

GOVERNMENT OF INDIA

DEPARTMENT OF EDUCATION; HEALTH AND LANDS.

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**Sixth Report showing the progress made in
giving effect to the recommendations of the
Royal Commission on Agriculture in India.**

PART II.—PROVINCIAL GOVERNMENTS AND ADMINISTRATIONS.

(In the case of the provinces of Madras, Bombay, Punjab and Delhi the progress from 1929 to 1937 has been reported. In the case of the other provinces the information relates to the action taken during the years 1936 and 1937 only.)

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CHAPTER III.—Organisation of Agricultural Research.

1. Constitution of Provincial Committees to co-operate with the Council of Agricultural Research (paragraph 57).

Assam.—The Provincial Agricultural Research Committee continued to function. The views of the Committee on the various schemes were forwarded to the Imperial Council of Agricultural Research from time to time.

Bengal.—A Provincial Agricultural Research Committee was constituted.

Bihar.—The Provincial Agricultural Research Committee approved of the following schemes of Research :—

- (1) Extension of the Rice Research Scheme.
- (2) Extension of the Sugarcane Research Scheme.
- (3) Scheme for the Improvement of crop statistics in Bihar.

The following scheme has been sanctioned by the Imperial Council of Agricultural Research but awaits allotment of funds :—

- (1) Investigation on the economics of tube-well irrigation.

The following schemes await consideration of the Imperial Council of Agricultural Research :—

- (i) Potato storage scheme.
- (ii) Scheme on the biochemistry of rice.
- (iii) Scheme for the improvement of crop statistics in Bihar.

The following new schemes were sanctioned by the Imperial Council of Agricultural Research during the years under report and have come into operation :—

- (a) Scheme for the analysis of indigenous fodders grown in ...
- (b) Village enquiry regarding cattle and the production and consumption of milk.
- (c) Extension of the Rice Research Scheme.
- (d) Extension of the Sugarcane Research Scheme.
- (e) Scheme on sunn-hemp.

The following Research schemes were in progress :—

- (1) Fruit Research Scheme.
- (2) Economic enquiry into the cost of production of sugarcane and crops grown in rotation with it. (This scheme was closed in June 1937.)
- (3) Scheme for investigating the malting and brewing qualities of improved Bihar Barleys. (This scheme was closed in April 1937.)
- (4) Scheme for investigating the possibilities of manufacturing Khandsari sugar by the single-pan method. (Closed in October 1937.)
- (5) Co-operative experiments on cigarette tobacco.
- (6) Marketing Scheme.

Bombay.—In conformity with the recommendation, a committee consisting of officials and non-officials was constituted in June 1930. The committee advises Government on programmes of agricultural research to be submitted to the Imperial Council of Agricultural Research, on applications from persons within the Province of Bombay for grants from that body and also on any scheme or project which may be referred to it by Government for opinion.

Central Provinces and Berar.—The Provincial Agricultural Research Committee was constituted in the year 1932. Six research schemes which were subsequently submitted to the Imperial Council of Agricultural Research were first reviewed by the Provincial Committee.

Madras.—A Committee was appointed in 1929 to serve as the Provincial Committee contemplated by the Royal Commission. It was superseded in 1932 by the Provincial Research Committee which consists of heads of Agricultural, Co-operative, Industries and Veterinary departments and other officers associated with the teaching of sciences in the Presidency town and is presided over by His Excellency the Governor. The function of the Committee is to scrutinize the schemes formulated for transmission to the Imperial Council of Agricultural Research.

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The following is a list of schemes so far scrutinized :—

- (1) Scheme for research work on potatoes in the Nilgiris.
- (2) Scheme for research work on sugarcane at Anakapalle and Gudiyattam.
- (3) Scheme for research on fruits (station in Cuddapah).
- (4) Dry farming Research Scheme (station in Bellary).
- (5) Investigation of the Chemistry of malting cholan.
- (6) Scheme for extension of work on animal nutrition.
- (7) Scheme for research on oilseeds (station in South Arcot).
- (8) Scheme for the improvement of sunn-hemp.
- (9) Scheme for research on coconuts.
- (10) Scheme for research on bananas.
- (11) Sheep Breeding Scheme.

The Committee also scrutinized an application for a medal offered by the Imperial Council of Agricultural Research for improvements in "Machinery for preparing crops for market, for food and for storage." The application was in respect of an invention of a new turmeric polisher.

Orissa.—No provincial agricultural research committee has yet been formed.

Punjab.—A Punjab Council of Agricultural Research has been formed. Besides the Director of Agriculture and Director, Veterinary Services, several officers on the staff of the Punjab University have been appointed members of this Council.

Sind.—In conformity with this recommendation, the Bombay Provincial Research Committee was constituted in June 1930. Thereafter the Sind Research Committee under the Chairmanship of the Commissioner in Sind was established, and its schemes were submitted to the Imperial Council of Agricultural Research through the Bombay Provincial Research Committee. After the separation of Sind from the Bombay Presidency from 1st April 1936, a separate Provincial Research Committee for Sind has been constituted with the Honourable Minister in charge of Agriculture as Chairman and the Director of Agriculture, Sind, as Secretary. Schemes involving applications for grants from the Imperial Council of Agricultural Research are considered by this Committee, and it advises Government on any scheme or project connected with agricultural or irrigational research which may be referred to it for opinion by Government.

United Provinces.—The United Provinces Committee of Agricultural Research which was established in 1929 met only once during the last two years, as consideration of new schemes had been postponed by the Imperial Council of Agricultural Research. Eight departmental schemes financed by the Imperial Council of Agricultural Research were in operation at the beginning of 1936 and one new scheme was brought into operation during 1936-37. Of these, three schemes were completed during the years under report but two of them were extended and thus at the close of 1937 eight schemes were in operation.

One new scheme was sanctioned at the beginning of 1936 but was not brought into operation.

CHAPTER IV.—Agricultural Improvement.

2. Progress of research work on soils and soil conditions (paragraph 78).

Andamans.—Samples of soil from the reclaimed areas at Bumliton, Sipighat and Taylerabad villages were sent for analysis to the Imperial Agricultural Chemist, New Delhi, in 1936. His report showed that while the soils at Bumliton and Sipighat contained only traces of salt, those at Taylerabad had a relatively high salt content. The cultivation of these areas by private persons has proved a failure and has been more or less abandoned, but at Sipighat a new village (Cosgravemyo) has been founded with the object of draining and working the soil systematically by convict labour.

Samples of soil were also taken from the reclaimed area at Craikabad (Chauldari) and sent to the Agricultural Chemist, Burma, whose analysis showed that the soil was free from salt and that while having a high lime content, the available nitrogen and potash was low.

Assam.—The post of the Agricultural Chemist remains in abeyance. There is only one permanent Chemical Assistant and a Second Chemical Assistant was appointed in 1933 temporarily for a period of five years, for sugarcane research. The staff is inadequate for a systematic study of soil and soil conditions in the province. Since the retirement of the Agricultural Chemist in 1923 only routine analyses of soil have been undertaken. A number of soil samples were analysed from different sugarcane tracts

of the Sibsagar district. Other analyses included soils from rice lands and important fruit growing areas. In addition to this, soils from different Government farms were analysed in connection with manurial and other experiments.

Bengal.—Study of soil deficiency and its improvement was conducted at the chemical section of the Agricultural Department. The following items of work were worked out in that section :—

- (i) *Soil Chemistry.*—Investigation on peat formation in coastal regions.
- (ii) *Manurial experiments.*—Studies on soil deficiency, and its amelioration.—Nutrition of rice plants.
- (iii) *Studies on soil physics.*—Movement of sub-soil water. Influence of manures on conservation of moisture. Water requirement of crops. Pan formation in soils. Dynamometric studies.
- (iv) *Studies on Animal Nutrition.*—Investigation on the nutritive value of feeds and concentrates. Mineral requirements of animals; maintenance requirements.

Bihar.—Considerable progress was made in connection with the soil survey of the province. It was decided to take samples at distances of 36 miles all over the province with the distance halved in regions where marked differences in soil conditions exist or where the intensity of cultivation is high. More than 26 points have already been touched.

Laboratory studies in the reclamation of alkaline soils showed that when these were incubated from 4—12 weeks with correctives such as straw, ammonium sulphate, farm-yard manure and sulphur, molasses or tamarind, the exchangeable sodium and P^H were considerably lowered and approximated to those of normal soils.

Two years' data on the effect of growing berseem on soil nitrogen showed that in samples from the first foot of soil the total nitrogen increases up to January and then decreases indicating that at the latter stage the plant draws its nitrogen supply from the soil. The second foot of soil shows very little change all along.

Results of three years' experiments on the effect of heat on soil showed that paddy seedlings grown on heated soil were much bigger and healthier than the control but these seedlings when transplanted on to an unheated soil did not produce a significantly better crop. Chemical analysis showed considerable increase in available nitrogen, phosphoric acid and potash as a result of heating soil.

The effect of decomposing organic matter on the solubilization of phosphoric acid and potash from soil is being studied.

The effect of ultra violet radiation on soil was also studied.

Bombay.—At the Sugarcane Research Station, Padegaon, a soil survey according to the Russian method (which takes the entire vertical cut of the soil or the "soil profile" as a unit of study) has been in progress since 1932 on the canal zones of the Bombay Deccan. Nine soil types have been identified so far on the three major canals and the survey on the other canals is being continued. Analytical data on these types have brought out some interesting generalization regarding the genesis and field behaviour of these soils and their relative position in the world group of soil classification. As a result of these studies it has been possible to arrive at a practical system of soil classification and soil mapping based on profile examination in the field and entailing minimum amount of laboratory work. Investigations into the physiological behaviour of three of the important soil types have been started during this year in lysimeters in order to evolve systems of irrigation and manuring suited to these types.

Soil fertility surveys conducted on the older canals like Nira Left Bank Canal and the Godavari Canals showed that soils deteriorate under cane growing due to high carbon-nitrogen ratio in the soil or sodium colloid formation, the former factor being responsible for about one-third of the total damage under irrigation. The general effect of cane growing on the physico-chemical properties of soils, however, has been (1) to raise the base saturation capacity of the soil colloid, (2) to favour the rate of increase in electrical conductivity or the microbiological activities, (3) to lower the calcium carbonate contents and (4) to raise the nitrogen status of soils.

Investigations on a typical alkali soil of the tract, called *chopan* soil, considered so far unfit for cane growing, have shown that although the soil can be successfully reclaimed by artificial means, such as application of sulphur, gypsum, etc., such reclamation need not necessarily be resorted to unless the sodium saturation is so high as to prevent plant growth. It has been found that ordinarily cane can be successfully grown on such soils with a judicious system of irrigation, manuring and crop rotations and a scheme embracing the findings of these experiments has been prepared for trial in outside centres.

Central Provinces and Berar.—A study of the fluctuations in organic nitrogen content of black cotton soil under varying conditions of cropping has been made. Silica alumina ratios of the clay fractions of different depths from the black cotton soil, and of those from the surface samples in the case of other soils have been determined. Experiments to test the effect of sunlight on the nitrification of ammonium sulphate and oilcake in the soil are in progress. Mechanical analysis (by three different methods) of typical soil samples received from various provinces, is in progress.

Chemical and mechanical analysis of rice soils of the province are being carried out by the staff employed under the Rice Research Scheme financed by the Imperial Council of Agricultural Research.

Coorg.—It has not been possible with the limited resources of the Province to undertake research on soils but eighteen samples of soils of various kinds were sent to the Imperial Agricultural chemist at Delhi for analysis and four specimens of crops with fungoid disease were sent to the Government Mycologist, Coimbatore, for examination and advice.

Delhi.—Nothing appreciable has been done.

Madras.—A Soil Physicist was appointed in 1930 for a period of one year in the first instance to study the methods of treatment and management of soil with a view to finding a way of retaining the maximum amount of moisture in the soil and the effect of different cultural operations. Subsequently, the term of his appointment was extended and with the advent of the Dry Farming Scheme (financed by the Imperial Council of Agricultural Research) he was transferred to Hagari and he is now closely collaborating in that scheme. A soil map of the Madras Presidency showing the nature and distribution of different soils was drawn up and submitted to the Imperial Council of Agricultural Research.

A systematic study of soils for their characteristics has been carried out in certain tracts. The object of such a study was to obtain precise information from the behaviour of soils towards varying cultural and manurial practices and to enable the chemist to advise the agriculturist on problems of soil fertility. From the available data on the analysis of clay, it would appear that black soils are characterised by a high content of total silica (50.54 per cent.) and lime and magnesia (5.7 per cent.) and low iron and alumina (28 per cent.). The red soils are relatively poor in silica (45 per cent.), very poor in lime and magnesia (0.6 per cent.) and richer in iron and alumina (41 per cent.).

The measurement of the salt content of soils by the electrical conductivity method was studied in detail with soils and waters.

Soil surveys of various parts of the Presidency have been carried out and the information obtained has been directed to the solution of problems of a general nature. The early work on soil surveys was confined to Godavari, Kistna, Cauvery and Perivar and Guntur deltas and Malabar district all of which are rice growing tracts. The scope of subsequent surveys has been restricted to specific areas for particular objects as in the case of Lower Bhavani, Cauvery-Mettur, Toludur, Tungabhadra and Gundlakama projects where the reaction of irrigation on soils was proposed to be investigated. Of these surveys, the Tungabhadra is the most outstanding by reason of the magnitude of the area and the nature of soils proposed to be brought under irrigation. The area covered by the Tungabhadra Soil Survey was 2,000 square miles in the districts of Anantapur, Bellary and Kurnool and was carried out from December 1934 till February 1936. Profile pits were excavated one for every four square miles and the soils of the horizon were subjected to a detailed study, first in the field and then in the laboratory. The three main classes of soil that were found were: (i) black, (ii) red, and (iii) mixed, the first two being markedly different from the third. Preliminary examination has shown that these soils are capable of irrigation with caution and discretion. To study the effect of irrigation on soils of this tract, a research station was started at Siruguppa (Bellary district). The Lower Bhavani and Cauvery-Mettur areas were found to have very porous soils with low fertility but are suitable for irrigation. The soil survey of these two projects was completed in 1934-35.

North West Frontier Province.—A Chemical Analyst was appointed during the years under report, i.e., 1936 and 1937. He has been furnished with an equipped laboratory at Islamia College, Peshawar.

Orissa.—In the absence of a Chemical Section, no work was done.

Punjab.—Soil analysis forms part of the routine work of the Chemical Section of the Punjab Agricultural College Department and is always in progress. Investigations are also in progress for ascertaining the amounts of plant food removed from soil by crops. Soil surveys of new areas to be brought under irrigation in the Lower Chenab

Canal Extension and Haveli Project and also in the Salt Range have been carried out. Work is in progress in connection with the improvement of Kallar Soils. Laboratory work on soils has been directed mainly to the study and improvement of soils of the *bari* type. A separate Soil Physicist has not yet been appointed.

Sind.—The Scheme for investigation into the change in the Microflora of kalar soils in Sind (sub-surface investigation) was sanctioned by the Imperial Council of Agricultural Research in 1936-37. Allotment of funds is awaited.

The Scheme for sub-surface investigation work to be carried out in the Lloyd Barrage areas in Sind is under the consideration of the Imperial Council of Agricultural Research.

Detailed research work on soils and soil conditions in the Barrage Right Bank areas will shortly be undertaken on the appointment by the Sind Government of experts for the Agricultural Research Station, Dokri, and will be concerned with dry crops as well as with rice cultivation. The work on soils at the agricultural Research Station, Sakrand, with special reference to areas on the Left Bank which was started in 1926, has progressed satisfactorily. Considerable work has been done on the reclamation of kalar lands which has given very good results, and on the maintenance of soil fertility and the water requirements of crops. As regards the maintenance of soil fertility, Government have made important concessions to encourage green manure crops. Regarding the water requirements of crops, it has been found that over-irrigation is having a bad effect on crop yields and soil conditions, and that in crop production irrigation can never take the place of efficient preparation and cultivation of the soil.

United Provinces.—Systematic research work on soils and soil conditions was continued; soils from different parts of the province including the hill area were analysed by the Agricultural Chemist. The analysis of a large number of *usar* (alkali) soil samples was also undertaken.

3. Soil erosion (paragraph 79).

Andamans.—Owners of coconut plantations and small holdings were given advice by the Agricultural Department in terracing and contourbunding to check soil erosion.

Assam.—In order to prevent soil erosion in the hills terraced rice cultivation has been introduced and the work is being extended gradually in Naga Hills, North Cachar Hills and Sadiya Frontier Tracts.

Bihar.—As a result of a lay-out adopted at the Nawadah farm in the district of Gaya a considerable amount of improvement has been effected in the condition of the ravine land there which has improved the quality of land.

Bombay.—In North-Central Division, propaganda and technical advice for terracing and embanking of fields to prevent soil-erosion was continued with the help of the funds received from rural uplift and departmental grants in the three districts of Nasik, East Khandesh and West Khandesh. As a result an area of about 1,500 acres was bunded in the year 1936 and 4,000 acres in 1937.

In the South-Central Division, one Graduate Assistant has been appointed for bunding work. Bunding and land development classes are held and the response from the agriculturists is so great that it is very difficult to cope with the work. The question of training some District Agricultural Overseers in this line of work in the famine areas is being considered. The Bunding Officer in the division is making special study of soil-erosion and there is an increasing demand for his services, but progress is not possible unless more money and staff are made available. During the year 1932-33, the post of the Bunding Officer was held in abeyance; hence special activities of land development could not be undertaken. However, during the year 1934-35, 30 applications for technical advice about land development were attended to. During the year 1935, eight schemes of land development were surveyed and plans and estimates were prepared. (Seven tagai loan applications, sent by the revenue officers were disposed of by necessary technical advice.) In 1936-37, the Bunding Officer surveyed in detail and prepared plans and estimates of 71 schemes of bunding or land development covering an area of about 1,804 acres and estimated to cost about Rs. 20,450.

Out of the above 71 schemes surveyed with plans and estimates, 22 schemes covering an area of 805 acres and costing about Rs. 11,730 were actually constructed during the two years. (32 new applications for tagai loan sent by the revenue officers, amounting to Rs. 12,200 were disposed of.)

Special features.—The evil effects of soil-erosion and the effective method of controlling it by means of bunding were vividly brought home to the cultivators as well as the revenue officers of the division. As a result the Collectors of Sholapur, Ahmednagar

and Poona kindly allotted Rs. 800, Rs. 800 and Rs. 700, respectively, from the Village Improvement Committee's grants to entertain a Bunding Sub-Overseer in each of the above districts, to assist the Bunding Officer, South-Central Division, Poona, in this useful work. These grants have been continued in the second year. In addition the Collector of Ahmednagar contributed Rs. 500 for constructing two schemes of model bunding in the Ahmednagar district. They are constructed at Hanga (Parner taluka) and Chikhali (Sangamner taluka).

Bunding work on scientific lines conducted in the Southern Division of the Province of Bombay is much appreciated by the cultivators. Its expansion depends upon the combination of the expert advice and provision of tagavi loans. A special Bunding Officer was deputed to prepare plans and estimates for the cultivators in the Bijapur district during 1930; but later on in 1931, two Bunding Officers continued to do the work. The District Agricultural Overseer also inspected and guided the bunding work to a certain extent. Although the post of the Special Bunding Officer was retrenched during 1932, a Graduate Assistant from the district staff has been entrusted with this work. He has continued to prepare plans and estimates of important works and the regular staff of the District Agricultural Overseers inspected the existing work and rendered whatever possible guidance could be given to the cultivators. During the year 1931, 57 schemes costing Rs. 53,425 were executed while during 1932-37, 134 schemes costing Rs. 53,116, spread over an area of 2,732 acres were executed. Of these, 61 schemes extending over an area of 914 acres and costing Rs. 24,941 required tagavi loans, and the remaining 73 schemes extending over an area of 1,818 acres and costing Rs. 28,175 were executed from private capital.

