* (383).
- Khunti Central Bank, increased use of, in area covered by, *Roy, S. K.* (463).
- Leaves, *Dobbs* (87) 65561 ; *Lyall*, 67928-9 ; *Roy, S. K.* (463).
- Lime deficiency, *Sethi* (359).

Muzaffarpore : increased use of manure, *Ganga Vishnu* (39).

Natural :

- Conservation, importance of, *Roy, S. K.* (462).
- Shortage owing to insufficient cattle, *Ghose* (381-3).

Nitrate of soda : experiment, *Henry* (4) 64994-6.

Nitrogen :

Deficiency, *Sethi* (354-5).

Nitrogenous fertilisers :

- Increased use, *Sethi* (355) 67600-2.
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- Health conditions, devotion of spare time to improving : village societies and propaganda recommended (450).
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- Dairying :
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 - Schools recommended (449).
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- Consolidation of holdings societies recommended (452).
- Credit societies :
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 - Loans from Government, free of interest, recommended (451).

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 - Loans for purchase of, recommended (447-8).
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- Joint farming societies recommended (452).
- Milk supply societies recommended (449).
- Minorities, compulsion of, to join in schemes for the common benefit, recommended (452).
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- Purchase societies should be increased (452).
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- Indigenous methods recommended (440-1).
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- School farms and school plots recommended (442).
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LAMBERT, H., M.A., I.E.S., Officiating Director of Public Instruction, Bihar and Orissa.

BLAIR, F. R., M.A., I.E.S., Deputy Director of Public Instruction, Bihar and Orissa (316-34) (See also FAWCUS, witness).

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LYALL, J. H., B.A., Officiating Conservator of Forests, Bihar and Orissa (416-29). (See also **GIBSON**, witness.)

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MEYRICK, N., General Secretary, Bihar Planters' Association, Ltd., Motihari, Bihar and Orissa (429-40).

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NARENDRA, BABU BIRBAR NARAYAN CHANDRA DHIR, Garhmadhupur, District Cuttack (407-15).

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NORRIS, Mrs. R. V., Director and Bio-Chemist, Lao Research Institute, Namkum (476-82).

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PHILLIPS, Lt.-Col. J. A. S., I.M.S., Officiating Director of Public Health, Bihar and Orissa (335-7).

ADMINISTRATION: Union boards recommended (336-7).

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PRASAD, RAI BAHADUR DURGA, M.A., Registrar of Co-operative Societies, Bihar and Orissa (159-97).
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Infant mortality reduced appreciably, 67423.

Legislative Council's favourable attitude to public health activities, 67444-5.

Malaria :

One-third infected (337).

Prevention :

Agricultural improvement recommended (338) 67404-7.

Ordinary methods inapplicable (338).

Vitality, etc., seriously affected by (337).

Medical Research :

Medical College, 67441-3.

Public Health Institute, 67446-50.

Medical School graduates do not practise in rural areas, 67466-9.

Medical staff, 67388-91.

Milk :

Control suggested, 67500-5.

Importance of, 67454.

Model villages, 67403.

Public Health Act :

England, example of, 67459-61, 67475-83.

Necessary, 67455-8.

Wells :

Apathy of the people, 67470-4.

Financial difficulty, 67380-7.

many Unfit, 67424-31.

ROTATION, *see under* CULTIVATION.

ROY, N. K., Assistant Registrar of Co-operative Societies, Ranchi Circle (482-604).

ADMINISTRATION :

Transport :

Communications in Chota Nagpur very good, 68374-6.

ROY, N. K.—contd.

ADMINISTRATION—contd.

Transport—contd.

Railways :

Coal, special facilities for, to prevent use of cowdung as fuel, recommended (487).

Fodder, flat rate for any distance within 500 miles suggested (488) (490).

Livestock, reduction of freights recommended (487).

Roads : Fodder, better transport facilities necessary (488) (490).

AGRICULTURAL DEPARTMENT : Co-operative movement does not receive much assistance from, 68368.

AGRICULTURAL INDUSTRIES :

Basket making, a caste occupation (491).

Co-operative organisation recommended (493) (495).

Health conditions, devotion of spare time to improving :

Boyscouts, organisation of, recommended (491).

Lectures recommended (491).

Industrial concerns, moving of, into rural areas, not desirable (491).

Jute spinning and weaving recommended (490-1).

Machinery :

Hire purchase system recommended (491).

Long-term loans for purchase of, at low interest recommended (491).

Obstacle : ignorance of methods (491).

Oil-pressing industry should be encouraged by loans under State Aid to Industries Act (488).

Poultry rearing, religious prejudice of Hindus (491).

Preparation of agricultural produce for consumption, industries connected with, Government encouragement recommended (491).

Schools to teach carpentry, furniture manufacture, rope making, etc., recommended (491).

Sericulture, a caste occupation (491).

Weaving, by hand, of cotton :

Finance : co-operative suggested (490).

Recommended (490).

Spinning mills for supplying yarn should be started by Government (490).

Teachers necessary (490).

ANIMAL HUSBANDRY :

Cattle breeding :

Co-operative, recommended (498).

Government farms should be increased (487).

Propaganda :

Co-operative, recommended (487-8).

Finance by Government and district boards (488).

Lectures, magic lantern, recommended (487-8).

Police should assist (488).

Shows recommended (488).

Railway freights on breeding stock should be reduced (487).

Stock should be distributed at reduced prices (487).

Dairying : model farms, mixed, Government aided, co-operative, recommended (488-90).

Fodder :

Crops, propaganda recommended (487-90).

Shortage from January to June (490).

Supply must be increased (488) (490).

Transport improvement necessary (488).

Oil-pressing industry should be encouraged by loans under State Aid to Industries Act (488).

Pastures :

Common :

Fencing recommended (489-90).

Overstocked (489).

Ploughing recommended (489-90).

Enclosed, absence of (489).

ROY, N. K.—contd.

ANIMAL HUSBANDRY—contd.

Root crops :

- Encouragement by Government recommended (488).
- Food tests recommended (488).
- Silage recommended (489).

CO-OPERATION :

- Adult education, movement must be a system of (492).
- Agricultural Department, not much assistance from, 68368, 68385-99.
- Agricultural improvement work recommended (483-4) (487-8) (493) 68382-91.
- Arbitration recommended (493).
- Boy scouts' organisation recommended (491) (497) (499).
- Cattle breeding societies, encouragement by Government and district boards recommended (498).
- Central Banks :
 - District Boards :
 - Connection with, necessary (496).
 - should Deposit funds with (497).
 - Good work of, 68366.
 - Supervision of primary societies necessary, 68366-7.
- Credit :
 - Imperial Bank should lend to Provincial Bank at 3 per cent (498).
 - Interest : Reduction necessary (485) (498).
 - Long-term : Government financial assistance to Provincial Bank recommended (485) (498).
 - Multiplication of societies, as at present organised, not recommended (498).
 - Restriction of activities of societies to, deprecated (484-5).
- Dairy, mixed, modal farms recommended (488-9).
- District Boards :
 - Assistance received from, 68369.
 - Connection with Central Banks necessary (496).
 - Contracts should be placed with co-operative societies (498).
 - Deposit of funds with Central Banks suggested (497).
 - Favoured-village policy recommended (498).
- Education Department, no relationship with, 68369.
- Education of members recommended (493).
- Federation : subsidies from Government and district boards recommended (494-5) 68368, 68377-81, 68388-90, 68396-403.
- Health work recommended (493) (495) 68370-3.
- Honorary organisers : not satisfactory (495-6).
- Irrigation, recommended (485).
- Minorities, compulsion of, to join schemes for common improvement, recommended (498).
- Municipalities should encourage co-operative societies (498).
- Objects : should be mainly moral and educational (492-3).
- Organisation too narrow (484-5) (491-9) 68364.
- Organisers, paid, necessary (493-4) (496) 68357-65.
- Primary societies :
 - Condition not satisfactory, 68354-6, 68364-5.
 - Supervision by Central Banks necessary, 68366-7, 68400-3.
- Public Health Department, no organic connection with, 68370-3, 68393.
- Schools, should establish (493) (495) 68369.
- School teachers should be trained to assist the movement (497) (499).
- Subsidiary industries recommended (493) (495).
- Supervision inadequate, 68365-7.
- Thrift should be taught (493).
- Training : Institutions for training co-operative workers should be maintained by Government (493-4) 68357-63, 68368, 68371, 68377-81, 68388-90, 68396-403.
- Welfare work in villages recommended (493).
- Whole-village societies recommended (484-5) (491-9) 48357-8, 68382-4.

CROPS AND CROP PROTECTION :

- Fodder crops, as part of a dairy and cattle breeding scheme, recommended (487-90).
- New crops : marketing arrangements necessary (487).

ROY, N. K.—contd.

CROPS AND CROP PROTECTION—contd.

Root crops :

Encouragement by Government recommended (488).

Food tests recommended (488).

Seed distribution :

Co-operative godowns stocked by Government recommended (487).

Organisation necessary (487).

Wild animals, damage by : gun licenses should be more freely granted (487).

DEMONSTRATION AND PROPAGANDA :

Comparative demonstrations of improved and old methods recommended (483).

Co-operative :

Recommended (483-4) (493) 68382-99.

Subsidies from Government recommended (483-4).

Training of workers necessary (483-4).

on Cultivators' own fields, recommended (483-4).

Decorations (honours) for landowners taking an interest in animal husbandry, recommended (490).

Failure of demonstration in Kutey village (484).

Meetings of co-operative societies should be utilised (483).

Successful demonstration by Peloul Co-operative Society (484).

EDUCATION :

Attendance of boys in fourth class poor owing to inefficiency of teachers (499).

Boy Scouts' organisation recommended (491) (497) (499).

Compulsory, not recommended (499).

Co-operative assistance recommended (493) (495) 68369.

Propaganda necessary (499).

Schools should be village community centres (498-9).

Teachers :

Inefficient (499).

Pay inadequate (499).

Training to act as local organisers recommended (497) (499).

FERTILISERS :

Adulteration :

Co-operative distribution recommended (486).

Sealed bags recommended (486).

Artificial :

Rarely used (486).

Testing recommended (486).

Co-operative distribution :

in Ranchi Circle, 4 Central Banks agents for sale of sulphate of ammonia (486).

Recommended (486).

Subsidies, temporary, recommended (486).

Cowdung, use of, as fuel : tree plantation and transport facilities for coal recommended (486-7).

Demonstration recommended (486).

FINANCE :

Taccavi : not suitable (485).

FORESTS :

Deforestation in Chota Nagpur (491).

Rights, definition of, necessary (491).

IRRIGATION :

Bunds in Chota Nagpur recommended (485-6).

Co-operative societies for minor schemes recommended (485-6).

Extension, vast scope for (485).

ROY, N. K.—contd.**IRRIGATION—contd.**

- Obstacles : finance and lack of definite policy (486).
- Reservoirs recommended (485).
- Schemes suggested in Chota Nagpur (485).
- Wells :
 - Scope for, unlimited (486).
 - Tube, research necessary (486).

RESEARCH :

- Indigenous method, investigation of, recommended (482).
- Nutritional, on cattle foods, recommended (483).

STATISTICS :

- Census of livestock and implements :
 - Methods defective (499).
 - Time of taking should be the same as that of population census (499).

WELFARE OF RURAL POPULATION :

- Health posters useless, 68372-3.
- Surveys, economic, recommended (499).

ROY, S. K., M.A., Principal, Gossner High School, Ranchi (456-76).**ADMINISTRATION :**

- Meteorological Department : seasonal instead of annual basis suggested (459).
- Transport : railway, freights should be reduced (459) (463).
- Roads : Public Works Department should control more inter-district roads (459).
- Steamers : freights should be reduced (459).

AGRICULTURAL DEPARTMENT :

- Irrigation, special section recommended (462).
- Staff : lower grades should be considerably increased (459).

AGRICULTURAL INDEBTEDNESS :

- Causes of borrowing, unproductive expenses mainly (461).
- Land mortgage banks recommended (461) (465).
- Mortgages, non-terminable, should be prohibited (461).
- Repayment prevented by : unproductive expenditure and small income (461).
- Restrictions on credit of cultivators by limiting right of mortgage and sale deprecated (461) 68266-8, 68297-306.
- Sources of credit : moneylenders and co-operative societies (461).
- Usurious Loans Act recommended (461).

ANIMAL HUSBANDRY :

- Co-operative assistance recommended (463).
- Dairying : Model farms with poultry, recommended (463).

CAPITAL, ATTRACTING OF, TO AGRICULTURE :

- Improvements hindered by law of resumption by superior landlord in the event of failure of heirs (469).

CO-OPERATION :

- Audit : Government should control and pay for (466) 68265.
- Bank, All-India Reserve or State, co-operative movement should be linked with (459-60) 68236-42, 68293-6.
- Boy Scout movement (466).
- Central Banks, criticism of finance policy, 68238-41.
- Chota Nagpur, intensive co-operative development advocated (470).
- Consolidation of holdings societies recommended (462).

ROY, S. K.—contd.

Co-OPERATION—contd.

- Credit Societies : short-term recommended (460-1).
- District boards, connection with movement (466).
- Education, as to credit, necessary (460) (465) 68240.
- Fertilisers, distribution of, recommended (462).
- Government policy suggested (465-6) 68249-50, 68286-8.
- Improvements :
 - Large, finance by land mortgage banks (465).
 - Minor, by individuals with co-operative assistance (465).
- Interest : Reduction to 9½ per cent to cultivators by means of loans from all-India bank at 4 per cent to provincial co-operative banks, suggested (460).
- Joint farming, with limited liability and Government financial help, recommended (458) (464-5).
- Marketing organisation recommended (464) 68249-50, 68255-60.
- Minorities, compulsion of, to come into schemes for joint improvement, recommended (466).
- Non-officials, importance of (466) 68281-8.
- Objects achieved only as loans institutions (466).
- Propaganda, idealistic, necessary, 68281-8.
- School teachers, assistance of (466) (468).
- Seed distribution recommended (463).
- Training of officials, etc., by Government recommended (466).

CHOTA NAGPUR : Intensive development advocated (470).

CROPS AND CROP PROTECTION : Seed distribution : co-operative recommended (463).

DEMONSTRATION AND PROPAGANDA :

- Adult education, should be conterminous with (458).
- Co-operative, recommended (458-9).
- Field comparative demonstrations recommended (458).
- Sugarcane successfully demonstrated (459).

EDUCATION :

- Agricultural :
 - Agricultural classes, small proportion drawn from (457).
 - no College (457) ; revival of, recommended, 68234-5.
 - Demand greater than supply (457).
 - Extension advocated (457).
 - Importance of (467-8).
 - Incentive, Government employment (457).
 - Institutions insufficient (457).
 - in Middle schools recommended (468).
 - Practical recommended (468).
 - no Schools (457).
 - Teachers : Supply insufficient (457).
 - University, faculty of agriculture recommended (457) (468) 68234-5.
 - Vocational teaching, only provision for, is the taking of apprentices at Government demonstration farms (457).
- Attendance in upper class of schools poor : reasons (469) 68269-75.
- Compulsory :
 - Recommended (469) 68251-4.
 - of Zamindars recommended, 68251-4.
- Co-operative assistance recommended (469).
- Middle class youths, attracting of, to agriculture :
 - is the Central agricultural problem in India (457).
 - Co-operative limited liability farming with Government financial help recommended (458) (464-5).
 - Demonstration that agriculture can be profitable, recommended (458).
 - Desire for agricultural life (457).
 - Land Acquisition Act necessary (458).
 - Towns drain the villages (457).
- Nature study as a compulsory subject, recommended (469).

ROY, S. K.—contd.

EDUCATION—contd.

Project method recommended (468).
 School boards, district, recommended (469).
 School plots essential (469).

Teachers :

Negligence and dishonesty of (469).
 Training schools, intimate touch with village schools recommended (468).
 Village life, should play an important part in (468).

FERTILISERS :

Adulteration : co-operative distribution recommended (462).
 Cowdung, use of, as fuel : tree plantation, use of leaves as fuel, and coal supply, recommended (463).
 Demonstration as to resulting profits necessary (462-3).
 Increased use in area covered by Khunti Central Bank (463).
 Leaves (463).
 Natural : conservation, importance of (462).
 Research inadequate (463).