The subject of soil-erosion has been investigated for three years, viz., 1934 to 1936, at the Dry Farming Research Station at Sholapur but only for one year, viz., 1936, at Bijapur. Loss of silt with the run-off water as the effect of heavy rains during monsoon has been studied under eight different treatments on plots of 1/80th acre at Sholapur with a view to find out the most effective treatment for controlling soil-erosion. At Bijapur only two treatments of cultivation are compared.

It was found during three years' experiments at Sholapur (1) that the plot on which natural vegetation was preserved lost the least quantity of silt, (2) that the standing crop reduced the quantity of silt lost to some extent and (3) that the special treatment to the surface soil, viz., scooping, in which numerous hollows or scoops were made in the soil by a special implement, was most effective in controlling soil-erosion.

The quantity of silt lost from a plot which was well cultivated and which had a Jowar crop grown on it lost about 1.3 tons of silt per acre in 1934, and about 4.3 tons per acre in 1936. In both these years the rainfall was well distributed and was much below the annual average. But in 1935 when the rainfall amounted to the annual normal and consisted of several heavy showers, the quantity of silt lost per acre from the above-mentioned plot reached a very high figure, viz., 115 tons. At Bijapur during 1936, from a similarly cultivated plot the silt lost per acre amounted to 7.5 tons. It may be mentioned that the rainfall in that year was only 60 per cent. of the annual average for Bijapur.

The Professor of Agricultural Engineering, Physics and Mathematics is now a technical adviser in the matter of bunding and erosion. He attends by visits, surveys and plans, where necessary, to enquiries on erosion prevention and land development. 35 enquiries have been attended to. He advises the departmental Bunding Officers, etc., and visits their schemes. Development enquiries are on the increase showing the increasing interest the ryot is taking in this. He conducts observations and investigations in soil and gully erosion. In the Diva-Ghat forest area small bunds that have been put up have been successful. Last year attempt was made to lay large and modified bunds across the gullies.

Coorg.—Soil erosion is not a problem in Coorg.

Madras.—This is not an important problem in this Province, except in the Ceded districts where the effect of erosion is of a serious nature though no ravines are formed as in other provinces. Steps are taken to prevent this evil by contour ploughing, by building stone embankments right at the source of the erosion, by putting up of bunds and by terracing and levelling the fields. Experiments conducted during the past three years at the Agricultural Research Station, Hagari, show that by constructing bunds about 7 inches high along contours or by dividing fields by such bunds into small plots of about 5 cents, each the run off of water can be lowered with consequent prevention of soil erosion. It is roughly estimated that by this means the soil is able to absorb 28 per cent. of rain against about 10 per cent. in the unbundled fields besides preventing the loss of fine soil particles. Crops sown along the contour also arrest to a certain extent the free flow of

the run off and the resultant soil erosion. The Government sanctioned in 1936, a special scheme for carrying out similar experiments in bund-forming and water-storage in the Anantapur district in ryots' lands. The experiments are to be carried out till March 1939. The Research Engineering Section has designed a simple and efficient bullock implement for forming bunds. It has passed into the hands of local manufacturers (please see also item 9 below).

Punjab.—Erosion is widespread throughout the hills and the position is particularly bad in districts containing sloping lands and foot hills where no Forest Department control exists. The area of foot hills under the Forest Department forms but a small proportion of the total sloping waste lands in the Province and it must be emphasised that erosion losses from forest lands are infinitesimal compared with the terrific losses which are occurring from waste lands as a whole. For counter erosion work a start has been made by deputing three Deputy Conservators and one Extra Assistant Conservator of Forests to the Civil Division or districts and some work has been done by them in Hoshiarpur, Ambala, Gurgaon, Jhelum and Gujrat. The work consists mainly in persuading villagers voluntarily to allow their lands to be closed to grazing and in organizing self-help for land reclamation and improvement. Erosion control projects have been prepared district by district, but reports on Shahpur, Rawalpindi and Attock districts are still under preparation. In addition an erosion survey of the Uhl Catchment Area was carried out at the request of the Hydro-Electric Branch.

Erosion research was taken up at the close of 1935-36 as a major project. Experiments are being continued at Nurpur in the Kangra district to demonstrate the method of checking erosion. The run off data showing the difference between the good grass land, heavily grazed land and bare land are being collected. These indicate very heavy soil losses from the latter.

United Provinces.—The construction of field embankments with a view to retain water and to check the scour in Bundelkhand districts with the aid of tractors was contemplated but response from the cultivators was not encouraging. Under the rural development scheme some funds were allotted to each district officer for the construction of suitable earthwork for the prevention of erosion, with the assistance of villagers, but much progress was not made.

4. Work on fertilisers (paragraphs 80-93).

Ajmer-Merwara.—Manufacture of rain watered compost on the "Indore" system was carried out by Agricultural Assistants in many villages in the District and the process was explained to the cultivators.

Andamans.—As there was no appreciable rise in the price of agricultural products, the use of artificial fertilisers could not be adopted either for coconuts or for field crops.

Assam.—Manurial experiments on sugarcane were continued at the Jorhat Farm with various manures and fertilisers and with different doses and times of application.

Nitrogen in the organic form generally appeared to be more suited for sugarcane than the artificials. Moreover, it appeared to be the limiting factor for cane growth both in plant and ratoon canes. Cowdung was found to be the best of manures, but as its supply is limited mustard cake which sells cheaper now-a-days may be used with advantage. A dose of 190 lbs. nitrogen in the form of cowdung and oilcake gave the most profitable yield both in plant and ratoon canes under conditions of the Jorhat Farm which has been continually cropped with sugarcane under rotation for the last thirty years. Regarding time of application the earliest application of manures in trenches before planting of the setts was found to be decisively better than any later application.

The experiment with different doses of amophos from 100 lbs. to 400 lbs. per acre with a basal application of 1,000 lbs. oilcakes equivalent to 50 lbs. nitrogen per acre did not give conclusive results. The effect of phosphatic fertilisers on the sugarcane crop was not significant at all but potash at both 100 lbs. and 150 lbs. per acre gave a significant increase, the higher dose being, however, found to be unfruitful. The question of obtaining a remunerative increase due to application of potash appears to be very doubtful. The effect of liming the acid soils of Assam (PH5.0-5.6) did not have any marked effect on the yield of sugarcane and such little increases obtained with the heavier applications of lime at the rate of 30-40 mds. slaked lime per acre, were hardly sufficient to meet the cost of lime used. On the contrary, it tended to deteriorate the quality of juice. In fact sugarcane has a wide adaptability and has been found to grow equally well in the very acid soil as well as in the neutral and slightly alkaline soils on the riparian tracts.

Green manuring alone with cowpea which was grown between the rows of cane and ploughed under after a couple of months was not found very effective. This in combination with a light dose of cowdung supplying 50 lbs. nitrogen per acre gave a substantial

increase over no manures. The combination of green manure with (1) oilcake and (2) niciphos, supplying the same amount of 50 lbs. nitrogen per acre, was poorer than green manuring and cowdung although giving significant increase.

Manurial experiments on rice at the Titabar Farm were continued with different doses of cowdung from 100 maunds to 300 maunds per acre. The results appeared to be very satisfactory. The highest yield was obtained with 300 maunds and all the different applications gave significant increases over no manure, both with regard to yield of grain and straw. Significant residual effect was observed with 300 maunds application in the succeeding years.

Another manurial experiment on rice at Titabar with different doses of phosphatic fertilisers has been started this year.

In a manurial experiment on potato with artificial fertilisers at the Upper Shillong Farm, the combinations of niciphos with sulphate of potash and amophos with sulphate of potash, gave significant increases over no manure, but these were not quite significant over niciphos or amophos applied alone. The increase due to amophos done over control was not significant although the percentage of increase came to about 25. The increase due to niciphos alone over control gave significant increase which came to about 35 per cent. The effect of sulphate of potash was not found quite prominent and significant. Any way it was not altogether unsatisfactory, inasmuch as the increase came to 17.5 per cent. in one case and 20.1 per cent. in the other.

Another manurial experiment on potato at the above farm with different doses of cowdung from 100 maunds to 400 maunds per acre gave satisfactory results. The percentages of increase due to 400 maunds, 300 maunds and 200 maunds, application were respectively 85.4, 65.1 and 33.4 over 100 maunds application.

The making of compost manure from waste organic matter is in regular practice at the Shillong, Khanapara, Sylhet and Jorhat Farms. The use of bonemeal as a manure for rice is established in the Khasi Hills. Cultivators themselves have begun to collect crushed-bones in a rough way. Manurial demonstrations on sugarcane, pineapple and oranges have been organised on cultivators' fields in a few selected localities. Definite results are yet to be obtained.

Artificial fertilisers like amophos, niciphos, alphos, sodium nitrate, ammonium, sulphate, etc., were successfully demonstrated on vegetables in the fields of the cultivators and in the grounds of the Jorhat Agricultural Training Class. Compost-making with farm wastes in a modified indoor process to suit Assam conditions, was taken up at the Jorhat Farm with conspicuous success.

An initiative was taken by the Demonstration Staff in respect of proper preservation of cattle manure in properly constructed pits. Use of green manure crops like Bogamedaloo, Cowpea and Matikalai was largely encouraged and middle class farmers could be induced to follow it to some extent. Advantage of mulching garden crops with such materials as sugarcane baggas, leaves and loppings of trees, paddy husks, etc., was demonstrated in several centres.

In Sylhet also the recuperation of soil fertility is receiving increasing attention. The propaganda and demonstration for the preservation of cowdung in covered pits and the utilisation of waste organic matter by conversion into composts are being continued vigorously. The latter offers bright prospects in this province.

The cultivation of sun-hemp, groundnut and matikalai which can supply green manure without impairing the commercial value of the crop is being encouraged.

Bengal.—Experiments with manures such as Niciphos, sulphate of ammonia, oilcake, green manure, farmyard manure, etc., were carried out on the Government farms and the results of these experiments were successfully demonstrated on Union Board farms and in the villages.

Bihar.—Two years' work on the time of application of easily available nitrogen on the yield and quality of wheat and barley showed that there was little difference in the yield if the nitrogen was applied, either when the plant was four weeks old or at flowering, but the late dressing was always reflected in a higher nitrogen content of grain.

The interactions of N, P₂O₅ and K₂O as affecting the quality and nutrient up-take by wheat, paddy and sugarcane are being studied.

The conditions of working have been standardized for preparing a good manure by composting habitation wastes with night-soil by the Indore method. In pot experiment the manure compared favourably with farmyard manure and compost. It is now being prepared on a large scale for trial in field experiments.

Evidence of nitrogen fixation when molasses were used as a fertiliser was obtained.

Work on the disintegration of bone was continued and locally obtained bones were composted with different chemicals.

The practice of green manuring is now an important feature of the activities of the Department, and intensive propaganda is being undertaken. As a result of our efforts 1,331 maunds and 38 seers (green manure seeds) were sold during the years under report.

Sales of fertilisers are steadily increasing, in particular, in the cane growing tracts of the Province where the cultivators are beginning to realise the value of dressing their crops with these fertilisers.

Every effort is being made to demonstrate the value of making compost from animal and vegetable refuse. Greater stress is being given in the cane growing tracts where the trash is being chiefly used for the purpose of converting it into valuable manure.

Bombay.—In the North-Central Division manuring of cotton with concentrated fertilisers was further studied. It has been found that mixture of groundnut cake and sulphate of ammonia is the most beneficial.

Manuring of wheat with sulphate of ammonia at sowing is being tried and the results so far are encouraging.

Use of sann-green manuring for wheat in Khandesh is being advocated; the quantity of sann seed distributed for the purpose is nearly 40 tons.

Manuring of rice with oil-cakes is being further studied. Castorcake has been found to be more beneficial.

The Imperial Chemical Industries have organised a net work of agencies all over the division and they effect very large sales of commercial fertilisers amongst which sulphate of ammonia is the most widely sold. The Taluka Development Associations are their distributors in several places and through them the following quantities of fertilisers were distributed :—

Name of manure.	Quantity distributed in tons in 1936-37.
1. Sulphate of ammonia	664
2. Oil-cakes	700
3. Denatured salt	105

In addition basic organic manures of 2,800 carts of compost and 45 tons of bone manure were prepared by cultivators.

In the South-Central Division, large number of experiments in connection with the several manures, e.g., farm-yard manure, green manure with sann hemp and other leguminous crops, denatured salt, artificial manures, oil-cakes, etc., has been conducted so far and the results have been published in the form of bulletins or leaflets, which are distributed free to cultivators. The Deputy Director moved the railway authorities to grant concession rates for manures on the G. I. P. Railway. The staff of the division is carrying on active propaganda for the use of these proved manures.

During the year 1934, 75,000 lbs. of sann seed was distributed while during 1935, 50,000 lbs. of seed was distributed. The distribution of this seed has now been taken up by several private agencies, as the cultivators have now understood the advantages of sann green manuring :—

The following quantities of fertilisers have been reported to have been sold :—

Names of fertilizers.	Quantity sold in 1936. lbs.	Quantity sold in 1937. lbs.
Sulphate of ammonia	5,214,720	35,481,600
Niciphos	22,400	5,850
Superphosphate	36,960	7,840
Oil-cakes	58,240	24,860
Bone-meal	103,040	50,400
Denatured salt	2,710 Mds.	2,271 Mds.

During the year 1936, 75,000 lbs. of sann seed was distributed, while during the year 1937, 31,260 lbs. of seed was distributed.

On the Agricultural College Farm, Poona, work on fertilizers on the following items has been carried out with the following results :—

(a) Association of humus (farm-yard manure) with artificial manures (sulphate of ammonia) for dry crops, viz., cotton and wheat under Deccan conditions. The work is in hand since 1929. No advantage of giving farm-yard manure with the artificial, so far as wheat is concerned, has been found whereas with cotton the results so far are conflicting. This study is being continued.

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(b) Plant food requirements of—

- (i) *Brinjal*.—This study has been done since 1932 and it is found that in the medium black soils as found in Poona, nitrogen (given as sulphate of ammonia) is the ruling element and has shown significant increase over only farm yard manure. Potash and Phosphoric acid have not shown any advantage.
- (ii) *Suran (elephant foot)*.—This study was done during 1930-33. The results show that 115 lbs. nitrogen in the form of sulphate of ammonia gave significant advantage over only farm yard manure.
- (iii) *Sweet potato*.—This study done during 1933-36 did not show any particular advantages of either N, K or P over 20 carts of farm yard manure.

(c) Nitrogenous fertilisers for various crops :—

The fertilisers tried were (a) sulphate of ammonia, (b) nitrate of soda, (c) Calcium cyanamide, (d) niciphos and complete fertiliser, at 10 lbs. and 20 lbs. N per acre.

- (i) *Winter jowar (unirrigated)*.—This crop did not show any advantage with any of the above fertilisers, over the check treatment.
- (ii) *Chillies (long red, spice type)*.—With this crop nitrate of soda gave the best advantage over the check (farm yard manure only), calcium cyanamide stood second and sulphate of ammonia third so far as only nitrogenous fertilisers were concerned. But niciphos with equal quantities of N and P stood next to nitrate of soda whereas complete fertiliser stood the lowest amongst all.
- (iii) *Groundnut (Spanish peanut early-rainfed)*.—20 lbs. of nitrogen were given to this crop. The results, however, varied since niciphos gave advantages over farm yard manure only during all the three years of trial, sulphate of ammonia in two out of three years, and nitrate of soda and complete fertiliser in one out of three years.
- (iv) *Bajri (Pennisetum typhoideum rainfed)*.—10 lbs. of nitrogen did not show any advantage. When 20 lbs. N were given all the fertilisers showed varying but significant advantages over farm yard manure only, the best results having been given by nitrate of soda.
- (v) *Onions (Winter irrigated)*.—20 lbs. and 40 lbs. of nitrogen were tested against farm yard manure. Both doses given in the form of different fertilisers gave significant increases over farmyard manure only. Sulphate of ammonia was the best both at 20 lbs. and 40 lbs. N per acre whereas nitrate of soda was even superior to the former at 40 lbs. N but not at 20 lbs. N per acre.

In Gujarat the use of sulphate of ammonia is increasing for sugarcane and rice. Similarly use of castor cake and sann seeds for green manuring is also becoming popular.

The supply of these manures is now taken up by the trade.

The following quantities were supplied to the cultivators through the department :—

Name of fertilizer.	Quantity in 1936. Lbs.	Quantity in 1937. Lbs.
Sann seed	33,600	62,200
Denatured salt	69,200	32,280
Bone meal	7,360	12,400
Sulphate of ammonia	4,700	55,200
Castor cake	..	87,200

The experiments with "Daincha" as a green manure crop on Surat and Broach farms are in progress as the crop succeeds better than sann (*Crotalaria Junera*) in the heavy black cotton soils of South Gujarat under heavy rains.

As a result of experiments conducted in different parts of the Southern Division in previous years the use of fertilizers like sulphate of ammonia, cake manure and bone-meal largely increased during 1931. The results of sann green manuring experiments on the Dharwar farm have continued to be promising. The use of nightsoil and poudrette is considerably increasing as a result of experiments in various places where municipalities exist. Owing to low prices of guano since 1932, there is no noticeable encouragement to the use of artificial manures. Even so, the use of sulphate of ammonia and oil cake to sugarcane has become popular and local agencies have taken up the distribution of the same. The use of bone meal to paddy crop is extending and a local factory at Dharwar was opened in 1933-34 and has continued to prepare bone meal for general supply in this tract. The proper method of preparing farm yard manure was explained and demonstrated in many villages. During the last two years, 1,000 improved pits were dug with a small subsidy of rupee one for each from the village improvement funds.

At the Sugarcane Research Station, Padegaon, physiological investigations have revealed that the top-dressing of 150 lbs. N. which had been considered as a standard dose for sugarcane on the basis of the previous experiment at Manjri is not a balanced and economic one for all seasons and therefore, a higher dosage of 225 lbs. N. to suit all types of environmental conditions is recommended. The Manjri standard method of the distribution of this total top-dressing is also not found to be in accordance with the results of the relationship of its absorption by the plant and its availability in the soil and experiments are in progress to evolve suitable modifications. Investigations with higher nitrogenous top dressing have shown that the top limit is not reached even with 300 lbs. N. and doses up to 600 lbs. N. are being experimentally applied. The response of cane to these higher doses is mainly dependent upon the varietal characteristics as regards feeding habits, the distribution and also the proportion of cake to sulphate of ammonia in the total top-dressing. The substitution of sulphate of ammonia by other artificial fertilisers as nitrate of soda, sulphate of potash and calcium cyanamide has shown no marked difference; but the application of the total top-dressing as sulphate of ammonia alone gave significantly lower yields pointing out the advisability of utilising a combination of organic and inorganic manures. The necessity of phosphatic manuring to increase yields has been definitely proved for this type of soil by large-scale trials, while experiments on the comparative value of bone meal and superphosphate are in progress. Potassic manuring has not resulted in either increasing yields or hastening maturity.

Experiments regarding the availability of various nitrogenous, phosphatic and potassic fertilisers in the soil showed that their available portion was all released during the first six months after their application. Among these, nitrogenous fertilisers showed rapid availability while there was a considerable amount of fixation of phosphatic and potassic fertilisers.