FINANCE :

Banking system only finances traders and capitalists (460).
 Currency notes recommended (460).
 Importance of (459-60).
 Land mortgage banks recommended (461) (465).

FORESTS :

Deforestation in Chota Nagpur (463).
 Rights, definition of, necessary (463).

HOLDINGS : consolidation : co-operative societies recommended (462).

IRRIGATION :

Agricultural Department, special irrigation section recommended (462).
 Bunds in Chota Nagpur :
 Advocated (462) 68243-8, 68289-90.
 Successful, examples of (462) 68243-8.

LAND TENURE :

Landlords : absentee (457).
 Resumption by superior landlords in the event of failure of heirs, hinders improvement of land (469).

MARKETING :

Federation of village co-operative societies :
 Finance (464) 68255-60.
 State control discussed (464) 68249-50.
 Suggested (464).
 Prices, stabilisation of (463-4).

RESEARCH :

Board of scientific advice and research recommended (459).
 Chemical research recommended (456-7) 68291-2.
 Finance : Imperial grants to Provinces for all-India research recommended (459).
 Indigenous theory, research urgently required (466).
 Inter-provincial co-ordination advocated (459).

STATISTICS : Central Co-operative Banks' staff should carry out with Government subsidies (469).

VETERINARY : Department : lower grades should be considerably increased (459).

ROY, S. K.—concl'd.

WELFARE OF RURAL POPULATION: Surveys, economic, with assistance of Central Co-operative Banks, recommended (469).

SABOUR AGRICULTURAL COLLEGE, *see under* **EDUCATION.**

SABOUR FARM, *see under* **EDUCATION.**

SALE, *see* **MARKETING.**

SANITARY CONDITIONS, *see under* **WELFARE OF RURAL POPULATION.**

SARUP, Rai Bahadur Bishun, Secretary to the Government of Bihar and Orissa, Irrigation Department (309-10).
(*See also* **BERY,** witness).

IRRIGATION :

Distribution :
in Bihar satisfactory (310).
in Orissa, great wastage (310).
Persian wheels suggested (310).
Schemes, scope for small (309-10).
Tanks in Bihar (310).
Wastage (310).
Wells (310).

SEED, *see under* **CROPS AND CROP PROTECTION.**

SERICULTURE, *see under* **AGRICULTURAL INDUSTRIES.**

SETHI, D. R., M.A., B.Sc. (Edin.), I.A.S., Deputy Director of Agriculture, Orissa Range (349-73).
Duties, 67569-80.
Experience, 67547-8, 67620-1.

ADMINISTRATION :

Posts and Telegraphs : marketing information should be exhibited to cultivators at offices (352-3) 67517-8.

Transport : Communications, lack of, hampers marketing (352).

AGRICULTURAL DEPARTMENT :

Co-operative societies, close touch with, in Orissa, 67605.
Deputy Director, duties of, 67569-80.
Economic Botanist should be replaced by plant breeding specialist (356).
Expansion urgently necessary (349).
Staff :
Insufficient (349) (355-6) 67603-4, 67617-21.
Training (350) 67538-44, 67574-8, 67623-9.
Visits to Pusa and other Provinces recommended (352) 67514-6.

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : Thriftlessness, illiteracy, crop failures, uneconomic size of holdings, decay of cottage industries, loss of cattle, laziness (353).
Measures for lightening agriculture's burden of debt : Education (353).
Moneylenders :
Exorbitant interest and inhuman conditions (353) 67524.
Sale, compulsory, of produce, to moneylenders at low prices (360).
Mortgages : facilities for redemption, of doubtful benefit (353).
Repayment prevented by : Thriftlessness, unproductive expenditure, exorbitant interest (353).
Source of credit : mainly moneylenders (353).
Usurious Loans Act, of doubtful benefit (353).

SETHI, D. R.—contd.

AGRICULTURAL INDUSTRIES :

- Co-operation recommended (359).
- Cottage industries to decrease fragmentation of holdings, recommended (353).
- Demonstration recommended (359).
- Fruit growing recommended (359).
- Gur-making recommended (360).
- Implements, made by village carpenter, 67637-8.
- Importance of (359).
- Industries Department should assist (359).
- Leisure period of cultivators (359).
- Obstacles : laziness, ignorance, prejudice (359).
- Oil-pressing recommended (360).
- Pisciculture recommended (359) 67507-8.
- Population, pressure of, subsidiary occupations necessary to relieve (353) (359) 67633-8.
- Poultry rearing recommended (358-9).
- Preparation of agricultural produce for consumption, industries connected with recommended (360).
- Rice hulling recommended (360) 67634-5.
- Sericulture recommended (359-60).
- Spinning recommended (359-60) 67633-8.
- Weaving recommended (359).

AGRICULTURAL LABOUR :

- Migration in the slack season to Calcutta, Jamshedpur, etc. (359).
- Population, agricultural, slowly but steadily increasing (359).

ANIMAL HUSBANDRY :

- Bulls, stud :
 - Brahmini, of no use (358) 67648-50.
 - at Village farms recommended (358).
- Cattle :
 - Condition in Orissa appalling (357).
 - Uneconomic : reduction recommended (359) 67545-6, 67651.
- Cattle breeding :
 - Dual purpose recommended (358) 67606.
 - Herds kept (358).
- Dairying :
 - Co-operative, recommended (358).
 - Middle class youths should be encouraged to take up (358).
 - Model farms recommended (358) 67622-6.
- Fodder :
 - Crops recommended (356) (358-9).
 - Rice dust as cattle food (358).
 - Rice straw :
 - Reservation for cattle recommended (359).
 - used for Thatching purposes (358-9).
 - Shortage from January to June (359).
- Fodder crops recommended (356) (358-9) 67607-8.
- Goats recommended (358).
- Landlords :
 - Encouragement to take interest, necessary (359).
 - have done Nothing to improve (359) 67526-8, 67654-6.
- Pastures :
 - Co-operative societies recommended (358).
 - Fees should be charged (358).
 - Shortage of (358).
- Pinjrapoles, 67566-8.
- Propaganda recommended (357-8) 67651-6.
- Sheep (358).
- Silage (358-9).
- Stall-feeding (358-60) 67609-11.

SETHI, D. R.—contd.

CO-OPERATION :

- Agricultural Department, close touch with, in Orissa, 67605.
- Central Banks : merely cheap moneylenders (360-1) 67523-5, 67529 32.
- Consolidation of holdings societies recommended (353).
- Credit societies :
- Loans :
 - insufficiently Controlled (360) 67611-6.
 - for Manure should not be in cash but in kind (355) 67519-25.
- Main co-operative activity (360).
- Objects not achieved in Orissa (361).
- Dairies recommended (358).
- Demonstration of improved agricultural methods recommended (351) 67563.
- Fencing recommended (356) 67643.
- Grain golas (360).
- Implements, societies for purchase, sale and hire, recommended (357).
- Irrigation societies recommended (354).
- Livestock societies recommended (358).
- Members, education of, neglected, 67611-6.
- Minorities, compulsion of, to come into schemes for joint improvement, recommended (361).
- Non-credit Societies :
 - Recommended (360-1).
 - not generally Successful in the past (360).
- Non-officials :
 - Importance of (360).
 - Landlords should help (360).
 - Objects not achieved (361) 67611-6.
 - Pasture societies recommended (358).
 - Sale societies recommended (358) (360).
 - Staff of Department should be increased (360).
 - Subsidiary industries, societies recommended (359).

CROPS AND CROP PROTECTION :

- Cattle, straying :
 - Damage to crops serious (356) 67643.
 - Fencing, co-operative, recommended (356) 67643.
- Fodder crops recommended (356) (358-9) 67607-8.
- Groundnut, large scope for extension (356-7).
- Maize under irrigation on early paddy lands recommended (357).
- Rice :
 - Improvement of (67581-2).
 - the Main crop in Orissa (357).
- Seed distribution :
 - Free, for demonstration, recommended (356).
 - Methods, 67583-6.
 - Middle class youths should be encouraged to take to farming (356).
 - Village farms recommended (356).
 - Work done, 67564-5.
- Successful efforts in improving crops (357).
- Sugarcane :
 - Coimbatore, 213, successful, 67563-62, 67581.
 - large Scope for extension (356-7).
- Wild animals, damage by :
 - Imperial research recommended (356-7).
 - near Jungles (356).