As a result of early work of the Manjri Sugarcane Station and the scarcity of farm yard manure with its consequent high cost, sann (*Crotalaria juncea*) green manuring is becoming a normal part of sugarcane rotation in the canal tract. Experiment at Padegaon with other crop species has proved this to be the best green manure crop, next to it being *Dhaincha* (*Sesbania Aegoptea*) and *udid* (*Phaseolus mungo*). A leguminous plant *Patada shevra* (*Alysicarpus belgamonsis*) isolated from the weeds growing on the farm is also showing promise as a good green manure crop.

Biological investigations on the decomposition of farm yard manure in different soil types have shown its poor availability on the type existing on the Padegaon farm, although it induces fixation of nitrogen. It appears that the indiscriminate use of farm yard manure may lead to enormous waste of this manure in certain soil types where green manuring would be advisable. A successful and cheap method of converting trash into compost has been evolved at the Padegaon farm, the cost of the compost working out at Rs. 1-5-0 per ton with an analysis of N-0.63% per cent., P₂O₅-0.65 per cent. and K₂O-3.35 per cent. The direct incorporation of trash with a sprinkling of sulphate of ammonia during monsoon has also given promising results as regards its decomposition and its effect on crop growth. The work on molasses as a manure as well as a reclaiming agent is in progress. The application of molasses four to five months before planting of sugarcane with neutralisation of its acidity by begasse ash is found to give higher yields.

Central Provinces and Berar.—Results of the various fertilizer experiments conducted by the department between 1900 and 1930 have been statistically examined and published. An investigation into the effect of green manuring alone and in combination with phosphatic fertilizers on the yield and phosphatic content of paddy has been carried out and experiments have been conducted to test the effect of various manurial treatments on the mineral composition of pasture grass.

Manual experiments to test the effect of varying ratios of nitrogen and phosphoric acid on the yield of paddy are being conducted by the Rice Research Scheme financed by the Imperial Council of Agricultural Research.

Cotton stalks, *Juar* stubble and various other vegetable waste materials are composted and converted into artificial farm-yard manure.

Coorg.—Manures such as ammonium, sulphate, niciphos, superphosphate, bonemeal and oilcakes are supplied. The importance of the careful preparation and use of green manure and cattle manure is impressed on the agriculturists and experiments in the manurial requirements of paddy and orange, the two principal crops in Coorg, are carried out. The growing of leguminous green manure crops in wet lands after the paddy has been harvested and the preparation of compost are now taken up and demonstrated.

Delhi.—Little progress has been made. Fertilizers are freely used in the market gardens round Delhi City, but the conservation of manure in villages has not been improved. The pitting of manure is now being encouraged.

Madras.—The experimental work of a quarter century with indigenous manures and artificial fertilizers was reviewed by a special officer and the review submitted to the Imperial Council of Agricultural Research in 1931. The data were revised in 1933 incorporating all further experiments and a revised report submitted.

A scheme of subsidized manurial trials for the first crop of paddy was completed at the Agricultural Research Station, Maruteru, in 1934-35. The general indications from the experiments were that the application of green manure definitely increased the yield and that organic manures like oil-cakes serve the same purpose. Fertilisers like ammonium sulphate, ammophos and niciphos are as good as green manures in increasing yields and act also in conjunction with them, but phosphatic manures do not show any increase when applied with green leaves. The subsidized manurial trials on the second crop at the Agricultural Research Station, Maruteru, indicated that the application of 32 lbs. each of nitrogen and phosphoric acid per acre as ammophos or a mixture of ammonium sulphate and superphosphate is a beneficial economic dose, that both milled guano and flour phosphate as suppliers of phosphoric acid had a similar effect, that phosphoric acid by itself gives no response and that both in organic and inorganic manures, no residual effects were noticeable in the yield of the succeeding main crop. At Nanjanad, after a series of manurial trials, a standard mixture of manure for potatoes with an analysis of 5.4 per cent. nitrogen, 13.3 per cent. phosphoric acid and 6.7 per cent. potash has been found to give very good results. Many manure firms supply this and other similar manure mixtures at competitive rates.

The making of composts from a large variety of waste material, animal and vegetable, has been successfully carried out. Successful results have also been obtained in the conversion of nightsoil into poudrette.

Molasses has been used for experiments on paddy and in garden lands at Coimbatore. It has given no significant increase in yield. The application of molasses to wet lands in place of green manure did not make any contribution to the organic matter in the soil but the whole quantity of molasses applied fermented away in fifteen days' time. In fact, the application of molasses affected the seedlings adversely when they were transplanted within these fifteen days.

The manurial value of sullage water on paddy was tested in the Central Farm, Coimbatore, and it was found that it had a better effect than the use of channel water alone. Undiluted effluent had a deleterious effect on the growth of seedlings in their early stages but later on it helped to improve the tillering capacity of the plants.

The qualitative effect of manuring was under study. A crop manured with cattle manure has been found to have a superior nutritive value. The herbage of ragi grown with cattle manure and no manure was compared for the digestibility of its protein fractions and it was found that cattle manure herbage had a superior digestibility. These findings led to further work on the possibilities of a different synthesis of protein in the crop when grown under different manurial treatments. The results so far obtained indicate that while organic manure stimulates the synthesis of one type of protein in cereal grains, inorganic manures appear to favour the production of another type.

Research on fish manure.—In connexion with a meeting of the Fertilizers Committee appointed by the Imperial Council of Agricultural Research to investigate problems relating to the conservation of indigenous manurial resources, the development of the use of indigenous fertilizers and the preparation of a programme of research on fertilizers, the Director of Fisheries was asked by Government in October 1930, to furnish the Imperial Council of Agricultural Research with a note on the existing condition of the fishing industry in the Madras Presidency and the possibilities of development in so far as supplies of fish manure were concerned. A report was furnished on the 8th October 1931, and a detailed scheme for advanced research on fish manure, fish oil, and fish meal arising out of the above report was sent to the Imperial Council of Agricultural Research by the Madras Government. The proposal is to establish a Fisheries Bio-Chemical Laboratory at Tanur and to engage the services of a competent and experienced chemist for the first three years and to train an understudy to the chemist for subsequent work, to investigate the various problems connected with the process of manufacture of oil guano and meal and devise the best methods on up-to-date scientific lines to ensure both cheapness of production and excellence of quality. The capital cost of the scheme was estimated at Rs. 50,620 and the running cost at Rs. 80,987. Towards the close of the year 1937, the Imperial Council informed the Madras Government that pending a review of the financial position of the Council early in 1938 it was not possible to say whether there was likelihood of funds being allotted for this scheme during 1938-39.

North-West Frontier Province.—Preparation of shora bonemeal on small scale to be easily adopted by petty zamindars has been tried with success. Preparation of compost by various methods to suit the cultivators' needs and conditions is in progress. Green

manuring in conjunction with other artificials and alone is being tried extensively. A newly prepared departmental blood manure has been tried and it has given promising results.

Propaganda was made among the zamindars by delivering lectures and laying out demonstration plots on their own lands in order to impress the economic utility of manures.

Orissa.—Experiments were conducted to find out the nitrogen requirement of paddy and sugarcane and the residual effect of phosphatic manures applied to paddy in the Kharif season on the rabi crop "Mung".

Work was also done to find out the comparative value of farm-yard manure and oil-cakes with and without the addition of bonemeal.

in collaboration with the Imperial Chemical Industries, investigations were carried out on the effect on potatoes of different combinations of chemical fertilisers.

The Agricultural Department is introducing 'compost', the correct way of storing farm-yard manure and the use of Dhaincha in the villages.

Punjab.—A large number of experiments are being conducted with artificial fertilizers on the various experimental farms of the Agricultural Department and on the lands of private zamindars. Schemes for manurial trials are prepared and examined by a Committee consisting of the Agricultural Chemist and Deputy Directors under whose supervision the experiments are conducted. The advantages of proper preservation of farm-yard manure including composting and application to the soil were promulgated as usual.

Sind.—Experiments in co-operation with various well-known commercial firms are being carried out at the Agricultural Research Station, Sakrand, and at the Government Seed Farm, Mirpurkhas, to find suitable manures both organic and inorganic, for the main crops under cultivation in the Barrage areas, viz., cotton, wheat, sugar-cane, potatoes, chillies and onions. Nitrogenous manurial experiments on the cotton and rice crops are in progress but definite conclusions will be arrived at only after the experiments have been carried on for several more seasons. Experiments performed at the Government Seed Farm at Mirpurkhas, have shown that artificial manures like ammonium sulphate and niciphos can be economically applied to cotton and wheat with profit to the cultivator. Similarly experiments at the Agricultural Research Station at Sakrand have proved that ammonium sulphate applied at the time of flowering not only increases the yield but helps in the development of sound seed. As a result of the experimental work carried out at the Agricultural Research Station, Sakrand a simple standard technique for the preparation of compost from farm waste materials, crop residues, etc., has been evolved and has been placed before the public in Agricultural Leaflet No. 52. 'The manufacture of compost manure from farm waste materials'.

The Agricultural Department is also carrying on intensive propaganda work to bring to the notice of cultivators the value and importance of green manuring and a series of 'green manure crops' demonstrations are organised annually in both the Kharif and Rabi seasons on zamindar lands in all the districts of Sind. Government have made a liberal concession by foregoing assessments on certain crops, e.g., guar, indigo, mung, cowpeas, soya-beans, dalicos bean in Kharif, matar and peas in Rabi and senn-hemp, guar, indigo and mung in Adhawa. These crops have to be ploughed into the soil in order to qualify for the concession. One cutting is, however, allowed to be taken for fodder purposes provided intimation by fixed dates is sent to the Public Works Department Sub-Divisional Officer.

United Provinces.—With the availability of abundant water supply on the Sarda Canal and State tube-wells in the hydro-electric grid area, the demand for artificial manures specially for the sugarcane crop increased.

In 1936, 60,000 maunds of castor cakes mixed with ammonium sulphate was issued as a manure for sugarcane and the results achieved were so encouraging that in 1937 the issue of the manure rose to 124,767 maunds.

Compost making was also demonstrated and adopted as a means of getting cheap manure. In addition to this the advantages of a better conversation of dung and refuse were also explained in villages.

Experiments to test the value of certain chemical manures were also carried out on potato, tobacco and cane crops some of which are still in progress.

Sustained propaganda carried out by the Co-operative Department for the promotion of farm-yard manures in pits outside the *abadi* is gaining ground. The number of villages in which storage is done rose from 900 in 1928-29 to 2,653 during the period of report. Steps were also taken to popularize the use of chemical manures and 16,622 acres were cultivated therewith during 1937. In many villages, assistance was given by the rural development staff.

5. Introduction of improved varieties of crops (paragraphs 97—103).

Ajmer-Merwara.—Improved varieties of the following seeds were multiplied at the farms maintained by the District Board and distributed to the cultivators and these placed largely the poor-yielding varieties formerly grown by them :—

- (1) Wheat—Pusa varieties (Pusa 4, 12 & 52) Punjab (P. C. 591, 518 & P. 8 A.).
- (2) Barley—Cawn. 251 & 255.
- (3) Oats—Mulga & Weston.
- (4) Sugarcane—(Co. 290).
- (5) Bajra—Jamnagar giant Bajra.
- (6) Cotton—Cambodia Indore 1 Cawn. 520.

Andamans.—In areas reclaimed from the Sea the Agricultural Department continued experiments in growing varieties of paddy imported from Burma which were reputed to withstand a certain amount of salt in the soil. A new variety of paddy from Bengal (Patnai) was introduced with a view to double-cropping. The yield of paddy from plots in the reclaimed areas showed an improvement while that from double cropping with Patnai was satisfactory, 26 maunds per acre having been obtained as compared with 20 maunds per acre with other varieties. A number of cultivators have been induced to give this variety of paddy a trial in the coming season.

In 1936 an area of 102 acres of reclaimed land at Chauldari (since named Craikabad) in the upper part of Port Blair Harbour was handed over to the Supply Department in order to experiment in the cultivation of local and imported varieties of fodder for cattle. Local grasses and sugarcane have grown there readily, while paddy has produced a crop almost up to the average elsewhere and imported cuttings of Napier Grass (*Pennisetum typodeum*) and *Euchlaena* (Reana) luxurians did sufficiently well to justify more extensive cultivation of these and other imported fodder grasses.

Assam.—In the work of introduction of improved strains of rice in Surma Valley promising types from pure lines and hybrids were compared against the standard recommended types at the Karimganj Station and up-to-date methods of statistical interpretation of the data were followed. In addition to the 20 strains which have already been recommended to the cultivators the following types were found superior in yield and other desirable characteristics such as earliness, easy thrashing, better grain-size, etc. :—

- | | | | |
|---------------------|----|----|---------------------------------|
| A. Broadcast aus | .. | .. | (1) M. 175-1 pure line type. |
| | | | (2) M. 175-2 pure line type. |
| C. Transplanted aus | .. | .. | (1) As. C. 536-48 Hybrids. |
| | | | (2) As. C. 536-143 Hybrids. |
| C. Sail | .. | .. | (1) S.C. 638-3 Hybrids. |
| | | | (2) S.C. 671-16 Hybrids. |
| D. Asra | .. | .. | (1) Ar.C. 353-148 Hybrids. |
| | | | (2) Ar.C. 108-1 pure line type. |

The seeds of some of the above types are already available to the cultivators and the rest will be made available very soon.

The work at the Titabar station was carried on as before and the following promising types were evolved as a result of comparison with the standard recommended types :—

- (1) Aus—As 20 Pureline type.

I.

- (2) Sail—S. 13 Pureline type.

L.

S. C.	308	} Hybrids.
	210	
S. C.	308	
	372	

The seeds of the above-mentioned types in addition to 6 strains already recommended to the cultivators in Assam Valley are under field-scale trial.

It has been estimated that more than 52,000 acres of land are under the improved types in Assam.

The Deep Water Paddy Research Scheme financed largely by the Imperial Council of Agricultural Research has been in existence since 1934. During this period it has concentrated on improvement of the Deep Water Aman and Boro (Spring paddy). In the former plants are being selected for high yield and flood resistance and in the latter for high yield and drought resistance. Selection work is in progress and some promising selections are being tested out in yield trials. It is hoped in a couple of years a few selected strains will be available for distribution. Cultural experiments are also being conducted

and observations are being maintained on the incidence of stem Borers (*Schnoebium bipunctiper*) which is one of the major pests of this crop.

The problem of growing a rabi crop in rotation with Aman is being investigated. Linseed is being tried for the last three years. In addition to this it is intended to try out leguminous crops such as lentils, mug, gram and matikalai.

A few deep water grasses are being studied with reference to their suitability as fodder for cattle in the low-lying areas.

(b) *Sugarcane.*—Work on selection of sugarcane continued at Jorhat. The selection made during the last two years under report were Co. 419, Co. 364, Co. 411, Co. 412, Co. 313, and Co. 421 in addition 10 varieties already recommended. Besides a number of other promising varieties are awaiting final trial.

(c) *Potatoes.*—Four new varieties of potatoes were imported for trial and multiplication in the Upper Shillong Farm. Fifteen successful varieties are grown in the Upper Shillong Farm for issue to the cultivators.

Baluchistan.—The following improved varieties of wheat and cotton have been introduced :—

Cotton :—Desi 39M, NT 12.

American :—KT 23, KT 25, 4F 98, 4F 18, 47F.

Wheat :—P 114, C 518, C 591, 8A.

Bengal.—The departmental varieties of improved jute and paddy have been introduced into almost every locality. Researches on trade rices and for the improvement of the quality and yield of the most important types of rice were continued at the Rice Research stations at Chinsura and Bankura. Co. 213 sugarcane has to a great extent replaced the local varieties. Its cultivation is increasing rapidly as a substitute for jute. Sabour gram, Matihari tobacco, Kharif til, groundnut, and linseed were successfully demonstrated in several districts of the province. Napier grass as a fodder crop has been introduced in different localities and the cultivators have begun to appreciate it.

Improvement of jute and other fibre crops was effected during the period under report :

(a) by pure line selection (D. 386) and (b) by hybridization (D. 136 × R. 85). In the course of the last two years these types are proving equal or even better than the standard D. 154.

New fibre crops such as Hibiscus Sabdariffa Var Altissima, Sisal and Flax were introduced.

Hibiscus Sabdariffa Var Altissima is acclimated as a superior substitute for the existing types of Mesta fibre.

Flax extraction experiments were continued. New devices were experimented with, with encouraging results.

Further improvement in sunnhemp was effected with valuable results.

Experiments testing the yield of the jute crop on cultivators' land were undertaken in several places in order to discover whether there was disparity with the accepted standard of yield for the locality.

Bihar.—A systematic yield trial of the 13 best fixed Sabour hybrid types of gram has been carried out against the standard Sabour 4 variety.

Other variety trials of the best types of Pusa wheats, gram, pigeon pea (*rahar*) and linseed have been tried for the third year.

Varieties of mustard have been tested against one Pusa variety.

Spacing trials of Sabour *rahars* have been conducted.

The isolation of pure lines of maize (*juar*), sunn-hemp and barley is still in progress.

A collection of different varieties of gram, linseed, mustard, pea, saf-flower, chickling vetch (*kasari*), castor, green gram (*mong*), black gram (*kalai*), maize, *juar* and *rahar* from various localities in the Province are being grown and studied.

The Coimbatore canes are as popular as ever, and now the Department has five varieties which have been recommended to the cultivators.

The demand for P. 52 wheat is on the increase and is finding favour with the growers in view of the heavier yield, its awned characteristics and its powers of resistance to drought and disease conditions.

The cultivation of elephant grass and other annual and perennial fodder crops is being encouraged but the response to its adoption is gradual.

Bombay.—In the North Central Division through the agency of the Banilla Seed Distribution Scheme which was financed from the funds of the Indian Central Cotton Committee, Bombay, an area of about 65,000 acres has been covered up in Khandesh and Nasik. The scheme has now terminated and a new scheme for the spread of Jarila cotton which is wilt resistant and a finer variety has now been launched.

3,500 lbs. of seed of 1,027 A. L. F. cotton were distributed in Nawapur peta of West Khandesh and the results are being watched with interest.

To meet the growing demand for seeds of improved wheat and rice 497,501 lbs. of wheat seed and 92,150 lbs. of improved rice seed were distributed through the agency of registered seed-growers which has been organised for supplementing the departmental supply.

In the South Central Division, Pusa, No. 4 wheat is well established. With the existing facilities as regards staff and funds, the work on jowar breeding is carried on at Mohol, in the great rabi growing tract of South East Deccan. The Jowar Breeder at Mohol is working on two rabi varieties—Maldandi and Dagdi—and it seems within a year or two new selections would be available for distribution. During the year 1934-35 the following jowar varieties from Maldandi and Dagdi have been evolved :—Maldandi, no. 47-3 and 35-1 ; Nagar-Dagdi, no. 8-50 ; Bijapur Dagdi, nos. 24, 29, and 34. Trials of these varieties in the Sholapur, Ahmednagar and Bijapur districts are in progress and the results so far are encouraging. During the year 1936-37, the work of breeding jowar varieties of Maldandi and Dagdi was further continued. Maldandi, M-9, was distributed and 31-2 and no. 15 are being tried.