CULTIVATION :

- Rice :
 - Broadcast (357).
 - Hand weeding (357).
 - Improvement, 67581-2.
 - the Main crop in Orissa (357).
 - Second crop not usually taken (357).

SETHI, D. R.—contd.

CULTIVATION—contd.

Rotation :

- Demonstration recommended (357).
- None in Orissa (357).

DEMONSTRATION AND PROPAGANDA :

- Co-operative assistance recommended (351) 67563.
- Court of Wards estates should be used for demonstration (351).
- on Cultivators own fields recommended (351-2) 67563.
- Farms :
- Control by Agricultural Department assisted by private agencies and co-operative societies (351).
- Cultivator demonstrators should be in charge (351).
- should Distribute seeds, manures, implements, etc. (351).
- in each important Village, suggested (351) 67630-2.
- Fodder crops, demonstration of, recommended (356).
- Landowners should assist (351).
- Staff insufficient, 67603-4.
- Successful demonstrations (352) 67581-2.

EDUCATION :

- Adult : practical agricultural demonstration recommended (351).
- Agricultural :
- After-careers, of students :
- Farming, none (350).
- Government service usually (350).
- College, provincial : revival of :
- Affiliation to University necessary, 67543-4.
- Required (350) 67536-44, 67549-52.
- Veterinary college, should be linked with, 67549.
- Incentive, hope of obtaining Government employment (350).
- in Middle rural vernacular schools, recommended (350).
- Pupils, rarely from cultivating classes (350).
- Elementary : urgently needed (350).
- Middle class youths, attracting of, to agriculture :
- improving Village life, educational institutions, model farms, land, financial help and advice (350.1) (358) (358) 67510-3, 67533-5, 67622-7.
- Nature study, school farms and school plots, recommended (350) 67509.
- Teachers : agricultural classes, should be drawn from (350).

FORESTS : Village plantations recommended (355).

FERTILISERS :

- Adulteration :
- Analysis, facilities for, necessary (355).
- Guarantee recommended (355).
- Legal penalties recommended (355).
- Artificial : price difficulty (355).
- Cowdung, use of, as fuel :
- causes Shortage for manure (355).
- Village tree plantations recommended (355).
- Demonstration recommended (355) (360).
- Distribution, co-operative, free, recommended (355).
- Export of bones, oilcakes and fish refuse, should be stopped (355).
- Green manuring, 67581-2.
- Lime deficiency (359).
- Nitrogen :
- Deficiency (354-5).
- Fertilisers :
- Increased use (355) 67600-2.
- Price, decrease in, (355).
- Phosphate deficiency (354-5) (359) 67639-42.
- Research : insufficient (355).
- Sulphate of ammonia, used for sugarcane and potatoes (352) 67553-60, 67600-2.
- Taccavi for purchase of manures recommended (360).

SETHI, D. R.—contd.

FINANCE :

- Importance of (353).
- Taccavi :
 - not of material Benefit (353).
 - for Drainage of land recommended (354).
 - for Manures recommended (360).
- Unpopular (353).

HOLDINGS :

- Consolidation prevented by ignorance (354).
- Co-operative consolidation of holdings societies recommended (353).
- Cottage industries to relieve pressure on land recommended (353).
- Fragmentation :
 - Education recommended (353-4).
 - Legislation not recommended (354).

IMPLEMENTS :

- Co-operative societies recommended (357).
- Demonstration on village farms recommended (357).
- Engineering Section of Agricultural Department, should take up improvement (357) 67644.
- Instalment system recommended (357).
- Mass production by private enterprise recommended, 67644-7.
- Ploughs :
 - Improvement, importance of (357).
 - Inefficient country plough used (357).
 - Punjab iron plough used, 67645.
 - Price difficulty (357) 67644-7.

IRRIGATION :

- Co-operative irrigation societies recommended (354).
- Extension, importance of (354).
- Lift : iron *rahat* wheel, etc., recommended (354) (357).
- Rainfall, average 60 ins. but not well distributed (354).
- Tanks and bunds in Orissa silted up and brought under cultivation (354).

LAND TENURE :

- Landlords :
 - Absentee, 67528.
 - take no interest in agriculture (359) 65526-7, 67654-6.

MARKETING :

- Communications, lack of, hampers marketing (352).
- Co-operative sale societies recommended (358) (360).
- Facilities : not satisfactory (360).
- Information as to prices should be exhibited at post offices (352-3) 67517-8.
- Moneylenders, sale of produce to, at low prices (360).

RESEARCH :

- Deputy Director's experiments, 67569-80.
- Finance : funds insufficient (349).
- Imperial Department : should deal with problems of all-India importance and quality crops (349) (352) 67587-91.
- Indigenous theory should be studied (349).
- Lines of research suggested (349-50).
- Provincial :
 - Investigation of problems recommended (349).
 - Staff, scientific, should be strengthened (352) 67587-91.
- Staff :
 - Insufficient (349) 67617-21.
- Short-term contracts recommended (352) 67592-4.

SETHI, D. R.—concl'd.

SOILS :

- Drainage :
 - Agricultural Engineer's staff should be increased (354).
 - Demonstration (354).
 - Loans, taccavi, and under Land Improvement Act, recommended (354).
 - Survey, necessary (354) 67595-9.

VETERINARY :

- Inoculation, serum-simultaneous :
 - Recommended, 67545-6.
 - of Uneconomic cattle, not recommended, 67545-6.

WELFARE OF RURAL POPULATION :

- Malaria : pisciculture recommended, 67507-8.
- Population, increasing pressure on the land (359).

SHEEP, see under ANIMAL HUSBANDRY.

SILAGE, see under ANIMAL HUSBANDRY.

SILT, see under SOILS.

SILTING, see under IRRIGATION.

SINHA, ARIKSHAN, Pleader, General Secretary, Bihar Provincial Kisan Sabha, Muzaffarpur (256-77).

ADMINISTRATION :

- Court fees, etc., increase of, deprecated (272).
- Government policy criticised (256-7) (272-3) 66822.
- Posts and Telegraphs : increased cost deprecated (272).
- Taxation of poor people excessive (272).
- Transport :
 - Railways :
 - Distance from station, difficulty of (270).
 - Perishable produce, prompt dispatch necessary (260-1).
 - not Satisfactory (260-1).

AGRICULTURAL DEPARTMENT :

- Co-operative Department, co-operation with, suggested (271).
- Extension recommended (260).
- Services : do not benefit cultivators (260).

AGRICULTURAL INDEBTEDNESS :

- Causes of borrowing : need of capital, maintenance of family, and ceremonies (261).
- Mortgage right should be conferred on tenants (261).
- Repayment prevented by : crop failure and reduced productive capacity of soil (261).
- Restriction or control of credit of cultivators not recommended (261).
- Sources of credit : agricultural produce, land and cattle (261).
- Transfer right should be conferred on tenants (261).
- Usurious Loans Act :
 - strict Application recommended (261).
 - Interest reduction by co-operative societies should precede application of Act (261).

AGRICULTURAL INDUSTRIES :

- Cardboard, utilisation of wheat straw for, will cause scarcity of fodder (268).
- Employment can only be increased by industrialism (268).
- Fruit growing is carried on (268).
- Health conditions, devotion of spare time to improving of : village societies recommended (268).

SINHA, ARIKSHAN—concl'd.

AGRICULTURAL INDUSTRIES—*cont'd.*

- Industrial concerns, moving of, to rural areas :
 - Shortage of agricultural labour would result (268).
 - Leisure period : cultivators work 200 days in the year (268).
 - Obstacles : conservatism of cultivators (268).
 - Paper, utilisation of rice straw for, will cause scarcity of fodder (268).
 - Study, intensive, not necessary (268).

AGRICULTURAL LABOUR :

- Attracting of, higher wages discussed (268-9).
- Forced labour (268-9).
- Manual labour, prejudice against (268-9) 66863-6.
- Shortage, existence of (268-9).
- Wages (268-9).

ANIMAL HUSBANDRY :

- Bulls :
 - Brahmini : (267) 66817-9.
 - District boards should maintain (267).
 - Free use recommended (267).
- Cattle : heavy decrease in number (264-5).
- Fodder :
 - Green :
 - Absence of from March to June (267).
 - Supply, July to September (267).
 - Makai (267).
 - Shortage of (265) (268).
 - Wheat and barley straw best (267).
- Grazing grounds : shortage of (264-5).
- Pastures :
 - Common :
 - Extension recommended (267) 66843-4.
 - Overstocked (264-5) (267).
 - Legislation necessary (268).

CAPITAL, ATTRACTING OF, TO AGRICULTURE :

- Capitalist land monopoly, danger of (262) (271-2) 66840.
- Facilities for capitalist acquisition of land necessary (271).
- Improvements, factors discouraging (272).

CO-OPERATION :

- Agricultural Department, co-operation with, suggested (271).
- Cattle breeding societies not feasible (271).
- Consolidation of holdings societies recommended (271).
- Credit societies : working well (270).
- Demonstration of improved agricultural methods, no provision for (270).
- Drainage recommended (271).
- Fertilisers, distribution of, recommended (265) (270-1).
- Finance, large advances from Government recommended (270).
- Implements, hiring, recommended (266) (271).
- Improvements, societies for effecting, recommended (270-1).
- Interest :
 - Excessive (261) (270).
 - Reduction to 12 per cent or 9 per cent per annum recommended (261) (270).
- Joint farming societies not feasible (271).
- Minorities, compulsion of, to come into schemes for joint improvement, strongly recommended (271).
- Objects : only partly achieved (271).
- Seed distribution recommended (266) (270).
- Tirhut Agricultural Association, a failure (258) (271).

SINHA, ARIKSHAN—contd.

CROPS AND CROP PROTECTION :

- Expert advice necessary (266).
- Fodder :
 - Crops recommended (269-70).
 - Janera grown (265-6).
- Fuel : *rahar*, cotton and castor recommended (269-70).
- Output has decreased (258-9) 66820-1, 66823-4.
- Profitable crops (266).
- Seed distribution :
 - Co-operative, recommended (266).
 - on Credit, suggested (258).
 - Necessary (258).
- Sugarcane : capital required for (266) 66804-5.
- Varieties cultivated (265-6).
- Wheat, Pusa, a failure (258) (260) (266) 66832-3.
- Wild animals, damage by :
 - Afforestation near villages will increase (270).
 - Importance of (266).

DEMONSTRATION AND PROPAGANDA :

- Agricultural Association at Muzaffarpur, failed (256) (260) 66825-6.
- Agricultural associations, sub-divisional, recommended (258).
- Demonstrators, experts, in each sub-division recommended (258).
- Fertilisers, demonstration necessary (260).
- Field demonstration recommended (259-60).
- Lectures recommended (260).
- Local demonstration necessary (258).
- Non-co-operation movement, effect of (260).

EDUCATION :

- Agricultural :
 - Institutions, lack of (259).
 - in Primary and middle schools recommended (271).
 - Schools required in every sub-division (259).
 - Teachers should be drawn from agricultural classes (259).
- Compulsory primary education advocated (271).
- Fourth class, small proportion of boys in, due to want of compulsion (271).
- Methods, useless for agriculture or trade (271).
- Sabour Agricultural College : Agriculturists had no faith in (259).
- School farms recommended (271).

FERTILISERS :

- Artificial : not used in Muzaffarpur area (265).
- Ash (wood) :
 - used as Fertiliser (265).
 - Shortage of (265).
- Cattle, decrease of, has reduced supply of dung (264-5).
- Co-operative supply recommended (265).
- Cowdung :
 - Scarcity of (264-5).
 - Use of, as fuel, due to scarcity of alternative fuels (265).
- Distribution on credit recommended (265).
- Expert advice necessary (265).
- Soils : some requiring manures and others not (263).

FINANCE :

- Taccavi :
 - Co-operative distribution recommended (261).
 - Extension recommended (261).

SINHA, ARIKSHAN—contd.

FORESTS :

- Afforestation :
 - Legislation necessary to encourage (265).
 - in Villages, no opening for schemes (270).
- Bamboos : Planting recommended (265).
- Firewood, shortage caused by land tenure system (265) (269).
- Grazing :
 - Deterioration of forests not being caused by (270).
 - Facilities inadequate (269).
 - Landlords, obstruction by (269).
- Shisham trees : Planting recommended (265).

HOLDINGS :

- Co-operative consolidation societies recommended (271).
- Fragmentation :
 - Bad results of (261-2) (271).
 - Legislation necessary (262).
 - Legislation to deal with widows, minors, etc., recommended (262).

IMPLEMENTS :

- Co-operative hiring out of ploughing machinery recommended (266) (271).
- Ploughs :
 - Country types generally used (266).
 - Meston, not found satisfactory (266).

IRRIGATION :

- Bunds (264) (270).
- Drainage, importance of (263) (266).
- Flood, protective schemes recommended (262) (270).
- Landlords, obstruction by (262-3).
- Legislation recommended (262-3).
- Saligrami bund from Bettiah to Hajipur, should be cut (264) 66834-9.

KISAN SABHA, 66846-54, 66859-62.

LAND TENURE :

- Capitalist land monopoly, danger of (262) (271-2) 66840-2.
- Firewood scarcity caused by law as to ownership of trees (265).
- Price of land has increased, 66823.
- Rent is increasing, 66823.

MARKETING :

- Fruits : railways, difficulty of distance from (270).
- Information being placed at disposal of cultivators, etc., recommended (270).
- Village markets :
 - as to Food crops and vegetables satisfactory (270).
 - as to Money crops, difficulties (270).

RESEARCH :

- Fertilisers, experiments necessary (260).
- Pusa Research Institute : a waste of public money (257-8) (264) (267) 66803-16, 66855-8.
- Tenant class (kisans) have not benefited by (257).
- Tirhut Agricultural Museum at Muzaffarpur (258) (271).

SOILS :

- Alkali lands :
 - Expert advice necessary (264).
 - Flooding found successful (264).

SINHA, ARIKSHAN—contd.**SOILS—contd.**

- Classification (263).
- Erosion : bunds recommended (270).
- Reclamation :
 - Expert advice necessary (264).
 - Grants-in-aid recommended (264).
 - Loans without interest suggested (264).
- Silt :
 - Bagmati River water beneficial (264).
 - sometimes Beneficial but sometimes injurious (264).
 - Gandak River water North of Muzaffarpur injurious (264).

STATISTICS : extension recommended (272).

TARIFFS AND SEA FREIGHTS : reduction of custom duties and sea freights on agricultural produce recommended (270).

VETERINARY :

- Contagious diseases :
 - no proper Arrangements for dealing with (267).
 - Legislation recommended (267).
- Department of no benefit to cultivators (260) 66813-6.
- Dispensaries :
 - Expansion inadequate (266).
 - Inadequate, 66814-6.
 - Provincial control recommended (266).
- Research :
 - Necessary (267).
 - Provincial institution and officers advocated (267).
 - Superior Veterinary Officer with the Government of India unnecessary (267).

WELFARE OF RURAL POPULATION :

- Expenditure, increase advocated (272).
- Policy of Government criticised (256-7) (272-3) 66822.
- Surveys, economic : Recommended (272).

SINHA, DEVAKI PRASAD, M.A., M.L.C., Patna (197-216).**ADMINISTRATION :**

- Boards of Agriculture :
 - Central :
 - for Co-ordination (198-9).
 - Finance : tax on agricultural exports recommended (199) 66527-30.
 - Higher appointments should be controlled by (202) 66491.
 - Provincial : reorganisation recommended (199).
 - Provincial Development Board recommended (208) 66486-8.
 - Pusa, post-graduate study at, recommended (200).
- Transport :
 - Bridges, lack of (202).
 - Cowdung, use of as fuel : coal should be substituted by means of improved transport (204).
 - Employment, rural, might be increased by improved transport facilities (206).
 - Roads, lack of :
 - Agricultural development hampered by (202).
 - Marketing hampered by (202).
 - Subsidiary industries : transport difficulty (206).

AGRICULTURAL DEPARTMENT :

- Expenditure, inelasticity of rules (198) (202) 66486-8.
- Province, limitation of appointments to, deprecated (202) 66491-3.
- Red tape : (198) (202) 66486-8.
- Services : not sufficiently useful (202).