Improved varieties of cane.—Since the year 1932, substantial progress was made, in the introduction of new varieties, like P. O. J. 2878, and E. K. 28 and Co. 290 and the following sets of these varieties were distributed by the department, during 1936 and 1937 :—

Name of variety.	No. of sets distributed in 1936.	No. of sets distributed in 1937.
E. K. 28	522,250	94,550
POJ 2878	9,500	17,000
POJ 2883	11,400	4,500
H. M. 89	30,700	500
Co. 290	8,000	30,000
H. M. 320.. .. .	5,000	16,500
Co. 360	135,500	81,500
Co. 419	21,200	49,500

It may be interesting to note that during the years 1936 and 1937 the following areas have been planted with these varieties :—

Year.	Area of cultivators. Acres.	Area of factories. Acres.
1936	4,660	8,135*
1937	5,000	9,192*

Introduction of the Banilla Cotton seed.—A self-contained and self supporting scheme, for the production and distribution of the Banilla Cotton seed in the Deccan Canals area has been started. This scheme has been financed by the Indian Central Cotton Committee and is expected to produce 18,000 lbs. of seed, enough for 750 acres of the registered seed growers, and the seed produced on these 750 acres will be sufficient for the whole cotton area under the Deccan canals of about 30,000 acres.¹

During the year 1934, 30 acres of pure Banilla cotton was grown on the Kopergaon farm, which produced pure seed to the extent of 20,750 lbs. In 1935 about 18,000 lbs. of pure seed was distributed to the registered seed growers for an area of nearly 1,000 acres. In 1936, 10,000 lbs. and in 1937, 8,875 lbs. of seed was produced and was distributed.

Introduction of tobacco crop in Konkan.—Tobacco is being grown in Ratnagiri district only for domestic use as there was no market. So the area has gone down.

* (Excluding the factories in Indian States).

Improvement of rice.—The following seeds of improved rice varieties were distributed to the registered seed growers :—

Name of strain.	Seed distributed in lbs. during			
	1934.	1935.	1936.	1937.
Panwel no. 61	6,900	6,766	16,310	11,103
Kolamba no. 184				
Kolamba no. 401				
Kolamba no. 42				
Patni no. 6				
Kudai no. 25				
Waksal no. 207				
Bhadas no. 79				

From the quantities thus distributed the following produce was available for further distribution :—

Year.	Quantity of seed produced by seed growers. Lbs.	Area covered by this seed. Acres.
1934	60,000	1,200
1935	1,80,000	3,000

Improved nagli strains.—During the past four years the following quantities of nagli seed strains were produced for distribution :—

Year.	Seed produced in lbs.	Area supplied.
1934	2,800	300
1935	1,400	160
1936	12,100	1,000
1937	20,211	1,685

Akola bajri.—During the last four years the following quantities of Akola bajri seed were supplied to the cultivators :—

Year.	Seed supplied in lbs.
1934	10,400
1935	7,500
1936	10,200
1937	2,640

Akola bajri is still giving a higher yield over the local variety.

The principal rice breeding station at Karjat, under the Crop Botanist to Government, continued to produce useful new strains of various varieties of rice and multiply pure stocks of old standard strains. At present among the Kolambas the early strain K-184 is spreading in Thana, Kolaba and Ratnagiri districts. The other companion strain, K-79, is favourable in several places in the Gujarat division. A new synthetic early strain, K-501, superior in quality of grain and yield and maturing about 10 days later has been given out for trials to replace these old early strains which mature rather too early and are caught up in rains at the tail-end of the monsoon.

The department has had a phenomenal success with the new synthetic mid-late strain of Kolamba, K-540. This strain not only possesses very fine grain but is so high yielding that it gives higher outturns over old grained mid-late rice varieties in Thana, Kolaba and Ratnagiri districts and in rice growing upghat talukas of the Deccan. It has completely replaced the old mid-late Kolamba K-153.

The late strains of Kolamba, K-42 and K-226, are continuing to spread in Kolaba and Thana districts. A new strain of Zinya, Z-149, has recently been released for distribution in the Thana district.

Improvement of wheat.—The Cereal Breeding Station opened at Kundewadi in the centre of Nasik district in the year 1931, is now a fully equipped farm. It is engaged in the improvement of such major crops as *wheat*, *bajri* and *gram* and such minor crops as *tur*, Italian millet and *linseed*, which are grown to a large extent in the Nasik district or in the adjoining Deccan districts.

The improved wheat strains are now spreading all over the province. Bansipalli-803, a synthetic variety, is now spreading in the Bijapur and Dharwar districts of the Southern Division, in the Ahmednagar district of the South Central Division, and in the Nasik district of the North Central Division. The strain, Bansi-224 is spreading in the "Bhal" tract of Gujarat and in the Broach district. It is also a standard variety in the East Khandesh district. The old strain, Bansi-162 has been replaced by a better grained and early high yielding variety, Bansi-168, in the West Khandesh district.

A higher yielding new dry wheat has been evolved. The famous Baxi wheat of the Ahmednagar district has also been improved. Considerable synthetic material is being produced by interspecific hybridization to evolve eventually stem rust resistant varieties of wheat.

Improvement of gram.—This crop is an important rabi crop in wheat growing areas. Improvement of this crop is in progress since 1933 at the Cereal Breeding Station, Kundewadi, Nipbad. Improved strains of brown and yellow grains have been produced. One of the yellow grained strains, G-816, is considerably higher yielding to local variety and has much larger and more attractive grains.

In the Southern Division, with the then existing facilities as regards staff and funds the work on cotton breeding was continued and during the year 1931, two improved varieties of cotton, viz., "Jayawant" and "Gadag No. 1" covered an area of 117,000 and 121,000 acres, respectively. A 50 acre seed farm was established at Gadag in the same year for multiplication of Gadag no. 1 selfed seed. The two improved varieties of cotton are fast replacing the local inferior types. The following table shows the area covered by pure pedigree seed of these two varieties in different years :—

Varieties.	Years.					
	1932.	1933.	1934.	1935.	1936.	1937.
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
Jayawant	108,590	170,000	161,339	240,236	187,200	245,318
Gadag no. I	54,484	69,420	90,234	92,100	84,410	92,539

Besides these, during the last two years the natural spread was about one lakh acres under Jayawant and 33,000 acres under Gadag no. I cotton. Supply of selfed seed for the different seed schemes of Jayawant continued to be raised on the Dharwar farm and that of Gadag no. I cotton in a cultivator's field at Gadag. The Cotton Breeder has secured progress in finding a still better strain than Jayawant and it will go into the district. The Cotton Breeder undertook the work of selection in groundnut in 1931 and that of breeding of gram during 1932, seeking higher yield in the first case and wilt resistance in the latter. This work has been continued.

The Rice Breeder selected three strains of Mugad and three strains of Antersal, which have become popular in the rice growing tract. For the distribution of the strains a seed multiplication scheme was started in the year 1930 and it has been continued to be in operation. These strains covered an area of about 10,000 acres of pure seed. The selection work on another variety of paddy called "Dodgya" has also been continued. Java 213 cane was introduced in many parts of the Malnad tract of Dharwar and Belgaum districts and H. M. 544 cane in parts of Kanara district. The area covered by these two was about 600 acres.

In Gujarat the introduction of 1,027 A. L. F. cotton seed in the tract lying south of the river Narbada was continued. The seed distributed during 1935 and 1936 was 2,687,009 lbs. and 2,936,110 lbs., respectively. The total area under cotton in this tract is nearly 6 lakhs of acres, nearly 50 per cent. of this area being under 1,027 A. L. F. from the seed directly supplied by the department.

Similarly the seed of B. D. 8 which is wilt resistant and spins higher than 1,027 A. L. F. is being distributed in Broach district with the help of Indian Central Cotton Committee during the last two seasons. The seed thus supplied was 192,000 and 128,000 lbs. during 1935 and 1936, respectively, from the controlled area of 1,000 acres. 615 full-pressed bales of lint were sold at a premium varying from Rs. 37 to Rs. 53 per candy.

Co. 213 variety of sugarcane has been spreading throughout the division but at the same time some cultivators complain that the quality of gul is inferior, being saltish in taste, and loses hardness or becomes liquid during monsoon thereby affecting the price of gul which is already low due to slump in the market.

Budh Perio Jowar no. 53.—It is a better yielder than local Perio jowar ordinarily grown by cultivators in Surat district. For its rapid extension in the district a five-year plan of supplying farm seed at half the cost to five registered growers in five villages of each taluka has been in operation. Every year twenty new villages are thus selected and the fields grown with the farm seed serve as demonstration plots. Besides the cultivators of surrounding villages get the opportunity of purchasing the resultant seed either in exchange or at a cheap rate for further spread in the interior of the district. During the two years 1935-36 and 1936-37 the improved farm seed (Budh Perio Jowar no. 53) to the extent of 15,108 and 16,659 lbs., respectively, was supplied to cultivators.

Improved varieties of tobacco, viz., Gandiu no. 6, Piliu no. 28 and Keliu, have been established in the Kaira district and the cultivators instead of purchasing the seed from the farm keep their own stock of seed from the crop grown by them.

Improved paddy K.-184 has been in greater demand in the division due to failure of local paddy crop in 1936. Fresh seed is being introduced in parts of Surat and Broach and the resultant seed will be supplied to cultivators in the interior of the district.

Wheat no. 224 has been spreading in Ahmedabad, Broach and Surat and the quantity of seed supplied during two years was 45,060 lbs. and 34,751 lbs., respectively.

Pusa 4 wheat has been well established in the Panch Mahals and part of Ahmedabad due possibly to the attack of rust in local Wagia variety but in the year 1936 this type also has equally suffered though it was till now considered rust resistant by the cultivators.

The groundnut crop has been largely grown in North Gujarat; but its cultivation is restricted in South Gujarat due to peculiarity of soil conditions. However the area is slowly but steadily increasing due to favourable market and slump in cotton prices.

As a result of the varietal investigations at the Manjri Sugarcane Station, seven varieties were liberated for trial on the Deccan Canals during the period of 1925 to 1932. Out of these P. O. J. 2878, and E. K. 28 have stood the test under varied conditions and have ousted the local variety *Pundia* from a large area. With the establishment of Sugarcane Research Scheme, Padegaon, in 1932, a comprehensive programme of varietal investigations has been laid down to include the needs of both the cultivators and factories and about 175 selections both from the Imperial Sugarcane Breeding Station, Coimbatore, and Economic Botanist, Hebhal, Mysore, have been under detailed study. Seven promising varieties have been so far liberated for trial outside with the factories and cultivators and among these Co. 419, which is found to top in yield, is spreading very rapidly. Co. 360 has proved to be a good yielder under specific soil types, although it has a defect of lodging. H. M. 89 has been found to be a good cane for Kolhapur tract. H. M. 320 being non-flowering is specially suited to cultivators' needs and is superior to *Pundia* in yield, whilst Co. 419, Co. 413, Co. 407 and Co. 408 are suited to factories and cultivators possessing power crushers. Among the new arrivals Co. 421 and Co. 426 are showing signs of promise. Among the sugarcane sorghum hybrids, Co. 352, Co. 353 and Co. 356 are found to be good yielders, but none of them attain maturity in less than 10½ months in January planting. Late planting is of no value as it reduces the yield greatly. Investigations are also in progress as regards keeping quality, seasonal response, power of drought resistance and requirements of water and manure of these selections in order to fit them up for the different tracts of the province.

Central Provinces and Berar.—Considerable progress has been made in the introduction of improved varieties of crops, particularly cotton, rice, juar, wheat, groundnuts and sugarcane. Intensive research on oilseeds, citrus fruits and sann-hemp has recently been initiated.

Coorg.—Experiments with different strains of paddy from Poona and Coimbatore are being continued. Several coffee planters have taken to the planting of Robusta coffee instead of Arabica as it is less susceptible to pest diseases.

Soya beans were obtained from Ceylon and distributed to agriculturists as a subsidiary crop.

Budded plants of varieties of oranges and grape fruit are being tried at the Orange Experimental Farm at Gonikoppal. The prospect of the graft budded orange trees is encouraging.

Delhi.—Seeds of the following improved or imported varieties have been brought into use on a field scale in villages—

1. Wheat 8A, 8D, C. 518, C. 591.
2. Gram no. 7.
3. Barley no. 4.
4. Mollisoni Cotton.
5. Berseem.
6. Cotton seed M. 60, A. 2, and 43 F.
7. Sugarcane Co. 205, Co. 215, Co. 223.

Elephant grass, Lucerne and Sudan grass have also been grown experimentally. Wheat C. 591 (1,759 maunds in 1936 and 1937) and wheat 8A (1,674 maunds in the same years) are very popular. Berseem is likely to grow in popularity, but Coimbatore canes have received a set back owing to a partial failure of the crop in 1937.

Madras.—The spread of the seed of improved strains of various crops evolved by the department has met with success. Improved strains of sugarcane, paddy, cotton, ragi and cholam, were introduced either to increase the actual yield or to resist diseases. The multiplication of improved strains evolved at the research stations is carried through what are called "seed farms," an arrangement which ensures the cultivation of seed on ryots' lands under ryots' conditions but under close departmental supervision. An agreement is entered into between the Agricultural officer and the ryot concerned binding the latter to carry out the cultivation, harvesting, etc., of the seed in accordance with the departmental advice and to sell or distribute the surplus seed to the department or other cultivators, as the case may be, if so required. Such seed farms are in existence in the I Circle for multiplication of strains of paddy and sugarcane, in the III Circle for cotton, V Circle for paddy, VI Circle for cotton and the VIII Circle for potato and cotton. Besides these, co-operative seed distribution societies help a great deal in the distribution of the approved strains. The Tiruppur Co-operative Sale Society which maintained seed farms with the financial help of the Indian Central Cotton Committee for the propagation and distribution of improved Co. 2, Cambodia cotton seed, was able to cover the entire area of over 100,000 acres and served it with this improved seed, entirely eliminating the local seed. The area under the improved varieties of crops during the past two years is given below :—

	1935-36.	1936-37.
	Acres.	Acres.
Paddy	1,277,583	1,395,043
Cambodia cotton	213,339	206,550
Karunganni cotton in V, VI and VIII Circles	182,255	165,440
Western cotton in III Circle	220,000	239,500
Sugarcane	39,597	42,650

North-West Frontier Province.—The most important activity of the Department was the introduction of improved varieties of various crops in the province and it is a matter of great satisfaction that the department has achieved a great success in this line. Improved varieties of various staple crops were under trial at Agricultural Research Station, Tarnab, and the most promising ones were given out to the zamindars. Wheat varieties from almost all over the wheat growing tracts of the world were tried at Tarnab Farm and many of them seem to be much better than those already given out to zamindars for growing on large scale, about 6,00,000 lbs., of improved wheat, maize, bajra, gram and cotton seed were introduced only last year in the province. The improved wheats have nearly yielded twenty fold of the seed rate used by the growers. Pusa 4, Federation C, 5918 A, and Bona have gained the confidence of Agriculturists.

There are many varieties of other crops that are yet under trial. These include varieties of oats, barley, chillies, peas, cotton, oil-seeds like sarson, toria, rai and linseed, etc.

The present staff for making propaganda in the rural area for infusing the advice of Agricultural Department, growing and disposing of their crops was inadequate. Proposals were put to the Local Government for increasing their numbers so that the work that has been done for the welfare of the agriculturists should reach everywhere in the province.

Orissa.—Pure strains of high-yielding paddy and strains to suit saline and flooded tracts have been evolved. Work still continues.

Thirty-four varieties of sugarcane were studied in observation plots. Of these C.O. 419 proved to be a good chewing variety and C.O. 421 has given good promise as a general purpose cane.

Experiments were conducted to ascertain the suitability of the cucurbitaceous vegetable *patal* (*Trichosanthus diocea*) for cultivation in sandy soil in this province. The results were very satisfactory. It is being introduced widely.

Comparative trials were carried out of the fodder grasses, Napier, Elephant, Johnson, Sudan and Guinea. Napier was found to be the best from the fodder point of view but is more difficult to grow than Elephant for which reason preference is being given to the introduction of Elephant grass in the villages. The leguminous fodder, *shaftal*, was tried and was found to be a heavier yielder than *berseem*.

Punjab.—Research on Millets and Oilseeds has been continued. Separate Botanists for Millets and Oilseeds have been appointed.

Sind.—Research work on the improvement of all the main crops, e.g., cotton, wheat, jowar, rice, bajri, oil-seeds, pulses, etc., is being vigorously carried on in the Botanical Section at the Agricultural Research Station, Sakrand, and at numerous other subsidiary experimental stations in the Barrage areas. The progress of this scientific research work and the introduction and extension of such varieties of crops into general cultivation in the districts has been fully maintained. The Agricultural Department is doing its best to supply new and improved varieties of seeds and has organised a scheme for the multiplication and distribution of pure seed of improved varieties of cotton, wheat, rice and jowar and the areas under such improved seeds are extending rapidly. 18 village implement depots have been established in all parts of Sind and this has greatly assisted the small khatedars and haris. Considerable progress has been made in research work on the improvement of oilseeds and pulse crop and on the evolution of better and high yielding crop varieties with special reference to resistance to the major insect pests in plant diseases. Scientific work on the improvement of bajri crop in Sind is progressing satisfactorily. A scheme for financing cotton seed distribution in Sind was prepared and submitted to the Indian Central Cotton Committee who have since sanctioned the scheme on the condition that the Cotton Ginning and Pressing Factories (Bombay Amendment) Act, 1936, is applied to Sind. The Scheme for the maintenance of a nucleus of seed of improved varieties of cotton financed by Indian Central Cotton Committee has been sanctioned for five years in 1937 and the work has been started.

A five-year programme was drawn up in 1936-37 and the work is progressing along the lines indicated therein.

United Provinces.—At the research stations at Shahjahanpur, Muzaffarnagar and Nagina efforts were made to select types of sugarcane and paddy better suited to the different conditions prevailing in the province. The station at Muzaffarnagar was chiefly concerned with testing new varieties of sugarcane for their suitability to the conditions prevailing in the Western districts and the demand for new varieties increased considerably. Nagina concentrated on the acclimatization of certain exotic paddy varieties and efforts were made towards raising fine grained heavy yielding varieties; approximately 830 and 650 maunds of seed of various improved paddy types was distributed during 1936 and 1937.

Improvement on wheat was also carried out by selection as well as by trials of suitable North Indian wheats and by studies on the types imported from overseas.

Four high yielding and rust resistant linseed strains containing high oil contents were also evolved by hybridization and selected for trial on an extensive scale under farm and cultivators' conditions. Such trials under farm conditions proved their worth as high yielding strains.

Strains of other oil seed crops and millets, etc., were also selected for extensive trial.

The distribution of better seed through seed stores and societies was pushed on by the Co-operative Department. There were 14 central stores against 2 of the previous year and the acreage under improved wheat was 92,224 against a total 53,349 of the previous years. The area under improved sugarcane also rose to 1,00,056 acres.

6. Research and experiments on Rotations and Methods of Tillage (paragraph 104).

Assam.—Sugarcane rotation for 3 to 4 years has been found successful at the Jorhat Farm. Rotation has also been encouraged in growing of winter crops like potatoes, pulses and mustard in aus paddy lands. Rotation of jute and sunhemp is a growing practice among the jute growers of Lower Assam Valley and attempt is being made to extend it more and more.

Baluchistan.—Rotations to reclaim Alkali lands are being tried.

Bengal.—The cropping schemes of all the farms under the Agriculture Department are based on four years' rotations. Rotation crops were undertaken by cultivators in many villages. Cereals are generally followed by leguminous crops and highland jute by transplanted aman paddy and sometimes by wheat, tobacco or potatoe in cases where the jute has been liberally manured. Improved implements invented by the Agricultural Engineer, Bengal, were demonstrated on the cultivators' fields in every district.

Bihar.—The cultivation of cane in lines and with the use of bullock drawn implements is now standardised and these methods are now being demonstrated in the villages.

The cultivation of maize in lines is becoming popular in view of the saving of time, labour and expense that is effected by adopting this method.

Experiments on the cultivation of berseem, elephant grass and soya bean as fodder crops were conducted with success and are being introduced in the villages.

In Chota Nagpur the practice of growing wheat and gram on the uplands after a leguminous crop in the monsoon is being introduced. The results so far achieved are encouraging.

Bombay.—In the South Central Division, Pusa no. 4 wheat, N.R. and Banilla cotton, Spanish peanut and tobacco are being introduced as rotation crops to sugarcane, especially in the canal tract. Wider planting of sugarcane and the standard Manjri method of sugarcane cultivation is now being followed generally. With regard to the rotational experiments there has not been much improvement on the Deccan canals. Sugarcane and cotton are the only valuable crops which are adopted by the cultivators generally.

At the Agricultural College Farm, Poona, the value of leguminous crops in rotation with a cereal (*bajri*) has been under study for 7 years. *Kulthi* (*Dolichos biflorus*) was the only leguminous crop included in the experiments. But during the last two years *tur* (*Cajanus Indicus*) has been introduced as a mixed crop in a continuous cropping of *bajri* and non-leguminous crop (sesamum) has also been added for comparison. In money value *bajri* and *tur* mixture is first, *bajri* and sesamum is second, *bajri* and *bajri* is third, and *bajri* and *kulthi* is fourth.

Bajri when rotated with *kulthi* has shown 20-50 per cent. more yield than *bajri* grown continuously, in three years. As regards the money value of the two cropping schemes considered collectively for the whole period under experiment *bajri* after *bajri* and *tur* as an annual row mixture and *bajri* rotated with sesamum as recently introduced, show higher money returns than the above two rotations.

In the Southern Division, rotation and tillage experiments started in the year 1931, with sugarcane on the Gokak farm, and with *jowar*, cotton, groundnut and tobacco, on the Dharwar farm, have been continued with useful results. Groundnut and tobacco proved better than cotton as rotation crops to *jowar* in the transition tract and this is of great value as groundnut forms a major crop in lighter soils of this tract. Experiments to find suitable rotations to fit in a second crop after groundnut (in the same year) were tried during 1934 and 1935 and gram and wheat were usefully tried as second (*rabi* season) crops, after groundnut. In the Gokak canal tract, the system of growing *tur* as a row crop with *kharif* maize instead of taking maize after maize in the same year has now become very popular, and experiments indicate very favourably towards growing *tur* or cotton as row crops in maize. The farmer is fast taking to this mixed cropping in preference to his previous system of growing maize after maize under irrigation and this mixed cropping is becoming more or less general.

Wider sowing of cotton and *jowar* in the districts of Surat and Broach is now an established practice. A further improvement of cotton dibbling by hand is also spreading largely in parts of Surat district. In both these methods the cost is reduced due to better interculture and the crops are better.

Trials in cultivators' fields of wider sowing of *bajri*, wheat and other cereals are being carried out in North Gujarat and as a result of propaganda the practice is gaining ground in those villages.

At the Sugarcane Research Station, Padegaon, the existing system of rotation of cane, *kharif jowar* (*Nilwa*) and *sann* evolved on the basis of previous experimental work at Manjri is found to be not suited to the soil type on the farm due to the poor growth of *kharif jowar* which is, therefore, replaced by either *rabi jowar* or cotton. A comprehensive study to elucidate the effect of various rotational crops on the soil and their subsequent influence on a cane crop has been also in progress. The results of experiments have revealed the efficacy of a new type of weed locally called *Patada shevra* (*Alysicarpus belgaumensis*). The cane yield followed the order of treatments *Patada shevra* > *sann* > *fallow* > *cotton* > *jowar* > *groundnut*.

Investigations at Padegaon on the influence of cultural methods on cane growth have shown earthing up, which is one of the important cultural operations, to be quite unneces-

sary from the standpoint of the development of the plant. It is in fact observed to smother young shoots capable of developing into millable canes eventually affecting yield.

Central Provinces and Berar.—Suitable rotations have been worked out for irrigated and unirrigated crops.

Coorg.—Experiments are now in progress in the cultural requirements of oranges. A farm has been opened in a dry cultivation area and experiments in a suitable rotation will be conducted next year. No further research work is possible at present with the limited resources at the disposal of the Government.

Delhi.—No research or experimental work of the kind referred to has been done.

Madras.—Experiments on rotation of crops were conducted in the cotton section at Coimbatore. The effect of a mixture crop of sorghum and pulse on the succeeding cotton was found to be the best in the proportion of three parts of the cereal to one of pulse. Of the pulses tried, cluster beans and green gram withstood better the interference of the cereal than other leguminous crops. It was noticed that the growing of certain leguminous crops like cluster beans, green gram and red gram, in association with sorghum was not beneficial to the succeeding cotton. Pure crops of cowpea and soya beans tended to depress the yield of Cambodia succeeding them. It was also found that the type of soil has a greater influence on the choice of rotational crops than the extent of water-supply. On a sandy soil it is advantageous to grow groundnut before cotton but on alkaline land cholam or ragi does equally well.

McCornick Dearing bullock cultivators which is an improved type recommended for inter-cultivation of crops planted in rows and H. M. Guntaka (improved blade harrow) were used for inter-cultivation of sugarcane in the II Circle (Kistna, Guntur and Nellore) and their use showed a saving of Rs. 4 per acre over the local method of ploughing. Light iron ploughs and H. M. Guntakas were used for preparing land for sowing sorghum in the place of country ploughs and local Guntakas and were found to be more economical in cultivation.

North-West Frontier Province.—The experiments reported in the previous reports are still in hand and regular propaganda among the zamindars was made for following proper rotations.

Use of the improved implements like Raja Plough, Ceres Plough, Punjab Ranso Plough, Clod Breakers and Harrows for tilling the soil has been found to be much more economical than the old method. Ploughing of the soil with an inversion plough followed by a clod breaker and harrow can give a much better tilth than repeated ploughs with Desi lial.

LEGUMINOUS CROPS THAT ARE BEING TRIED.

- (1) Sheftal (*Trifolium Euspinatum*).
- (2) Berseem (*Trifolium alexandrianum*).
- (3) Arhar (*Cajanus Indicus*).
- (4) Cow Peas (*Vigna Catiang*).
- (5) San Hemp (*Crotalaria Jriincase*).
- (6) Gura (*Cyomopois Peoralioidea*).
- (7) Daincha.

Orissa.—No work was done.

Punjab.—Work on the improvement of crop varieties, rotations and methods of tillage has been continued and expanded.

Sind.—The work of the Agricultural Department in this connection has been overhauled and expanded. Special attention has been devoted at Sakrand to research on rotations and methods of tillage suited to post-Barrage conditions. Attention is also being devoted to trials of rotations suitable for the reclamation of alkali lands and maintenance of soil fertility. Many of the methods worked out in the research station have been demonstrated successfully in the districts. The six new demonstration farms established under the 'Six Farm Scheme' have been developed and are taking a prominent place in departmental demonstrations and propaganda.

The Agricultural Engineering Section of the Agricultural Department has devoted attention to tillage problems connected with the inter-cultivation of drilled crops and a cheap and efficient implement for this work has been designed and is being manufactured at the Government Workshop.

United Provinces.—Economics of various rotational practices for both sugarcane and paddy were studied and trials made with fallow and sania for purposes of soil amelioration, wheat and grass as Rabi food crops and chari, berseem pea, etc., for fodder purposes. In addition to these cotton, mustard and linseed were the other crops which were studied in rotation with sugarcane and paddy, but definite results are not yet available.

7. Mass production of wooden parts of Agricultural Implements (paragraph 105).

Assam.—The Agricultural Department has no Engineering branch, and there is not much demand for improved implements. The first requirement is the development of a type of cattle which will be capable of operating better ploughs than the traditional models.

Bihar.—The recommendation has been accepted by the Provincial Government. Efforts will be made to give effect to it.

Bombay.—There is no standardisation in agricultural wooden implements and as they consist of very few parts the local carpenters replace them without much difficulty. The demand is not therefore so great as to prepare them on a mass production scale.

Central Provinces and Berar.—This has not yet been attempted as the village carpenter fulfils the present requirements. Suitable timber is generally available locally.

Coorg.—The Government is not in a position to employ an agricultural Engineer but the Agricultural Department is doing its best to popularise improved agricultural instruments and thirty-six Weston ploughs were sold during the year.

Madras.—This question was considered as early as 1929 by the Advisory Committee; but the Committee was not in favour of such a proposal.

United Provinces.—The wooden parts of improved ploughs and hoes were got prepared locally at different centres and distributed largely to the cultivators at a comparatively cheaper rate as a result of mass production.

8. Organisation of the Agricultural Engineering Sections of the Agricultural Departments (paragraph 106).

Assam.—There is no Engineering branch at present, and there are much more urgent needs. The advantages which might be derived from the use of water lifts for irrigating the riverside lands in the dry season, for growing boro paddy with better security, will be further examined when the organization of the department is strengthened and funds are available.

Bengal.—Owing to lack of funds the Engineering Section of this department has not been fully organised and equipped. Demonstration and experiments with gur and sugar manufacturing plants of the Agricultural Engineer's design were the main features of the section.

Bihar.—A nucleus staff which is engaged chiefly on installing tube-wells exists. Expansion of this staff in order to study other agricultural engineering problems depends upon the availability of funds.

Bombay.—A scheme for the reorganisation of the agricultural engineering section of the Agricultural Department, containing proposals to divide its activities into main branches, viz., (1) implements and machinery, including pumping, and (2) boring, was considered in 1929 but it did not materialise owing to financial stringency. In 1931 boring activities had to be stopped owing to retrenchment and it was decided to dispose of the machines. Permission was, however, granted to hire out the machines on certain conditions if there was a demand. So far thirty machines, including spares and accessories, have been sold for Rs. 86,488. There has been a demand for hiring the machines from places where rains had failed and water supply was scanty, and Rs. 20,000 have so far been realised by way of hire. The control of mechanical assistants has been recently transferred to this section. The transfer has considerably widened the sphere of activities of the section and has given it scope to render necessary help in machinery matters direct to the agriculturists.

Central Provinces and Berar.—The post of Agricultural Engineer having been abolished owing to retrenchment, the engineering section is under the supervision of the Principal, Agricultural College.

Delhi.—There is no separate Agricultural Engineering Section of the Agricultural Department. Delhi needs are met from the Punjab.

Madras.—In 1928, an Agricultural Research Engineer was appointed and the Research Engineering section was established. By 1931, the section was provided with an up-to-date workshop suitably equipped with a range of machine, tools and all facilities for the task on hand. The work connected with pumping and boring is under the control of the Industries Department (Please see also paragraph 9 below).

Orissa.—No Agricultural Engineering Section has yet been established; but a well-boring section is being organised.

Punjab.—Little Research in Agricultural Engineering has been done as the post of the Agricultural Engineer is still vacant. Instruction is being given in agricultural engineering to students attending the degree and other classes in the Punjab Agricultural College, Lyallpur.

Sind.—An Agricultural Engineering Section of the Agricultural Department consisting of the Agricultural Engineer in Sind, the Assistant Agricultural Engineer, the Tearing Mechanical Assistant, the Boring Mistry and 2 Mechanical Assistants, has been organised, and an up-to-date workshop has been established at Mirpurkhas where considerable progress has been made in the design of new and improved agricultural implements.

Two tractor outfits with complete equipment for developing new lands which could not otherwise be brought under cultivation owing to the existence of deep-rooted weeds and scrub-growth have been purchased. One is working on the Left Bank and the other on the Right Bank.

A Government ginnery has been established along with the Agricultural Engineering Workshop at Mirpurkhas for ginning the improved varieties of cotton grown on Government Research Stations and Farms in the Province, as well as that grown by registered growers.

United Provinces.—The reorganization of the engineering section has increased the efficiency of this branch.

It has not been possible to have two separate sections—one for machinery and the other for boring.

The number of tube-wells of five inch and over constructed was 307 and of small strainer wells 595 while that of borings in masonry wells was 5,191 of which 4,373 were successful.

An engineer has been in charge of the Engineering Section.

9. Research work on agricultural implements and machinery (paragraphs 107-108).

Assam.—Inversion ploughs are preferred on the Government farms. The improvement of implements for the staple paddy crop is not urgent. Tractor culture has not yet shown encouraging results. The only improved implement for which considerable demand has arisen is the 3-roller sugarcane mill.

Bengal.—Several new types of ploughs and 'cultivators' were designed, constructed and put on the market after close testing. Some other implements were also designed and constructed. They will be recommended for general use if their efficacy is proved after test.

Bihar.—The alteration of the small "Rudsack" plough manufactured by Messrs Ransomes Sims and Jefferies to suit local conditions has been taken up with the firm.

The designing of an improved type of "Noorag" bullock power has been taken in hand.

A hand-power winnower was designed and an experimental machine manufactured. Further experiments on the drive and design are being conducted so as to reduce the cost of the machine to Rs. 100.

Work on the designing of agricultural implements is being handicapped for want of funds and the services of a mechanical draftsman.

In order to meet the demand for a small power cane-crusher which would be worked by an engine of 8/10 H. P. the Bihar Junior power mill was designed and approved by the Sugar Technologist.

A complete set of bullock cultivating implements has been designed for the North and South Bihar tracts by Messrs. Cliff and Sarkar, respectively. The success of these implements can be judged by the steady increase in the sale of these implements.

Bombay.—Since the issue of the report of the Royal Commission on Agriculture more attention has been given to the research on implements, including design of new

machines and modification of the indigenous ones and the following designs were completed before the end of 1930 out of which the last has been granted a patent by the Patent Office :—

1. Improved plough share.
2. Modified "Orient" Plough.
3. Improved seed drill.

The design of an improved winnower was further added to the above in 1931 along with the design for a combined winnowing and threshing machine, modifications to the grass spear extractor and the rotary groundnut raiser. During this year the designs for the soil sampling machine, the steel chicken cage, the R. C. C. fowl cell and R. C. C. fencing posts were completed and found to be very useful.

The patented improved seed drill was, however, found to require excessive draft during its tests at various places. A new design had, therefore, to be evolved during 1932-33 taking into consideration the good features of the patented drill and making such additions and alterations which will result in the reduction of the draft and also the weight. The modifications to the grass spear extractor and the rotary groundnut raiser were completed during these years with very encouraging results and in addition two new machines, viz., the ring cutting machine and the lemon juice extractor, were made.

The designs for a ditching harrow for the Dry Farming Scheme, a simple winnowing fan and wheat thresher were then taken in hand and completed in 1934-35 along with several improvements in the improved drill, the groundnut digger and the Gujarat blade harrow. The ditching harrow which was later called a soil scooper on account of its making zig-zag pockets or scoops in the ground, gave very encouraging results when tested at the Dry Farming Research Station, Sholapur, and proved that it stopped erosion and checked the run-off very effectively. Its performance at the Bijapur Dry Farm was not, however, so very successful owing to peculiar condition of Bijapur soil, although scooping was found to be distinctly advantageous to check run-off and prevent erosion. The machine requires further improvements in order to make it suitable effectively to deal with the soil at Bijapur and efforts in that connection are in progress. Four such machines were built for trial at different places out of which two were sent to Khandesh. The results obtained in Khandesh were not, however, found to be so very encouraging because it was found on experiment that the scooper was mainly useful in *rabi* areas where heavy rains were received in a few hours on lands which had no crops at that time such as in Ahmednagar, Sholapur and Bijapur districts. However, the machine is not yet taken up by the public.

As regards the winnowing fans the chain gear and the rope gear models were found to be more economical and useful amongst the three or four types built for experiments. The rope gear model is less costly in initial outlay, and very simple in construction, while the chain gear is more easy to work and more effective on account of its higher wind velocity. The rope gear fan has been further improved and fitted with a belt drive in order to reduce the slippage to a minimum. The design of the chain gear fan also has been further improved with a view to make it more compact, and efficient. Both these fans have been demonstrated at several places and are greatly appreciated by the public in general and the agriculturists in particular. The demand for these fans is gradually on the increase especially in Khandesh where they were exhibited on a large scale. These fans supply artificial wind of velocity ranging from 5 to 10 miles per hour depending on their type and speed and are found to effectively deal with any kind of cereal.

The design for a bullock-power wheat thresher has been completed and is greatly appreciated by the agriculturists in Gujarat and Khandesh. The approved model is either fitted with 12 or 15 serrated discs.

The improved seed drill has almost reached a stage of completion and is built in three sizes, viz., (1) the all-steel model intended for all cereals, (2) the special wheat drill for Jalgaon tract and (3) the improved cotton drill for Karnatak and Khandesh. All the drills are fitted with lifting and automatic sowing attachments. The last two drills are cheaper and require reduced draft. Both the wheat and the cotton drills are only a conversion of the local drills into an automatic drill, the lifting and automatic sowing attachment of the all-steel model being fitted on them. Seven such improved drills were sent out in the district for exhaustive tests on sowing *jowar*, wheat and cotton and their performance has been appreciated by the agriculturists in general.

It has been, however, experienced that some preliminary training is very essential to handle these drills successfully with a view to get the best results and introduce them on a large scale.

The bullock-power all-steel groundnut digger mounted on wheels has been found to be very useful and economical in digging out groundnuts in comparison to the local method

of using a blade harrow for the purpose. Three such diggers have been made for conducting tests at different places and the results are fairly encouraging. In view of the experience gained during these trials it is found essential to improve the machine further and efforts in that connection are in progress.

The introduction of ball bearings in bullock-cart wheels has met with a fair amount of success. The problem presented several practical difficulties in the early stage but the majority of them have been so far overcome. There are at the moment 10 sets working at different places and it will be possible to say something definite regarding their utility within the next few years when complete information regarding their behaviour is available for scrutiny.

The tests with a dynamometer have distinctly shown a great reduction in draft in addition to much saving in lubricant when compared with the ordinary wheels.

The improvements on the Gujarat harrow are yet under study and the following are taken in hand for investigations :—

1. Type cultivator for Gujarat.
2. Ridging implement for Gujarat.

To recapitulate from the beginning it will be found that the improvements made so far are confined principally to the following :—

- Modified orient plough.
- Improved plough share.
- Improved automatic seed drill (patented).
- Improved light weight automatic all-steel drill.
- Special automatic wheat drill for Jalgaon tract.
- Automatic cotton drill for Karnatak and Khandesh.
- Winnowing machine.
- Grass spear extractor.
- Groundnut raiser.
- Winnowing fans, chain and belt-gear type.
- Soil scooper.
- Wire ring cutting machine.
- Lemon juice extractor.
- Bullock cart wheels fitted with ball bearings.

However, only limited items that are cheap are in demand by the public.

There is no special demand for wooden parts and the general demand is satisfied by the local carpenters. The two factories at Satara and Kirloskarwadi are supplying all the requirements of iron implements to the cultivators of South Central Division.

Central Provinces and Berar.—Owing to the abolition of the post of Agricultural Engineer, no special research work on agricultural implements is undertaken with the exception of designing sample implements.

Madras.—The work of the Research Engineer mainly consists in the improvement of indigenous implements, the modification and adaptation of types of implements introduced from other countries and the evolution of new types. Particular attention is devoted to the more important items like ploughs and other tillage implements, seed drills, and water-lifts. Large varieties of iron ploughs have been tested and a range of ploughs well adapted to the conditions of the various tracts of the Presidency has been selected after extensive comparative trials for recommendation to the cultivators. Ploughs of Indian manufacture have been vigorously fostered combined with a rigid insistence on better methods of production and a much improved product. As a result, there is a reduction in the general level of prices in the Presidency by more than 50 per cent. and the Indian made article has been placed in a very favourable and well merited position. Improvements to the design of a well known circular mho of South Arcot district have resulted in a 40 per cent. increase in output with a considerable reduction in draught and decrease in cost. Experimentation with seed drills has led to the development of a simple and efficient design of mechanical drill for which a patent has been obtained. The drill has since been further simplified and its cost has been brought down. Much improvement has also been effected in indigenous wooden drills and seed sowing attachments. A simple and efficient bullock implement for forming bunds has been designed and passed into the hands of local manufacturers. A simple mechanical turmeric polisher capable of producing a better quality of finish and effecting a considerable reduction in the cost of treatment was made and demonstrated. A grain polishing machine and a wet land puddling implement were under trial. Numerous

tests and experiments are also being conducted on hoes, cultivators, sugarcane crushing mills and centrifugals, groundnut shellers, cotton gins, chaff-cutters, threshers and winnowers and other classes of agricultural machinery.