SINHA, DEVAKI PRASAD—contd.

AGRICULTURAL INDEBTEDNESS :

Causes of borrowing : inadequate incomes, rent demanded in advance, litigation, ceremonies, large families, social aspirations, uncertainty of agriculture, old debts (203).

Insolvency, special measures to deal with, not necessary (204).

Interest : Disallowance by law over 12 per cent recommended (203-4) 66533-4.

Measures for lightening agriculture's burden of debt :

Agricultural banks (204).

Interest restriction to 12 per cent (204).

Moneylenders : (204).

Mortgages :

Limitation to some extent recommended (204).

Redemption, special measures to facilitate, not necessary (204).

Repayment prevented by : high interest, and unwillingness (203).

Restriction or control of credit of cultivators not recommended (204) (*see* Mortgages *above*).

Sources of credit (203).

Usurious Loans Act, application strongly recommended (204) 66533-4.

AGRICULTURAL INDUSTRIES :

Blacksmiths (205).

Co-operative societies recommended (206).

Domestic service in towns (205).

Employment, rural could be increased by :

Market organisation (206).

Transport facilities (206).

Government aid suggested (206).

Health conditions, devotion of spare time to :

Clubs, rural, recommended (206).

Gymnasias recommended (206).

House repairing (205).

Industrial concerns, moving of, to rural areas :

Catechu and Shellac industries might be moved to rural areas (206).

Markets, distance from, difficulties of (206).

Transport difficulties (206).

Jungle products, sale of (205).

Leisure period : cultivators generally busy for 6 or 8 months interspersed with days of idleness (205).

Matches, manufacture of : Government aid suggested (206).

Mining work (205).

Obstacles :

Conservative habits (206).

Market, lack of (206).

Transport difficulty (206).

Railway work (205).

Slack season, method of spending (205).

Splints, manufacture of : Government aid suggested (206).

Standard of life, improvement necessary (206) 66502-3.

Study, intensive, not necessary (206).

Weaving by *jalahas* (205).

AGRICULTURAL LABOUR :

Attraction of :

very Difficult (206).

labour Unions recommended (206).

Cultivation of unoccupied land :

very Difficult (206).

labour Unions recommended (206).

Supply :

Organisation necessary (206).

Spasmodic (206).

SINHA, D. P.—contd.

ANIMAL HUSBANDRY :

- Cattle : miserable condition of (205).
- Dairying :
 - Co-operative, recommended (205).
 - Farms, recommended (205).
 - Government aid suggested (206).
- Fodder :
 - Insufficient (205).
 - Shortage greatest in April, May and June (205).
 - Silage-making by co-operative societies recommended (205).
- Improvement :
 - by District boards and influential villagers, necessary (205).
- Landowners, cannot be induced to take interest in, unless forced by law (205).
- Pastures, common :
 - Legislation necessary (205).
 - Overstocked (205).

CAPITAL, ATTRACTING OF, TO AGRICULTURE :

- Advertisement recommended (208).
- Facilities, special, recommended (208).
- Improvements of land discouraged by :
 - Ignorance of cheap methods (208).
 - Land tenure system (208).

CO-OPERATION :

- Banking : not successfully managed (203) 66494-6.
- Bhadralogo class alone benefited (207).
- Cattle breeding societies :
 - Popularisation recommended (207).
 - very Rare (207).
- Cheque, use of, should be encouraged (207).
- Consolidation of holdings societies :
 - Popularisation recommended (207).
 - very Rare (207).
- Credit Societies :
 - Banks, in place of, recommended (203) 66494-6.
 - Business morality of members, importance of (207).
- Loans :
 - Cheque payment recommended (207).
 - Use of, importance of (207).
 - the most Popular (207).
- Dairy farms recommended (205) (207).
- Department : activities diffused (203).
- Fertilisers : sale depots recommended (204).
- Hospitals suggested (207) 66506-7.
- Implements : hiring to members and non-members recommended (205).
- Markets recommended (207).
- Minorities, compulsion of, to come into schemes for joint improvement, recommended (207).
- Objects : not much achieved (207).
- Poorest class should be included (207).
- Purchase societies : extension recommended (207).
- Sale societies : extension recommended (207).
- Silos recommended (205).
- Societies for improvement, joint farming and machinery utilisation :
 - Recommended (207).
 - Very rare (207).
- Subsidiary industries, societies recommended (206).

CROPS AND CROP PROTECTION :

- Pests : Insects in Mokameh Tal, research necessary (199).

SINHA, D. P.—contd.

DEMONSTRATION AND PROPAGANDA :

- Charts may be of use (202).
- Cinema recommended (202).
- Cultivators' confidence destroyed by unsuccessful demonstration (197-8).
- on Cultivator's own fields recommended (201-2).
- Exhibitions recommended (202).
- Fairs, propaganda at, unsuccessful (202).
- Farms of doubtful utility (201).
- Groundnut : successfully demonstrated (202).
- Leaflets of little use owing to illiteracy (202).
- Meetings recommended (202).
- Personnel, importance of (202).
- Posters may be of use (202).
- Rice :
 - Dahia and Indrasail varieties successfully demonstrated (202).
- Wheat : Pusa 12 successfully demonstrated (202).

EDUCATION :

- Adult : Evening schools :
 - recommended ; district boards should manage (201).
- Agricultural :
 - Bias recommended (199) (207).
 - College not recommended (200).
 - Field excursions recommended (199).
 - Government recognition necessary (207).
 - Incentive, service in Agricultural Department (200).
 - Institutions not popular (201).
 - Post-graduate study at Pusa, America or Denmark recommended (200).
 - Schools, costly and unpopular (199).
- Colleges, agriculture should be taught as a science subject (200) 66525.
- Compulsory primary education :
 - Financial difficulty, 66546-50.
 - Necessary (208).
 - Public opinion, 66644-50.
- Demonstrators of Agricultural Department should be trained at provincial farms (200)
- Farms, provincial, should undertake agricultural education (200).
- Fourth class, small proportion of boys in, due to early marriage and necessity of earning a livelihood (208).
- Kamdars should be educated for demonstration at provincial farms (200).
- Middle class youths, attracting of, to agriculture :
 - Preference should be given to agricultural students for executive positions (200-1) 66519.
- Officers, executive, should be educated in agriculture (200-1).
- Population, excessive growth of, would be checked by education, 66508-10.
- Primary schools, agriculture should be taught in (199).
- Results of : makes agriculture a discredited profession (207).
- Sabour Agricultural College :
 - Closed by recommendation of Agricultural Committee (198) 66520-5.
 - Re-establishment not recommended, 66525.
 - Research section still working, 66523.
- School farms :
 - in Primary schools unnecessary (199).
 - in Secondary schools recommended (199).
- School plots, in primary schools, unnecessary (199).
- Secondary schools, agriculture should be an optional subject (200).
- St. John's Ambulance Association : methods of education recommended as an example (200).
- Universities, faculties of agriculture recommended (200) 66525.
- Zamindars, etc., should attend short-period courses at provincial farms (200).

FERTILISERS :

- Co-operative sale depôts recommended (204).
- Cowdung, use of, as fuel :
 - coal, substitution of, should be facilitated by improved transport (204) 66540-3.

SINHA, D. P.—contd.

FERTILISERS—contd.

Literature should be distributed (204).
Markets, village, should be utilised to popularise new fertilisers (204).
Popularisation of new fertilisers through schools, post offices, markets and demonstrators recommended (204).

FINANCE :

Banks, agricultural :
in Place of of co-operative societies, 66494-6.
Recommended (203-4) 66494-6.
Taccavi : does not think much of (203).

FORESTS :

Afforestation :
Plenty of openings for in Chota Nagpur (206).
Waste lands should be afforested (206).
Firewood : Lopping not allowed in reserve forests, 66542.
Floods : opening of passages through railways recommended (206).
Fodder : waste land should be cultivated (206).
Grazing : forests not suffering deterioration from (206).
Guards : corruption (206).
Management : local control suggested (206).
Reservation :
methoda, criticism of (206) 66504-5.
Unpopular (206) 66504-5, 66542.

HOLDINGS : Fragmentation : Inevitable (204) 66497-501, 66535-6.