Punjab.—A scheme has been drawn up whereby it is proposed to award substantial prizes during the coming years for inventions designed to improve the various implements of cultivation required or used in the Province.

Sind.—Several new and improved water lifts were designed and manufactured by the Joint Mechanical Engineer at Sukkur. The Agricultural Engineering Section has designed several implements such as the all-steel bullock cart (Rs. 150), the improved winnowing machines (large Rs. 246, small Rs. 150), and the inter-cultivator (Rs. 11). These have been fully tested in the Districts and are being manufactured at the Agricultural Engineering Workshop. An improved clod-crusher evolved by the Agricultural Department is being manufactured by a firm in Karachi and sold to cultivators in large numbers. The Agricultural Department has also designed a mechanical device for sifting cotton seed and filling the same in bags and has installed it at the Ginning Factory. An all-steel harrow suitable for severe field service conditions has also been designed. The wooden one costs Rs. 8 and the steel one Rs. 16. A bullock power threshing machine, a universal seed drill and an effective implement for cutting cotton stalks are now being designed.

United Provinces.—Olpad thresher, a cheap implement for threshing wheat has been standardized and is showing signs of becoming popular. Other implements which were experimented on were seed drill, winnower and inter-culture implements.

The sugarcane crushers which were designed by the Sugar Technologist were tested and their manufacture was entrusted to a firm.

Two three-roller sugarcane crushers and an approved *gur* making pan which were constructed at Government Technical School, Gorakhpur, were tested and used for demonstration purposes in rural development centres and gave satisfactory results.

A ball bearing attachment was fitted to a water lift and was much appreciated. A simpler form of arrangement for giving similar service without the use of ball bearing was also evolved.

10. Attention to problems of cultivation in Dry and Precarious Tracts (paragraph 112).

Assam.—The terrace rice cultivation of paddy in the Naga Hills, North Cachar Hills, Saidya Frontier Tracts and Lushai Hills continued successfully. Successful demonstrations were carried on with several varieties of paddy. Fruits and vegetables also are being grown in these tracts.

Introduction of *Boro* paddy in *Aman* lands, where the latter crop is destroyed by unprecedented floods, has been continued on an extensive scale by means of power pumps.

Bihar.—Further work on dry farming was continued at Gaya Farm and the result achieved is encouraging. The yield of cane from this system averaged 700 maunds per acre.

Bombay.—The experiments in connection with the problem of dry farming as preliminarily studied by the Soil Physicist at the Manjri dry farming station are being continued at the new dry farming research station at Sholapur, with further problems for investigations.

During the year 1934 the use of seed grading by means of sieves and sowing with the improved seed-drills in plots with low bunds to check the surface erosion and constant interculturing, were advocated on a large scale and the area under these two methods of dry farming has been increased to 2,500 acres in the Poona district and 1,560 acres in the Ahmednagar district.

During 1935, the area in the Poona district increased to 3,000 acres and 2,000 acres in the Ahmednagar district. There were in all 169 sets of dry farming tools distributed in 84 villages of Ahmednagar district.

During 1936, the area under dry farming methods was 4,560 acres and in 1937 it was 9,800 acres in the South Central Division. The increased area is due to the extension of the dry farming methods in the Sholapur district.

The Dry Farming experiment was started on a field scale at Halli in the Bijapur district from 1931 and continued up to 1933. But the results were not encouraging as the net profit obtained by the methods adopted was less by about 30 per cent. than that obtained by local methods. A special dry farming experimental station has been started at Bijapur under special staff with the financial assistance of the Imperial Council of Agricultural Research to further investigate the problem locally.

From the calendar year 1929 to the end of September 1933, research work on dry farming was carried out by the Soil Physicists to the Government of Bombay, at a small station at Manjri near Poona. The average annual cost during this period was about Rs. 14,000. As a result of the experimental work, a tentative method called the Bombay dry farming method for securing the jowar crop in the precarious tract of the Bombay Deccan was evolved. This method was tried on the fields of the cultivators on extensive areas of the Poona and Ahmednagar districts by the staff of the Deputy Director of Agriculture, South Central Division. The method recommended included the following important items :—(1) ploughing the land with an iron plough during the hot weather ; (2) four to five harrowings during the monsoon months of June to September ; (3) placing bunds of 1' to 2' height in the fields across the slope so as to divide the field into small compartments ; (4) sowing a moderate quantity of seed with a drill having the coulter 18" apart ; and (5) interculturing the crop three or four times before flowering.

The Imperial Council of Agricultural Research sanctioned the scheme for research in dry farming as proposed by the Bombay Government. The total grant of Rs. 2,11,700 was finally sanctioned by the Imperial Council for a period of five years. The Bombay Government contributed a sum of Rs. 59,710, also for a period of five years. The scheme was actually launched from 1st October 1933 and will complete its first sanctioned period by the end of September 1938. The work was commenced simultaneously along three lines, viz., (1) work on soils, (2) work on the plant (sorghum or *jowar*) and (3) work in the field. A brief summary of the work done under each of the above three main divisions from the beginning of the scheme is given below. For carrying out the research work two experiment stations the main centre at Sholapur and the sub-centre at Bijapur—were established and suitably equipped.

(A) WORK ON SOILS.

The soil types of both the research stations have been studied intensively with regard to both their physical and chemical characters in their profile sections such as :—

- I. Survey and level contours.
- II. Soil Classification.
- III. Physical characters.
- IV. Chemical characters.
- V. Gains and losses of soil moisture.
- VI. Nitrogen recuperation of soils from Sholapur and Bijapur.
- VII. Rate of disintegration of murum (Disintegrate trap).

Disposal of rain-water and the problem of soil.—By means of suitably laid out plots and by constructing masonry tanks and lysimeters, the disposal of rain-water was studied for four years at Sholapur. Rain-water lost by run-off only was studied for two years, viz., 1936 and 1937 at Bijapur. The results showed that nearly 30 to 40 per cent. of the effective or useful rain was lost by surface run-off. Evaporation was also found to be responsible in making a large portion of the soil moisture unavailable.

(B) WORK ON THE PLANT (JOWAR).

Physiological Investigations on Jowar Plants.

The following items of work in the programme of plant investigation were undertaken and very interesting and important results have been obtained :—

1. Germination of jowar seeds in different soils.
2. Wilting co-efficient of jowar plant at different stages and in different soils.
3. Developmental studies of the jowar plant.
4. Manurial requirements of jowar plant.
5. Water-requirement of the jowar plant in manured and unmanured soil.
6. Sugary secretion of "Chikta" on the jowar plant.
7. Trial of jowar strains.

(C) FIELD OR AGRONOMIC WORK.

In consultation with the Statistician to the Imperial Council of Agricultural Research the unit experimental plot was fixed at one guntha with five or six replications. It was further decided to repeat the marginally

1. Preparatory tillage.
2. Bunding and mulching.
3. Manuring.
4. Fallowing.
5. Time of sowing and the plant population.
6. Rotation.

noted experiments on two types of soil at Sholapur and two types of soils at Bijapur. The results are available for three seasons in some cases but only for two seasons in others.

Besides these statistically laid out experiments, the trials of the Bombay dry farming method and of the cultivator's method were also conducted successively for three years at Sholapur and Bijapur with the object of studying the suitability of the former based on the previous results and the modifications necessary to suit local conditions in order to make it an economic and a practical proposition for the cultivators. The following statements compare the results of yields of the two methods in lbs. per acre at both centres :—

Year.	Bombay dry farming method.		Cultivators' method.	
	Grain.	Straw.	Grain.	Straw.
<i>Sholapur.</i>				
1934-35	224	496	106	218
1935-36	163	252	97	303
1936-37	99	356	43	156
<i>Bijapur.</i>				
1934-35	677	957	421	875
1935-36	451	602	114	194
1936-37	309	411	204	422

These results show very definitely and clearly the very great advantage which would accrue to the cultivators in "scarcity area" by the adoption of the "Bombay Dry Farming method" in place of the local methods of cultivation in such areas. However the financial results are not better and further work is necessary to get economic results.

The Cotton Transport Act originally applied in Surat district has been further extended in Broach area and a separate protected Narmada-Mahi Zone has thus been formed. This has tended to improve the quality of Broach cotton by preventing fraudulent mixing of inferior Malvi from beyond Paneh Mahals. The application of Cotton Transport Act has therefore a salutary effect in maintaining the quality of Surat and Broach Cottons.

Central Provinces and Berar.—In view of the fact that a large part of land in the Central Provinces and Berar is unirrigated, most of the Agricultural Department's work done is with crops grown on water supplied by the rainfall alone.

Coorg.—A farm has been opened to improve dry cultivation. There are no precarious tracts.

Delhi.—Methods of conserving moisture for purposes of "dry farming" have been fairly widely demonstrated by the departmental staff.

Madras.—The Agricultural Advisory Committee suggested the starting of a farm to study dry tracts with red soil. Proposals were formulated in 1929 for opening a millet station at Adoni to serve the Ceded districts but it was deferred owing to financial stringency. Then a scheme was submitted to the Imperial Council of Agricultural Research to study dry farming problems and this was sanctioned. Work on the scheme was started in 1934 at the Agricultural Research Station, Hagari. Even before the scheme was started, the station was endeavouring to effect improvements in the methods of dry farming with a view to obtain maximum benefits from the poor rainfall in the tract. Experiments in fallowing were conducted and this nearly doubled the yield in the next year as compared with continuously cropped plots. The experience of the past 3 years of the soil moisture experiments at the station has shown that bunding and ploughing at intervals are beneficial. Bunding gave 50 per cent. more yield with cotton in 1934-35 and 33 per cent. more yield with sorghum in 1935-36. Trials were also conducted with bunded plots of different sizes to determine the optimum size of the plots and bunds suitable to this tract and the most economical method of forming the bunds. On the success achieved at the Hagari station in the conservation of rainfall, experiments were started on the new methods of dry farming in the red soil areas of Anantapur district in 1936 but due to certain technical difficulties in laying out plots they had to be stopped temporarily. The implements used although satisfactory at Hagari were found to have limitations on shallow red soil. Although improved tillage and field bunding were tried in three centres, Anantapur, Kadiri and Hindupur, no differences in favour of the new practice were noted. It is proposed to pursue the work further and also adopt the use of rotary tillage which stirs the soil without inversion.

North-West Frontier Province.—On the dry farming sections of Agricultural Research Stations Tarnab and Naurang Serai, extensive trials on wheat, barley, sunflower, ground nuts, arhar, lupins, castor, isapghol and tugham malanga are in progress to explore avenues for putting such areas to the best possible use and to find better yielding and drought resisting varieties, their optimum seed rate, improved methods of cultivation and best methods of sowing, etc.

Orissa.—Precarious tracts in this province are represented by the areas liable to floods. Considerable progress was made in selecting a strain of flood-resisting paddy suitable for the areas. Trials also proceeded to find out a suitable flood-resisting variety of sugarcane. It has been found that C. O. 421 is superior to C. O. 285 both in flood-resisting character and in yield. Experiments for finding out the suitability of the different kinds of rabi crop for the flooded areas were continued. Work was also done for selection of an early maturing *Rahar* (*Cajanus indicus*), for cultivation in flooded areas after the recession of water to recompense to some extent the loss of the paddy crop.

Punjab.—Experiments on barani cultivation are being carried on at the following Experimental Farms :—

Rawalpindi.
Jullundur.
Gurdaspur.
Campbellpur
Ambala.
Karnal.
Gurgaon.

A Dry Farming Research Station jointly financed by the Imperial Council of Agricultural Research and the Punjab Government has been started in the south-east of the Province. The Millet Botanist is giving attention to work on crops suited to barani conditions.

Sind.—The botanical work on drought resistant type of bajri suitable for extension in the Desert Tract of the Thar Parkar District, is in progress. Early maturing varieties of rice have been evolved for cultivation in the non-Barrage areas in South Sind.

United Provinces.—Deep ploughing in *kans* infested lands in Bundelkhand with the aid of high power tractors proved effective in eradicating *kans* and the demand increased. Grants-in-aid amounting to Rs. 11,195 were paid for the construction of embankments and reservoirs; 57 embankments were completed and 13 were in progress in the precarious tracts.

11. *Legislation to deal with Pests and Diseases (paragraphs 113 and 114).*

Assam.—It has not yet been practicable to legislate on the subject.

Bengal.—The Bengal Water Hyacinth Act of 1936 was passed, but no legislation to control diseases has as yet been attempted.

Bihar.—There is no necessity for such legislation in Bihar at present. Before legislation is attempted the scientific side of the case should be fully worked out and the problem clearly defined.

Bombay.—No action has so far been taken in this direction in the province of Bombay and none seems necessary at this stage.

Central Provinces and Berar.—An Agricultural Pests and Diseases Act was passed in 1936 by the Central Provinces Legislature.

Coorg.—The Coorg Agricultural Pests and Diseases Act, 1933, is in force. This Act makes provision for the prevention of the spread of insect pests, plant diseases and noxious weeds.

Delhi.—There has been no such legislation.

Madras.—The Madras Agricultural Pests and Diseases Act, 1919 is enforced to combat diseases affecting palms and coconuts against water Hyacinth, a noxious weed, against pests like hairy caterpillar and insects attacking Cambodia cotton, etc. In cases other than the Cambodia cotton pests, the Act is enforced in specified localities whenever the pest or disease is prevalent or its occurrence is imminent. In the case of Cambodia cotton, the Act has been in force for a number of years in the principal localities where Cambodia is grown, viz., in the districts of Coimbatore, Salem, Trichinopoly and Madura and where it is subject to attack by the insect pests "stem weevil" and the "pink boll

worm" if the crop is not uprooted after the first pickings. To eradicate the pest, the notification issued under the Act requires the removal of all cotton plants from fields in the tracts by a specified date (which is generally 1st September though different dates as near as possible to this date are prescribed owing to the special conditions obtaining in certain tracts). A period of rest is enforced before the next crop is sown. It is now generally admitted by ryots and the cotton trade that the quality of cotton has improved with the continuous enforcement of the Act for some years. These measures continue to remain in force.

Similarly the enforcement of the Act for the purpose of eradication of Hairy Caterpillar (a pest attacking groundnut and cashew crops) has led the cultivators to become more and more alive to the necessity for taking prompt action immediately the pest is noticed and the pest is now being effectively checked.

The enforcement of the Pest Act for the eradication of the palm disease called Budrot of palmyra and coconut continued to be in force in the Malabar district. The Act is also in force in certain taluks of Guntur, Chingleput, South Arcot, Tanjore and Malabar districts to control "water hyacinth" which is a source of danger to water-courses and so is declared an agricultural pest under the Act.

In order to safeguard the purity of the Tinnevelly cotton, the Madras Cotton Control Act was passed in 1932. It has been put into force in the districts of Madura, Ramnad, Tinnevelly and Coimbatore, and in these areas, the cultivation of inferior cotton (known as pulichai) and the mixing of it with other kinds of cotton and the trade in such mixed cotton is prohibited by a statutory notification. The enforcement of these provisions continues and has produced the desired results.

Punjab.—Data have been collected regarding the incidence of certain pests and diseases of fruit of farm crops with a view to determining whether there is a case for legislation but persuasive methods rather than legislation are being tried. A scheme for surveying the incidence of the San Jose Scale insect in the Punjab and North-West Frontier Province has been financed by the Imperial Council of Agricultural Research and is in progress.

Sind.—No action has so far been taken in this direction and none seems necessary at this stage.

United Provinces.—The United Provinces Cotton Pest Control Act to provide for the proper treatment of cotton seed was passed in 1936.

12. Protection against wild animals and vermin (paragraph 116).

Assam.—The patent "Raticide" was a failure. Both carbon bisulphide as well as paradichloro benzene proved highly efficient in the control of rats. Filling of holes fumigated with carbon bisulphide proved of practical value. Paradichloro benzene was safely used in the godowns and kitchens and hen runs. Grains sweetened with gur and poisoned with strychnine served the purpose of a good trap food but special supervision is required in the use of such poisons.

The jackals cause heavy damage to sugarcane in certain localities. Use of traps has been only partially successful in their capture.

Bihar.—The Provincial Government do not propose to take any further action on this recommendation as there are quite a sufficient number of gun licences in existence at present.

Bombay.—In 1936, one gun-club was organised in East Khandesh in the North Central Division on co-operative basis to kill wild pigs and blue bulls (a kind of antelope) that damage the crops considerably. Pigs and blue bulls numbering 135 were shot dead and an equal number was injured.

In 1937, three more clubs were started in contiguous tract covering an area of 20 miles by 10 miles. The total number of wild pigs and blue bulls killed was 384 and an equal number was injured.

In the South Central Division work was done in Poona, Satara and Ahmednagar districts mainly through shikar parties paid from popular contributions. On the Godavari canals tract 204 wild pigs were killed. In the Mangi group in Shevgaon taluka a co-operative crop protection society for protection of crops against pigs and deer was organised and registered and it secured 81 pigs and 125 deer. In the Satara district, the Palshi group gun-club secured the grass in the reserved jungle (the club's area of operations) at a concession rate on cutting terms without being auctioned and the club levied a little extra charge per sickle on the members and engaged a local shikar party and killed 150 pigs and 15 deer. On the Mutha left bank canal and in the reserved jungle round about the fort of Sinhagad in Haveli taluka in Poona district a local

shikari under the supervision of the Shikar officer killed 329 pigs. The canal tracts in Ahmednagar district namely the Godavari Right and Left Bank canals and the Pravara Right and Left Bank canals are since 1936 cleared of pigs and the destruction of prickly pear by the Cochineal insect has removed the pig-shelter and less pigs are in evidence in the plain tract of Ahmednagar district.

Fencing with woven wire fence against the attack of wild pigs was undertaken in the Mallad tract of the Southern Division. About 20 miles of fence was erected upto 1931. A co-operative fencing scheme to protect an area of 1,014 acres with 5½ miles of fence was worked out at Tegur and share capital was also collected for the purpose of purchasing the fence. Later on the progress in this direction slowed down owing to fall in the prevailing prices of agricultural products and the difficulties in collecting the required share capital. The introduction of the Cochineal insects for the destruction of prickly pear helped to a considerable extent to reduce the damage caused by wild pigs. A crop protection society with a hunting party was organised at Turkewadi in the Chandgad mahal of Belgaum district and did good work. A new gun-club was started at Arwatgi in 1933 in the Dharwar taluka of the Dharwar district and it has continued to do excellent work. Similar gun-clubs have been organised during the last four years in the western parts of the Dharwar and Belgaum districts and they also did good work. There are 17 group gun-clubs now working. In all more than 1,900 wild pigs have been destroyed and many more were scared away with the result that the cultivators of 172 villages saved their crops without much watching at night time. The demand for similar gun-clubs is increasing and it is receiving attention. Campaigns against deer have been organised in Gadag and Ron talukas of the Dharwar district since 1928 and are continued.

Pig killing campaign in Ahmedabad district.—A Shikar party was organised by the Shikar Officer attached to the office of the Director of Agriculture to kill pigs at Dholera in Ahmedabad district. The Collector of Ahmedabad provided the funds from the village uplift grant. 231 animals including 62 Tuskers, 94 females and 75 half grown pigs were killed at a total cost of Rs. 196.

Nilgai (Roz) killing campaign in Kaira district.—The Collector of Kaira had received many applications from the cultivators regarding damage done to the crops by nilgai (Roz). A Shikar party was organised by the Shikar Officer attached to the office of the Director of Agriculture. The Collector of Kaira provided the necessary fund from village uplift grant. During the year 1936-37, 91 animals were killed at a cost of Rs. 238. Similar campaign is to be started this year also.

Central Provinces and Berar.—The use of wire fencing is demonstrated and advocated and taccavi for the purchase is available. Crop production societies were organized, but they are not very active. Co-operative fencing is recommended. Gun licences are freely given.

Coorg.—Gun licences are given liberally where necessary.

Spraying with Bordeaux mixture and sulphur dusting to combat leaf and fruit diseases in orange, coffee and arecanut is being done especially so far as coffee is concerned. The Agricultural Department gives instructions in the methods of controlling fungus and insect pests.

Delhi.—Black-buck and pig are commonly found in the Khadir area of the Province, and rats do much damage generally. It is said that the cultivator is now more willing than formerly to protect himself against wild animals and vermin, but there has been nothing in the nature of an organised campaign in this connection. Stored crops are to some extent protected by the activities of plague gangs employed to exterminate rats in buildings, etc.

Madras.—The recommendation of the Commission was that gun licences should be granted on a more liberal scale for destruction of wild animals which do damage to crops.

In November 1937, the Government have had occasion to draw the attention of District Magistrates to the fact that the number of licensed guns has been decreasing in this Presidency, and in that connexion, point out that such reduction might not be desirable in areas where there is a definite need for protection against wild animals. Instructions were issued to them to be more liberal in considering applications for licences from persons in such areas.

North-West Frontier Province.—Control of rats by District work staff with fumigation of cynogas remained in progress.

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Orissa.—Except from elephants, damage to crops from wild animals in Orissa is not serious. The most satisfactory remedy is to maintain the balance of nature within forest areas by adequate shooting rules so that no depredatory animals can increase abnormally, and to provide facilities for drinking within forest boundaries so that animals do not have to come to village tanks for the purpose. The provision of Game Tanks within forest reserves is now a regular feature of the Forest Department's annual programme of works.

Steps have been proposed to remove the application of the Elephant Preservation Act from most districts. The fact was overlooked however that, as elephants are not covered by the Wild Birds and Animals Protection Act (No. VIII of 1912), mere withdrawal of the present Act may cause more harm than good as there will be nothing in that case to prevent indiscriminate wounding of elephants. The situation is being reviewed and it is felt that the best solution will be a new Orissa Elephant Act.

Punjab.—This line of work has been continued and developed.

Sind.—In the year 1930, propaganda work in the direction of the use of "Cyanogas" jumps against the rat pest was started in certain rice areas where these vermin caused much loss and damage to the crops.

United Provinces.—A simple form of fumigator to control the field rats was devised by the Agriculture Department. Cheap method of fencing with barbed wire, digging trenches and raising up walls were also introduced.

CHAPTER V.—Subdivision and fragmentation of holdings.

13. Action to deal with the problems presented by the sub-division and fragmentation of holdings (paragraphs 124—127).

Assam.—The Government of Assam on examination of the position came to the conclusion that fragmentation of holdings had not proceeded yet to such lengths in the Assam Valley as to call for action. Such fragmentation is admittedly of a serious degree in parts of the Surma Valley, but the absence of a proper record of rights in the permanently settled areas renders the formulation of any simple administrative measure impracticable. Where consolidation measures appear desirable and feasible, as in the temporarily-settled areas of the Surma Valley, particularly the Jaintia parganas, it is considered that co-operative methods offer the best hope of success, and the possibility of encouraging action on co-operative lines is not being lost sight of, but for the present the co-operative movement in such areas is not of sufficient strength. A suggestion that the principles of civil court partition should be applied to partition proceedings under the Land Revenue Regulation, to prevent further fragmentation by enabling sale-proceeds to be distributed rather than the land and fixtures themselves was considered but was discarded as likely to be ineffective.

Bihar.—Local investigations were undertaken during the year in the Bettiah Wards and the Khurda Government Estates to ascertain the practical possibility of consolidation of holdings on a voluntary basis. In both the areas the investigations have demonstrated that there is no practical possibility of making any progress in this direction on a voluntary basis. For the reasons explained in the progress report for July 1929 the Provincial Government do not consider that it is feasible to introduce legislation to deal with this matter in Bihar at present.

Bombay.—The question of legislation to prevent the excessive sub-division of agricultural land and to promote the consolidation of such land is under the consideration of Government.

Central Provinces and Berar.—The Central Provinces Consolidation of Holdings Act was brought into force in 1928, and applied to the Chhatisgarh division. Considerable areas of land have been consolidated. The Act has proved of immense benefit in providing a solution of the problem of scattered holdings.

Coorg.—The fragmentation of holdings into uneconomic units is discouraged.

Delhi.—Two posts of Sub-Inspector for consolidation were sanctioned in 1929, and two more posts of the same kind were sanctioned in 1935. With this small staff working under an Inspector posted to the Punjab district of Gurgaon consolidation has been completed in 18 villages with an area of 13,098 acres. In 1937, a scheme was sanctioned for the appointment of a whole-time Inspector for Delhi with ten Sub-Inspectors under him, and this scheme is now (1938) in operation. It is hoped to complete all possible consolidation work within twenty years.

Madras.—The evils of subdivision and fragmentation of holdings have never been so pronounced in this Presidency as elsewhere in India. The Agricultural Development Sub-Committee of the Provincial Economic Council that considered the subject in 1936

thought that consolidation of cultivation on a co-operative basis should precede consolidation of holdings. Recently a report made by the Registrar of Co-operative Societies, after a visit to the Punjab, of the working of the scheme for consolidation of holdings in that Province and its benefits has evoked some interest in some parts of South India. Co-operative societies have been formed for the consolidation of holdings. At present there are six such societies in all, in the districts of Salem, North Arcot and Nellore. The plan of work is that the board of management will prepare a scheme for exchange of lands in accordance with certain general principles decided at a general meeting. The scheme so prepared should then be approved by at least two-thirds of the total number of members and every member is bound to carry out the proposals so approved. Most of the societies have not yet actually done any work of consolidation so far. But the work done by the society in Takkolam in North Arcot district is worthy of mention. Pichivakkam village, where there are 330 acres of wet lands, was selected for consolidation. It was divided into nine blocks and one block comprising 41 acres and 40 cents has been consolidated. Before consolidation, there were 167 holdings in this block; after consolidation, there are only 18 holdings. The spread of such societies will facilitate every kind of progressive agricultural measure and help to augment the cultivator's income.

The Government have accepted the proposal of the Registrar of Co-operative Societies to grant certain concessions to these societies with a view to facilitate their working, e.g., supply of village maps and settlement registers, permission to peruse field measurement books and register of holdings, etc. A proposal is also under consideration for the exemption of these societies from the payment of registration fees and of the charges for the grant of encumbrance certificates.

With the approval of the Government of India it has also been decided to utilize a portion of the rural reconstruction grant for the encouragement of these societies.

North-West Frontier Province.—The number of Consolidation of Holding Societies in this province is now 24. Total area repartitioned is 11,804 acres (5,186 acres in 1936 and 6,618 acres in 1937).

Orissa.—According to the previous reports of the Government of the Central Provinces the consolidation of holdings was not as serious a problem in the transferred areas as it was elsewhere in the Chhatisgarh division of that province to which the areas transferred previously belonged. The Government of Madras after examining the matter in their areas felt no action was necessary in this direction as the lands are of varying quality and classification of soil, and of different tenures. A large part of the proprietary area transferred from Madras is still unsurveyed and unsettled. The Government of Bihar and Orissa found that the problem of consolidation of holdings could not be tackled properly, the factors that stood in their way being want of uniformity of tenure and soil. An experiment was made by the Government of Bihar and Orissa in the most favourably situated Government estate of Khurda, Puri district, which now forms a part of the Orissa province, but it was given up as the result was found to be unsatisfactory. The Provincial Government have not been able to make any progress on the recommendation on the subject. The excessive fragmentation of proprietary interests is a serious problem in the coastal districts of North Orissa. Every endeavour is being made to resist the abuse of the Estates Partitions Act, which has been a feature of its administration in Bihar and in this province, but progress is slow and difficulties great. Almost every partition of a proprietary interest causes fragmentation of holdings and prevents their consolidation and also to a large extent any concerted action between landlord and tenant for the common good. The law of succession, the complex and varying character of rights in land and the difference in the productive capacity of soils militate against the consolidation of holdings.

Punjab.—The work of Consolidation of Holdings has been carried on with great vigour and enthusiasm. The Government of India grant and the contributions made by the villagers have enabled the Co-operative Department to increase their staff for this work. The total area consolidated up to 31st December, 1937, is 7,91,358 acres. Attempts have also been made to improve the methods of work; all Assistant Registrars were deputed for a fortnight's training in Revenue work in the Lahore Settlement to equip them better for the task of supervision.

United Provinces.—The work of consolidation of holdings was carried out through the co-operative societies in three districts and the number of societies rose from 68 to 94. In addition to this the remodelling of holdings by straightening the boundary lines of fields was carried out in the State tube-well area in 421 villages.

CHAPTER VI.—Demonstration and Propaganda.

14. Review of methods of propaganda employed (paragraph 130).

Andamans.—As a result of demonstration and propaganda all varieties of paddy now grown in Port Blair are of improved strains originating from the Agricultural

Department's experimental farms. During the two years under review the Department has not been able to meet in full the demands from cultivators for seed paddy. To do so in future it is proposed to earmark for the purpose certain holdings to be cultivated under the supervision of the Agricultural Department.

The Department's experimental plots in the Bumitan reclaimed area gave good promise in 1937 when the yield of paddy was slightly better than it had been in the year previous. It is proposed to plant out a short lived variety (Patnai) of about 110 days' life period with the object of obtaining a double crop if possible.

Efforts continue to be made to rid the soil of injurious salts in the various reclaimed areas by means of drainage and turning the soil over to rain and weathering action. The accumulation of excessive rain water owing to the small fall in the land and the eradication of clumps of a reed-like grass and a coarse fern (probably *Stichium Auratum*) present the greatest difficulties to be overcome. In one of these areas a small experimental plot of jute was tried with promising results. This plot is being extended though it is realised that unless planting is carried out during the early rains the limiting factor will be the shortage of fresh water in the dry season for the purpose of retting the jute.

Assam.—The chief method employed in this province was demonstration on the holdings of cultivators. The honorary correspondents gave a lot of help in demonstration and propaganda work.

More agricultural societies were organised. These societies formed active centres of demonstration and propaganda and also instilled in the members a spirit of co-operation. A large number of middle class youths took to farming with specialised crops and expert advice was in great demand. The nurseries that sprang up within the last couple of years continued to do well and served to encourage gardening of all sorts. Vegetable gardens in Lower Primary and Middle English schools continued. Demonstrations were also conducted through lantern lectures. Improved varieties of seeds produced at the Government farms, were distributed and sold among the cultivators.

Bengal.—Demonstration and propaganda continued as before to bring the recommendations of the department direct to the notice of the cultivators. Practical demonstrations with improved departmental seeds, manures and implements were conducted on the cultivators' fields. Lantern lectures were delivered at *hats* and meetings and on exhibition grounds. Departmental leaflets and bulletins were distributed on a large scale. The Agriculture Department also participated actively in the jute restriction propaganda organised by the Collectors of the districts and also in village propaganda work by means of cinema shows organised by the Publicity Department. The work on the rural uplift schemes for the improvement of cattle, fodder crops and of poultry, financed from the Government of India's grant, was carried on.

Bihar.—The system of bringing the recommendations of the Department to the notice of the cultivators is being pursued as before. In addition, propaganda is being undertaken by writing and free distribution of bulletins and leaflets, by holding agricultural shows at important *melas* and fairs, by the use of magic lantern slides and through lectures to social clubs and local bodies interested in rural uplift work. The result obtained is not so satisfactory owing to the limited staff available. Government have under consideration a scheme for more intensive propaganda in selected thanas.

It has been possible to entertain a special staff for sugarcane improvement work as a result of a grant from the Sugar Excise Fund. This staff has been further expanded during the years under report.

Bombay.—The following methods of propaganda are employed in the South Central Division :—

- (i) Ocular demonstration plots in the cultivators' fields are arranged.
- (ii) Help is taken of all local bodies, like the taluka development associations and co-operative credit societies in arranging propaganda.
- (iii) Enterprising cultivators are selected through whom propaganda is carried out.
- (iv) Demonstrations and shows.
- (v) Distribution of leaflets.
- (vi) Jamabandi meetings.
- (vii) Conferences and classes.
- (viii) Lectures, including magic lantern demonstrations.
- (ix) Reading agricultural literature in villages during halts.

(x) Contributing articles to the press.

(xi) Use of posters.

(xii) Village improvement committees.

Village improvement committees have been organized in the districts and talukas of this division and the propaganda officers of the department take part in the working of these committees, as far as the agricultural improvement work is concerned.

During the past four years, there is special movement of rural uplift, throughout this division and advantage of rural uplift centres was taken to undertake the propaganda on a very large scale.

In 1936, the rural uplift van of the Central Division, fully equipped with all the exhibits of village improvement items, toured in 61 villages in this division and actual demonstrations were arranged in these villages. Similarly 27 newly formed taluka development associations in the South Central Division, began to function and this helped to extend the propaganda.

The following methods were employed in the Southern Division :—

1. Ocular demonstrations on cultivators' fields.
2. Demonstrations and shows.
3. Distribution of leaflets.
4. Conferences and classes.
5. Lectures, including magic lantern demonstrations.
6. Contributing articles to the press.
7. Jamabandi meetings.
8. Help to taluka development associations and village improvement committees, and enterprising agriculturists.
9. Use of posters.

The district staff of the division arranged demonstration plots on cultivators' fields for showing improved varieties of crops, effects of manuring, wider sowing, gul-making, sulphur dusting against mango hoppers, use of sulphur dust against smut in jowar, etc., at several places. Similar demonstrations were held on farms. A new feature during the two years of 1936 and 1937 was propaganda through motor van which contained exhibits and demonstration equipment and which was taken to important villages of all the four districts.

An intensive propaganda against cotton boll-worm has been continued in Surat and Broach districts from the grants sanctioned by the Indian Central Cotton Committee, Bombay, by holding meetings of cultivators and giving magic lantern lectures. As a result 8,139 plant pullers were sold to cultivators by the department during 1935-36 and 1936-37. The method of up-rooting cotton stalks has reached 90 per cent. in the district of Broach with the exception of one taluka where the propaganda has been recently undertaken and similarly in some of the talukas of Surat district it has gone over 50 per cent. of the cotton area, while in the remaining talukas it is gaining ground slowly but surely.

The district staff of Agricultural Department conducted demonstration plots on cultivators' fields for showing improved methods of cultivation, better varieties of seeds, effects of artificial manure, gul-making, sulphur dusting against mildew in jira crop and mango-hoppers, use of sulphur dust against jowar smut, etc., at several places in all districts of the division.

Agricultural exhibitions and cattle shows were organised from the funds of village uplift committees where lectures on improvements in agriculture were given, with and without the help of magic lantern and prizes and medals were awarded so as to create greater interest in the activities of the department.

Central Provinces and Berar.—The methods employed consist of—

- (1) Demonstration at suitable centres of improved seeds, implements and fertilizers by peripatetic demonstration staff.
- (2) Demonstration of the advantages of improved methods of cultivation by management of cultivator's plots.
- (3) Demonstrations in villages by cinema films and magic lanterns.
- (4) Formation of Tahsil agricultural associations, seed unions and Co-operative Farming Societies.
- (5) Holding periodical refresher courses at Headquarters to keep the demonstration staff abreast with the latest developments in agricultural research.
- (6) Holding of Farmer's Days at Government farms.

Coorg.—Lectures on improved methods of cultivation are given at general body meetings of village co-operative societies, at conferences of co-operative unions and at cattle fairs.

Delhi.—Propaganda work is carried on as in a Punjab district. The only departmental officer resident in Delhi is an Agricultural Assistant. With the aid of *magaddams*, and under the control of his departmental superiors in the Punjab, he (i) conducts field experiments, (ii) collects and distributes improved seeds, and (iii) exhibits both seeds and implements at rural fairs, etc. Specialist advice (e.g., on fruit growing) is available when necessary. Arrangements have now been made (1937, to come into force in 1938) for the establishment of three outlying departmental centres, supervised by the Agricultural Assistant from his headquarters at Delhi.

Madras.—The successful results of research are brought home to ryots by propaganda through the agency of demonstrators, exhibitions, motor vans and lantern lectures and by practical demonstrations on the cultivators' fields themselves. Each taluk is provided with one demonstrator and a demonstration maistri. Each demonstrator has a depot where he stocks good seeds, suitable manures and improved implements. He has a stock of bulletins and leaflets for distribution to the cultivators. Till six years ago, the area allotted to each demonstrator was so extensive that he could not do any work of intensive and abiding nature. In 1931 came into force a new system by which a demonstrator is to concentrate his work in seven or eight central villages. In 1935, a scheme which aims at intensive propaganda with a view to bring to the door of every cultivator the advantage of adopting the improved methods advocated by the department was drawn up and it was sanctioned by Government to be tried first as a measure of experiment in nine taluks of the Vizagapatam district. This scheme is intended to intensify the demonstration work in the district by the employment of a large number of literate demonstration maistris. Eight maistris are attached to each demonstrator and they live in the villages among the ryots. The scheme is expected to bridge the gap between the demonstrator at the taluk head-quarters and the cultivators in the hamlets. The maistris not only devote their attention to the carrying out of agricultural improvements, but also interest themselves in problems of general rural uplift like sanitation, co-operation and revival of cottage industries, all leading towards educating the villagers in the realization of the essentials of a happy rural life. By the end of five years (for which period the scheme has been sanctioned), it is hoped that every village in the nine taluks of the Vizagapatam district will be covered and every cultivator made to feel the usefulness of the department.

Veterinary department.—A definite start in propaganda work was made by this department in 1928-29 by the preparation of charts, specimens, short stories illustrated by lantern slides, etc., to bring home to the public the importance of paying prompt attention to contagious diseases among cattle. Propaganda work was also done by the staff of the department, in the course of their ordinary duties by distributing departmental leaflets on the several important disease conditions, by participating in the Health and Baby Weeks celebrations and other exhibitions by exhibiting various items of popular and scientific interest and by demonstrating the Burdizzo method of castration. Opportunities were also availed of the several cattle fairs and exhibitions to deliver lectures and conduct magic-lantern demonstrations in order to educate the ryots on veterinary matters such as the correct methods of feeding and breeding of cattle and the ways and means by which they can co-operate with the department in the control of contagious diseases. The District Economic Councils were made use of to further the activities of the department and the model villages selected by these councils were visited by the staff of the department to educate the ryots on veterinary matters and rural uplift work. Two motor exhibition vans have been equipped for exclusive propaganda work of this department and these motor vans tour in the interior villages. The motor exhibition vans of the Agricultural department were also made use of for propaganda work of this department. With the aid of the motor exhibition vans, it has been found possible to carry on propaganda work on a more intensive scale in the remote villages in the district not served by main roads and railways in a much shorter time than would otherwise have been possible.

North-West Frontier Province.—The staff is making strenuous efforts to bring home to the Agricultural community the advantages of adopting scientific methods of Agriculture. Agricultural Propaganda has been better organised and is achieving a great success which can be seen from the huge quantity of improved seeds and implements to the value of Rs. 50,000 distributed annually. But still there is much ground to be traversed in this side and the present staff is not sufficient to meet proper need of propaganda and demonstrations.

Orissa.—A change has been introduced in the system of propaganda work. Demonstrations are now confined to certain defined centres (villages). A survey of agricultural conditions is made and thereafter, a programme of general improvement is drawn up which will be worked for a fixed period of years. On achieving fair result, the centres will be shifted.