IMPLEMENTS :

Hire-purchase system recommended (205).
Hiring of costly implements from co-operative societies recommended (205).
Price difficulty (204).
Research necessary (199).

IRRIGATION :

Control of, by zamindars leads to oppression of the poor (204) 66537-40.
Laws : Minor and Private Irrigation Works Acts of 1922, no work carried out under (204).
Legislation necessary to bring irrigation under public control (204).
Research as to easy methods necessary (199).

LAND TENURE :

Bengal Tenancy Act, 66518, 66531.
Cesses, illegal, imposed by landlords (203) 66514-8.
Government's policy criticised (197) 66514-8.
Improvement of land discouraged by present system (208) 66531.
Landlords :
Lack of interest (205).
Oppression of tenants (203) 66517, 66537-40.

MARKETING :

Co-operative markets recommended (206-7).
Employment, rural, could be increased by organisation of markets (206).
Exporters : wide activities of (206).
Information :
Government should distribute gratis (207).
Ignorance of cultivators of price variations (207).

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SINHA, D. P.—contd.

MARKETING—*contd.*

- Markets: no Lack of (208).
- Roads, absence of, compelling dependence upon middlemen (202).

RESEARCH :

Central :

- Chief institutions should be (198).
- Fundamental research (198) 66489-90.
- Co-ordination by Central Board of agriculture necessary (199).
- Implements, research necessary (199).
- Indigenous theory : research recommended (199) 66526.
- Irrigation methods, research necessary (199).
- Insect pests in the Mokameh Tal, research necessary (199).
- Labour saving devices, research necessary (199).
- Provincial : activities should be mainly propaganda and testing of results of central institutions (198) 66489-90.
- Soils, research necessary (199).

SOILS :

- Analysis, facilities for, necessary (199).
- Research necessary (199).

STATISTICS :

- Committee appointed by Government of India two years ago; recommendations disregarded (208).
- Importance of (208).
- Progress : very little (208).

TARIFFS AND SEA FREIGHTS :

- Exports, agricultural, small tax to finance Central Board of Agriculture suggested (199) 66527-30.
- Protection would adversely affect cultivators (197) (207) 66527-30.

VETERINARY :

- Contagious diseases :
 - Legislation useless (205).
 - Propaganda recommended (205).
- Department :
 - Bureaucratic (202).
 - Director of Agriculture should control (205).
 - should be Independent of Agricultural Department (205).
- Dispensaries :
 - Control :
 - is by District boards (205).
 - by Provincial authority, discussed (205).
 - Expansion inadequate (205).
 - Touring, not fully used (205).
 - Use of, by agriculturists, not full (205).
- Indigenous methods :
 - Research necessary (205) 66526.
 - Resorted to because cheap and easily available (205).
 - Research : should be organised in the same way as recommended for agriculture (199).

WELFARE OF RURAL POPULATION :

- Clubs and gymnasia recommended (206).
- Hospitals :
 - Co-operative suggested (207) 66506-7.
 - Lack of, 66506-7.
- Kisan Sabha : an organisation of tenants, 66514-8.
- Politics, a camouflage when divorced from economic development (197) 66514-8.

SINHA, D. P.—contd.

WELFARE OF RURAL POPULATION—contd.

Population, pressure of, upon the land :

Colonisation abroad recommended as a temporary expedient (204) (208) 66508-10.

Education would check growth of population, 66508-10.

Families, large, a cause of indebtedness (203).

Standard of life, raising of, would check growth of population, 66508-13.

Provincial Development Board suggested (208) 66486-8.

Standard of life :

Improvement of, among those in contact with towns (66511).

Outlook as to, not well regulated, 66511-3.

Surveys, economic :

Chanakya Society in Patna College, work of (208).

Recommended (208).

Village life should be improved (208).

SINHA, MITHILA SARAN, Advocate, Bankipur District, Patna (298-301).

ANIMAL HUSBANDRY : Fodder scarcity, 66979-80.

CO-OPERATION : Irrigation schemes suggested, 66981-5.

CROPS AND CROP PROTECTION :

Rice :

Cost of cultivation Rs. 8 or Rs. 10 per *bigha*, 67010.

Output, average, 10 maunds of paddy per *bigha*, 67007-8.

FERTILISERS :

Cowdung :

Scarcity of, 66993-9.

Use of, as fuel : *rahar* cultivation recommended (299) 67000-1, 67004-6.

Green manure : Dhaincha and *zann* for paddy lands recommended (299) 67002-3.

IRRIGATION :

Co-operation suggested, 66981-5.

District boards might keep boring plants, 66984-5.

Government assistance suggested, 66984-5, 66989-90.

Schemes suggested (298) 66981-5.

SOILS :

Alkali land :

Groundnut cultivation recommended (299) 66986-8.

Irrigation recommended (299).

Drainage, importance of (298-9) 66991-2.

Reclamation :

Drainage Act recommended (299) 66991-2.

Irrigation recommended (299).

Sandy taur lands in Patna District show marked improvement (299).

SOILS :

ALKALI LAND :

Draining recommended, *Khan* (445).

Expert advice necessary, *Arikshan Sinha* (264).

Flooding found successful, *Arikshan Sinha* (264), *Khan* (445).

Groundnut cultivation recommended, *Sinha, M. S.* (299) 66986-8.

Gypsum recommended, *Khan* (445).

Irrigation recommended, *Sinha, M. S.* (299), *Lal* (303).

Analysis, facilities for, necessary, *Sinha, D. P.* (199).

Classification, *Arikshan Sinha* (263).

DRAINAGE :

Act recommended, *Sinha, M. S.* (299) 66991-2.

Agricultural Engineer's staff should be increased, *Sethi* (354).

SOILS—contd.

DRAINAGE—contd.

- Co-operative, recommended, *Arikshan Sinha* (271).
- Demonstration, *Sethi* (354).
- Importance of, *Arikshan Sinha* (263) (266), *Sinha, M. S.* (298-9) 66991-2, *Khan* (445).
- Khunti sub-division, co-operative drainage has improved soil, *Ghose* (382).
- of Lakes advised, *Atkins* (19).
- Loans, taccavi and under Land Improvement Act, recommended, *Sethi* (354).
- of Low-lying lands of Bihar, system should be devised, *Khan* (445).
- Necessary, *Lal* (304), *Ghose* (381-2), *Narendra* (409).

EROSION :

- Bunds recommended, *Arikshan Sinha* (270), *Ghose* (382), *Khan* (446).
- in Chota Nagpur :
 - the Cause of poor soil in uplands, *Dobbs* (61).
 - Serious, *Ghose* (382).
- Drainage recommended, *Lal* (304).
- by Floods, *Henry* (3-4), *Atkins* (19).
- caused by destruction of, Forests, *Foley* (228), *Ghose* (382) (389), *Gibson* (416-7), *Khan* (451).
- Levelling recommended, *Lal* (303-4).
- Ridges recommended, *Lal* (303).

FLOODING :

- Deteriorating of land by, *Khan* (446).
- Improvement of land by, *Khan* (446).

FLOODS :

- Committee of Enquiry, *Bery*, 67123-9.
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GLOSSARY

- Ah wab An illegal addition to rent demanded by a superior from an inferior holder of land.
- Aghani (crop) The crop which is harvested in the month of Aghan (November-December).
- Ahar (Ahara) A reservoir for collecting water for irrigation.
- Ail A division between fields; a boundary mark.
- Anda Castor (*ricinus communis*).
- Bajra A small millet (*pennisetum typhoideum*).
- Bakain The Persian lilac (*melia azedarach*).
- Bakaast-Bakaest See Sir.
- Balsumbhi soil Sandy loam.
- Bangar High land.
- Bania A Hindu grain trader who is generally also a moneylender.
- Batai Payment of rent in kind, by division of produce between landlord and tenant.
- Batwara officer A revenue officer.
- Begari Forced labour.
- Bhadai The crop gathered in the month of Bhadon (August-September).
- Bhadralog Gentleman.
- Bhith Ground either naturally or artificially raised.
- Bhusa The husk or chaff of grain; the straw.
- Biali Land on which only summer paddy is grown.
- Bigha A measure of land; the standard or *pucca bigha* is 3,025 square yards or five-eighths of an acre; a *kutchra bigha* is in some places one-third, and in others one-fourth, of the "standard bigha."
- Brahmani bull A bull dedicated, on the death of a Brahmin, as an act of piety and as a public service.
- Bund, Bundh A dam, field embankment.
- Charke A spinning wheel.
- Charpoy A bedstead, with tape stretched across the frame for a mattress.
- Chaukidar A watchman.
- Chaura Land intermediate in position between upland and lowland.
- Dahi Curd.
- Dahia A variety of paddy.
- Dalal An agent or broker.
- Damdopat Literally "double the principal". An ancient Hindu provision of law under which a Court, in passing a decree for principal and interest, cannot from that date allow interest in excess of the principal.
- Darpatni A sub-letting of the whole or part of an estate held on permanent lease to a sub-tenant on the same system.
- Daest-khat Signature.
- Desi Indigenous.
- Dhaincha A leguminous fibre plant often grown for green manuring (*sesbania aculeata*).
- Dhan A term applied to grain in general but especially to paddy.
- Diara Alluvial land.
- Dih Land of the best quality.
- Don Low-lying land.
- Eri A species of silk worm (*attacus ricini*).
- Gairmajura Uncultivated land.
- Ganja A narcotic derived from the unfertilised flowers of *cannabis sativa*.
- Gaontia A village headman.
- Gharrwalla The driver of a horse or bullock carriage.
- Go Clarified butter.
- Gowa A granary, store room.
- Ghilala A herdsman or milkman.

Gundli ..	.. A small millet (<i>panicum miliare</i>).
Gur ..	.. Unrefined Indian sugar, jaggery.
Guru ..	.. A teacher, especially a religious teacher.
Haisyat ..	.. A statement of assets and liabilities.
Hakim ..	.. A practitioner of one of the Indian systems of medicine.
Hasta (rain)	.. Rain received towards the end of September.
Hat ..	.. A market.
Hath ..	.. A measure of one cubit's length.
Hundi ..	.. A bill of exchange.
Indrasail	.. A variety of paddy.
Janera ..	.. A fodder jowar.
Jolaha ..	.. A weaver.
Jote ..	.. Cultivated land.
Jowar (Juar)	.. The large millet (<i>sorghum vulgare</i>).
Kala-azar	.. A malignant fever, common in north-east India, caused by infection with the parasite <i>Leishmania Donovanii</i> .
Kamdar ..	.. A fieldman in the Agricultural Department.
Kamia (adj. Kamiauti).	An agricultural labourer who works under an agreement.
Katbhat ..	.. A heavy intractable clay soil.
Katha ..	.. A measure of land equivalent to eighty square yards.
Kesari ..	.. A pulse (<i>lathyrus sativus</i>).
Khalsa ..	.. Lands or villages held immediately of Government.
Khansama	.. A house servant.
Kharif ..	.. The autumn harvest; crops sown at the beginning of the rains and reaped in October-December.
Khas-Mahal	.. Land under the direct control of Government and let out by them to tenants.
Khatian ..	.. An abstract kept by the village accountant showing the land held by each cultivator, nature of tenure, cropping, etc.
Kisan ..	.. A cultivator.
Kist ..	.. An instalment of rent or revenue.
Kist Kothiwalla	.. The proprietor of a loan office (kist kothi).
Kumri ..	.. Temporary cultivation in jungle clearings.
Kundi ..	.. A bucket (usually of iron) used with the latha for drawing water (see Latha).
Kutchra ..	.. Inferior or bad (Lit., not solid).
Laggi ..	.. A measuring rod.
Latha ..	.. A lever (made of wood or bamboo) used with a bucket and counterpoise for raising water.
Lichi ..	.. An evergreen fruit tree (<i>nephelium litchi</i>).
Ma Bap ..	.. A protector (Lit., Mother and Father).
Mahajan	.. A merchant.
Makai ..	.. Maize (<i>zea mays</i>).
Manjhibas	.. The landlord's private land reserved for the cultivation of the immediate head of the village.
Marua ..	.. A small millet (<i>eleusine coracana</i>).
Marwari ..	.. A banker, broker, merchant.
Masur ..	.. Lentil (<i>lens esculenta</i>).
Matiar ..	.. A brown clay loam, well adapted for rice. It contains about sixty or seventy per cent of clay.
Maund ..	.. A measure of weight of 82.28 lbs. (standard maund). Has different values for different commodities and for the same commodity in different localities.
Mela ..	.. A religious fair.
Mistri ..	.. A mechanic, carpenter, blacksmith, etc.
Mofussil ..	.. The country as opposed to the town.
Moong, Mung	.. Green gram (<i>phaseolus radiatus</i>).
Mote, Moth	.. The kidney bean (<i>phaseolus aconitifolius</i>).
Munsiff ..	.. Judge of the lowest court with civil jurisdiction.
Nullah ..	.. A water course,

- Paikar A wholesale dealer.
 Pain, Pync A water channel.
 Pairs A cold weather crop sown broadcast in standing paddy as the water begins to dry off.
 Panch, Pancha, Lit. a committee of five. An association, of any number of persons, instituted for objects of an administrative or judicial nature.
 Panchayat.
 Pargana A district; an administrative unit.
 Parwal The snake gourd (*trichosanthes anguina*).
 Passori A weight or measure of five seers.
 Pathkatal A term used in Tirhut to denote clayey soil.
 Patta A document of lease.
 Patti, Patni A division of land.
 Patwa Red sorrel (*hibiscus sabdariffa*).
 Patwari The village accountant or registrar.
 Peish cush Government land revenue.
 Pinjrapole A refuge home for cattle.
 Pucca Solid, correct, complete, etc. (the contrast in all respects to kutchra).
 Pundit Originally, a learned-Brahmin, a teacher; now a term of respect applied to Brahmins.
 Rab A stage in the conversion of cane juice into sugar.
 Rabi The spring harvest; crops sown in autumn and reaped at the end of the cold weather.
 Rahar (Arhar) A variety of pulse (*cajanus indicus*).
 Raj A state or estate.
 Rakhant Waste woodland.
 Raya See Sandha.
 Reharaland Land impregnated with sodium salts and thereby rendered barren.
 Ryot A cultivator.
 Sabha An association.
 Sal A forest tree (*shorea robusta*).
 Salami Fee or premium payable to a person, generally a zamindar or a landlord, for the recognition of a transaction in property in which he has an interest.
 Sanai, Sann Bombay hemp, a leguminous fibre crop (*crotalaria juncea*); also used as a green manure.
 Sandha The appearance of rush-like stems instead of flowers in rice, caused by a gall fly the larva of which feeds on the base of the stem.
 Sarso (Sarson) An oil seed (*brassica campestris*).
 Sawai An excess of one-fourth; interest at the rate of 25 per cent.
 Seer A weight (2·057 lb.).
 Shisham A deciduous tree (*dalbergia sisso*).
 Sir Home farm land; the personal, family or private holding of a proprietor or co-sharer.
 Siris A deciduous tree (*acacia lebbek*).
 Sowcar A moneylender.
 Sradh A religious ceremony on the termination of the period of mourning.
 Sumbhi Loam.
 Surguja An oilseed (*guizotia abyssynica*).
 Swaraj Self-Government.
 Taccavi (Takavi) An advance made by Government to cultivators for agricultural purposes.
 Tal A dam.
 Talukdar A big landowner.
 Taur Upland.
 Thana A police station; a post.
 Thika A contract by which a person engages to pay a fixed amount of revenue on an estate, etc., on being allowed to collect the revenue payable to the proprietor. Thikadar—one who takes up such a contract.

Tikli ..	.. A rope-twisting or cotton-spinning implement ; a device consisting of a flat stone with a hook to which the rope or cotton is fastened as it is being twisted.
Til ..	.. An oilseed (<i>sesamum indicum</i>).
Tisi ..	.. Linseed (<i>linum usitatissimum</i>).
Tum-tum	.. A vehicle drawn by horse or bullock.
Upanayan	.. Investiture with the sacred thread.
Urid	.. A pulse (<i>phaseolus mungo</i>).
Usur ..	.. Land impregnated with sodium salts and thereby rendered barren.
Zabardast	.. Powerful, oppressive.
Zamindar	.. A landowner, a peasant proprietor.
Zarpegi Mortgage with possession.
Zerat, Zirat.	.. See Sir.

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