In 1937 four predominant sugarcane areas were selected for the improvement of the cultivation of sugarcane by intensive propaganda and demonstration work. The cost is being met from the grant from the Sugar Excise Fund.

Punjab.—The main lines of work have been extended and intensified. Methods of propaganda are reviewed from time to time in the light of results obtained.

Sind.—In 1931, numerous local demonstrations and small agricultural shows were held and a special "Touring Party" was organised and equipped with a magic lantern and slides illustrating improved agricultural methods and materials. Later on the whole of Sind was divided into twelve propaganda charges and detailed programmes of district demonstration work were laid down and carried out in each charge. The recent reorganisation of the department itself has also been largely based on the importance of propaganda. There are now two Deputy Directors of Agriculture, one for the Right Bank and the other for the Left Bank, in addition to one Divisional Superintendent of Agriculture in charge of the non-Barrage areas in North Sind. These officers assisted by 38 graduate assistants, 14 non-graduate assistants and 54 kamgars in addition to the cotton extension staff (consisting of 2 cotton supervisors, 2 senior assistants, 4 graduate assistants and 8 non-graduate assistants), carry out a definite programme of demonstration and experiments on zamindari lands both in kharif and rabi, organise Agricultural shows and assist in the distribution of seed of improved varieties of crops and give regular advice and assistance to cultivators in their agricultural problems and difficulties.

In the Veterinary Department, the Veterinary Assistants usually devote 8 days each month on propaganda work. They attend local fairs and shows and rural uplift meetings.

United Provinces.—Agricultural propaganda continued on the old lines. Fairs and exhibitions were held to demonstrate the use of improved appliances and better methods. Attention was mainly devoted to the popularizing of improved seed and implements and the use of manure. In some of the canal areas carts fitted with dunlop tyres were also introduced for demonstration purposes. Leaflets describing improved methods of *gur* making were distributed and finished products of industrial schools were displayed through publicity vans. The demonstration of new agricultural varieties and crops was also carried out on cultivators' plots.

15. *Re-examination of the policy of establishing Demonstration Farms in the Punjab and the United Provinces (paragraph 131).*

Punjab.—The Punjab Agricultural Department does not possess purely demonstration farms as such. District farms have been started in several districts; these are intended to provide facilities whereby Research Officers of the Department can conduct investigations into local problems connected with the trials and introduction of new crop varieties, crop pests, cultural methods, manures, etc. As a measure of economy due to the general depression the whole area of these farms was put under tenants in 1931-32, but half the area of many of these farms has again been brought under direct cultivation.

(No remarks have been received from the United Provinces Government.)

16. *Establishment of Special Demonstration Farms (paragraph 131).*

Ajmer-Merwara.—The District Board, Ajmer-Merwara, runs two experimental farms, one at Makrera and the other at Tabiji, for the purpose of carrying out experiments, as well as for multiplying improved seeds for distribution to cultivators.

The Government pays a grant-in-aid of Rs. 2,970 to the District Board for the maintenance of the farms.

Assam.—*Vide* remarks against item 14 above.

Bengal.—Under the Government of India's grant 450 Union Board farms were started in the province in 1936-37 for purposes of improved seed supply and demonstration. Kharif and rabi crops suitable for the respective areas were cultivated and in places new crops such as linseed, tobacco, potatoes, English vegetables and groundnuts were introduced. A plot of Napier grass was also put down in each farm. The cultivators of the neighbourhood were thereby enabled to examine improved methods of cultivation, use of improved manures and to observe the yields of improved seeds.

Bihar.—After the transfer of the Imperial Agricultural Institute from Pusa to New Delhi, the existing estate and buildings were transferred to the Provincial Government and it is now the central farm of the Tirhut Range and headquarters of the Deputy Director of Agriculture.

Bombay.—There are no such farms in the province of Bombay but the trials conducted on cultivators' fields serve the purpose of such farms.

Central Provinces and Berar.—Certain of the existing Government farms have been adopted for special demonstrations. For example, the manufacture of white sugar is demonstrated at one farm and tobacco-curing methods on two farms.

Coorg.—Four demonstration farms are in existence where varieties of fruit and paddy are grown.

Delhi.—There is no provincial farm at Delhi.

Madras.—The results of research and study are demonstrated on cultivator's own lands as well as in demonstration areas in agricultural farms. The cultivation is carried on by the cultivator himself under the close supervision of the demonstrator. There are thousands of such demonstration plots in the Presidency and they are organized mostly to demonstrate agricultural improvements, beginning with quite simple ones which need no extra expenditure, like thinly sown nurseries and economic planting of paddy. The other improvements demonstrated are the use of iron ploughs and better methods of cultivation, the use of better mhoite buckets and wheels, the use of green manure crops, better methods of making and storing of cattle manure and cultivation of improved strains; in cotton areas distribution of improved seed and demonstration of drill-sowing and inter-cultivation with bullock power and better methods of irrigation; in the sugarcane areas, deep cultivation, line planting, propping and wrapping and manuring. The Agricultural Research Station at Kalahasti was recently converted into a demonstration farm styled as "Panagal Demonstration Farm".

North-West Frontier Province.—A small demonstration farm at Dera Ismail Khan has been opened. Lotus and cotton demonstration plots at Mohaya Killa and Miran Shah are running successfully.

Orissa.—Details were worked out for starting two special farms, one for growing temperate climate fruit and the other for growing English vegetables in the off season and for cultivation and curing of turmeric. One will be located in the Agency tract of district Ganjam at a height of 2,500 ft. and the other in the Koraput district at an elevation of slightly over 3,000 ft.

Punjab.—Please see remarks against item 15 above.

Sind.—Six Government Auxiliary Demonstration Farms have been established in the Barrage areas under the "Six Farms Scheme". The main object of these farms is to carry out under zamindari conditions the results obtained from successful research work on Agricultural problems investigated at the Research Stations and Experimental Farms of the Agricultural Department. The lands are cultivated by *harris* on the "batai" system of sharing the produce, prevalent in the province, under the supervision of the Farm Manager. These farms also play an important part in the organisation of schemes for the multiplication of seeds of all improved varieties of cotton and wheat which are being carried out by the Agricultural Department. "Farmers' weeks" are held twice annually at each farm and the North Western Railway authorities are co-operating by the issue of concessionary tickets to cultivators attending these "weeks".

United Provinces.—Work on the lines reported last time was further developed.

17. *Establishment of short courses on Demonstration and Seed Farms (paragraph 135).*

Assam.—There are two temporary training classes at Jorhat and Sylhet with a batch of 20 students in each for a course of 15 months with an allowance of Rs. 6 per mensem for practical and theoretical training in agriculture. Some of the students relieved were allowed to settle in a farm and others settled in their own villages. A short course of two weeks was conducted at the Upper Shillong Farm in October 1936 and was attended by 20 men. Simple agricultural information was given and demonstrated in practice.

Bihar.—The value of the facilities for practical training in Scientific agriculture in the Central Farms of this province is being increasingly appreciated and more and more people are taking advantage of these facilities every year.

Bombay.—In the North Central Division five agri-horticultural classes lasting for 8 to 10 days were held. In addition two classes on sugarcane, one on poultry, one on prevention of soil-erosion and one on oil-engine were organised. The number of cultivator-students who attended each of these classes varied from 50 to 200.

In the South Central Division, short course classes for training cultivators in agricultural improvements are being arranged on Manjri, Kopergaon and Ratnagiri farms. In addition to this, short period classes extending to a period of 2 to 7 days are arranged at the cultivators' fields. During the year 1932, 55 short-course classes were arranged on the Deccan canals and a special class in irrigated crops was arranged at Malsiras, which was attended by 143 students. During 1933, 25 classes were arranged. During 1934,

231 demonstrations and 12 big agricultural shows were held, while in 1935, 222 demonstrations, 54 Jamabandi meetings, 64 magic lantern lectures and 14 big shows were arranged. During the year 1934, 8 agricultural classes were arranged and in 1935, 20 classes were arranged. The sugar making classes held at Hol and Manjri were the special features of these years. During the year 1936, 332 demonstrations and 14 big agricultural shows were held, while during the year 1937, 397 demonstrations, 44 magic lantern lectures and 16 big shows were arranged.

During the year 1936, 30 agricultural classes were arranged, while during the year 1937, 12 agricultural classes were arranged.

Within the staff available short courses in dairying of apprentice type were given at the Agricultural College Dairy to 14 persons and to three in crop growing on the Agricultural College Farm during the year. From 1928-29 there have been in all 23 persons trained in short courses varying from 15 days to 3 months.

There is a regular *mali-in-training* course at the Ganeshkhind Fruit Experimental Station, Kirkee, where students are trained in fruit gardening. There were 12 students in 1936 and 33 in 1937 attending this class. The class continues to be very popular. Some students are also trained in horticulture as a special subject at the garden, College of Agriculture, Poona. The students are doing useful work as qualified horticulturists.

In the Southern Division arrangements were made from time to time to open short courses of training in horticulture, village improvement work and practical poultry farming. About 300 students have been trained in horticulture since 1932 and 83 men including fieldmen of taluka development associations attended the classes for village improvement work held in 1936, on Gokak and Dharwar farms. Many fruit gardens are coming into existence as a result of the horticultural classes. Men have started breeding White Leghorn and Red Rhode Island birds.

Central Provinces and Berar.—A combined course of instruction for Irrigation, Agriculture and Revenue Officers is held periodically and refresher courses are provided for demonstration *jamadars* and *kamdars*.

Coorg.—There are no seed farms, and short courses on demonstrations are not opened.

Madras.—The consideration of the question was postponed due to financial stringency. The short courses instituted at the College at Coimbatore and at the district farms are detailed in paragraph 119 *infra*.

North-West Frontier Province.—A scheme for training educated young zamindars has been sanctioned and about a dozen students were admitted to this class. The period for training has been fixed to be one year. Agriculturists were given proper facilities for acquainting themselves with modern agriculture. The adult school boys of the Naurang Middle School are taken round once in a week to be educated about the daily farm practice and success achieved.

Orissa.—Practical training is given to young men both in the central and the small farms in improved and modern methods of agriculture. The facilities available include training in the propagation of fruit trees and the manufacture of *gur* and white sugar.

Punjab.—Arrangements have been made to hold such courses where a demand for them exists.

Sind.—Short courses in *annewari* valuation and in improved methods of agriculture, for officers of the Revenue and Irrigation Departments are held twice annually at the Agricultural Research Station, Sakrand. Arrangements are also being made for short courses in horticulture at the Government Fruit Farm, Mirpurkhas, and in tractor driving and maintenance, at the Government Workshop, Mirpurkhas. A five-year course of apprenticeship in agricultural engineering under the supervision of the Agricultural Engineer in Sind at Mirpurkhas has been provided. Training for zamindars and *harris* in practical agriculture has been provided for, on some of the Auxiliary Demonstration Farms.

United Provinces.—Short courses were held at some of the departmental farms to train selected villagers, sons of interested zamindars, co-operative supervisors and organizers for rural development work. The trained villagers were utilized as village guides.

18. *Comparison of the two systems of carrying out demonstrations on the cultivators' own fields (paragraph 136).*

Ajmer-Merwara.—Comparative demonstrations were made by the Agricultural Assistants on the cultivators' own fields.

Assam.—It has not yet been possible to consider the point owing to the insufficiency of the demonstration staff.

Bihar.—The superiority of carrying out demonstrations on the cultivators' own fields cannot be doubted. Every effort is made to encourage the cultivators to actually do the work under the direction of departmental officers. The paucity of staff and funds rather hampers the progress in this direction in covering a wide field.

Bombay.—Demonstrations on cultivators' own fields appeal to cultivators more than on Government farms. This method is being adopted in the North Central Division. During the period of two years more than 1,200 demonstrations of crops, manures, implements, etc., which were attended by over 50,000 cultivators, were given on cultivators' fields.

In the South Central Division, both the systems are in operation. In all the demonstration plots, the comparative plots of cultivator's *versus* improved methods are always arranged on the cultivators' fields.

Central Provinces and Berar.—This is the established policy of the department at present and in accordance with this policy a large number of such farms have already been opened. Both systems are in operation, but "cultivators' plots" are now being used in large numbers as demonstration centres.

Coorg.—This has been started only this year.

Delhi.—Demonstrations have been carried out mainly through the cultivators themselves. This is undoubtedly the better method, the criticism against all work done departmentally being that it costs more than the average farmer can afford.

North-West Frontier Province.—Demonstration plots are arranged along with metalled roads and hearts of villages with improved varieties. They are accompanied by great success.

Punjab.—This is one of the main activities of the district staff. Thousands of demonstration plots are laid down in all parts of the Province on cultivators' holdings to bring home to them the advantages to be gained by showing improved crop varieties and by following improved methods of agriculture.

Sind.—The policy of the Agricultural Department in District Demonstration Work is "Demonstration on the Cultivators' own fields". Government have made concessions by foregoing assessment on the lands on which the experiments are made.

United Provinces.—Both the systems of demonstration have been found useful and employed on a large scale.

19. Peripatetic demonstrations of the use of improved implements (paragraph 138).

Assam.—To bring costly implements and machinery such as power pumps within easy reach of cultivators, arrangements are being made by the Department for their issue on hire-purchase system.

Bengal.—Improved iron ploughs and planet Junior Hand Hoes were demonstrated on cultivators' land in every district.

Bihar.—In North Bihar the number of peripatetic demonstration sets has been increased to 29 and in South Bihar 21 centres have been provided with complete sets.

In the Chota Nagpur Range the number of sets was increased to six complete sets in 1937.

The success of these outfits cannot be doubted and every attempt is being made to extend the number of sets as funds permit.

Bombay.—A Rural Uplift Van carrying exhibits, posters, pictures, etc., on various aspects of village life toured in the three districts of Nasik, East Khandesh and West Khandesh. It halted at 118 places where the district staff of the Agricultural Department gave lectures and demonstrations.

In the South Central Division, the department has maintained a number of depots in every district, from where the improved implements are given on hire and the working of these implements is demonstrated at the time of shows and fairs. In addition to the Government depots, the taluka development associations in this division and also some of the implement societies, have kept implements for giving them on hire to the cultivators. Shows and demonstrations for showing the working of these implements are arranged by the taluka development associations and at the time of the jamabandi meetings in co-ordination with the officers of the Revenue and Irrigation Departments.

In the Ahmednagar district, the Shevgaon, Pathardi and Jamkhed implements societies have kept more than 1,000 ploughs for hire and the total hire collected by these societies during 1935 was nearly Rs. 4,500. In 1936, these societies collected Rs. 5,290 as hire charges, but the hire dropped down to Rs. 875 in 1937, due to famine conditions. The Malsiras requisite society in Sholapur district collected Rs. 763 in 1936 and Rs. 800 in 1937 as hire of implements.

Central Provinces and Berar.—Practical demonstrations are given by touring assistants on an extensive scale. Cinema films and magic lanterns are also used.

Coorg.—The Agricultural Demonstrators take the improved types of ploughs to villages and demonstrate their use.

Delhi.—460 demonstrations of improved implements were given during the years under report. There is some demand for Hindustan and Raja ploughs, spring tooth and peg tooth harrows, and chaff-cutters. The iron Persian wheel has long been popular.

Madras.—Improved implements are stocked in depots and given on hire. Demonstration of these implements is held with a view to introducing them to the notice of the ryots. Different types of them have been purchased for exhibition and demonstration. The important implements demonstrated are Cooper ploughs, Guntakas, Mhote wheels, bund-forming implements, planet junior hoes, buch-scrapers, improved seed drills and water-lifts. Demonstrations were also given of rubber-tyred carts and turmeric polishers in the Salem and Coimbatore districts. Roll-easy mhote wheels were the main feature of demonstration activities in arecanut gardens on the West Coast. The ryots were impressed with the relief these wheels gave to their puny and weak cattle. Most of the improved implements are taken in the touring motor vans and demonstrated in fields.

The Industries Department owns nine power driven sugarcane crushing mills which are hired to the public for crushing canes and which serve to demonstrate the advantage of power crushing mills over bullock driven appliances. There has been heavy demand from the ryots for the hire of crushing mills and all of them were engaged during the crushing seasons. The manufacture of sugar by the open pan system with centrifugals has also been demonstrated to the public in several places and two more demonstrations with an improved furnace are in progress, one at Hospet, Bellary district, and the other at Dimili, Vizagapatam district.

North-West Frontier Province.—Agricultural Assistants and Kamdars are demonstrating the use of improved implements, budding and pruning with great success on zamindars' own fields and orchards. Many progressive zamindars have now commenced the regular use of improved implements and seeds.

Orissa.—Demonstrations by peripatetic parties were carried out in the cultivators' fields on the use of the Punjab plough and the implements for the cultivation of sugarcane, i.e., hoes, ridging ploughs, etc.

Punjab.—Such demonstrations are being given in backward tracts where the standard of cultivation is low.

Sind.—Peripatetic demonstrations of the use of improved implements are being carried out by all the district staff of the Agricultural Department, and the assistance of other departments of Government is being availed of extensively.

United Provinces.—Peripatetic demonstration work was started in 30 districts for the distribution of improved bullock power crushers and pans on a large scale and for imparting instruction in improved methods of *gur* manufacture. One demonstrator skilled in the art of *gur* manufacture was posted to selected villages to train the people of the locality and neighbouring villages in the improved method of *gur* manufacture. Demonstration of a portable ginning machine was also made in the Sarda Canal areas and effective sugarcane crushers were hired out for demonstration purposes.

Peripatetic demonstration parties for imparting instruction in weaving and dying worked in rural areas for the benefit of artisans.

20. Agricultural shows and agricultural stalls (paragraph 139).

Ajmer-Merwara.—Two Agricultural shows, including display of agricultural films, were organised during each of the years 1936 and 1937, one at Pushkar on the occasion of the annual Pushkar fair and the other at Kekri on Teja fair under the guidance and supervision of the Extension Officer of the Institute of Plant Industry, Indore, to which the District Board was a contributory member. These shows proved successful.

Assam.—The department also lost no opportunity in taking advantage of exhibitions, fairs and other local gatherings to further the work of demonstration and propaganda. Lectures were delivered by the district staff with and without lantern slides for agricultural education in these shows. This proved an effective means of dissemination of new ideas.

For exhibits of outstanding excellence, medals and prizes were awarded to growers.

Baluchistan.—Agricultural shows have been organized at the Sibi and Usta Annual Fairs. These shows are largely attended and evoke great interest. The Usta Seed Farm organises an Agricultural Exhibition at the Sibi Fair also which is largely attended.

Types of grain and new forms of agricultural implements are on show. Ploughing competitions form a feature of the Fairs.

Bengal.—The Agricultural Department made monetary contributions to a large number of agricultural fairs and shows and also participated by sending departmental exhibits and arranging lantern lectures.

Bihar.—The activities of the Department in this direction have been steadily maintained during the years under report. A sum of Rs. 850 every year is allotted to different *melas* in the way of prizes.

Bombay.—In the North Central Division four district shows attended by about 75,000 persons were held; Agricultural stalls were also opened at 18 places at the time of local fairs.

Agricultural College Dairy, Poona, arranged stalls for demonstrating feeding and housing of milk cattle as well as production of clean milk and milk products in agricultural and industrial exhibitions at three places. Since the year 1928-29, 13 demonstrations have been given in different parts of Deccan and Karnatak.

Agricultural economics and marketing stalls were organised by the Professor of Agricultural Economics and Provincial Marketing Officer at the following agricultural shows :—

1. Ahmedabad Agricultural Show, Sanand, held in December 1937.
2. Broach Agricultural Show, Broach, held in January 1938.
3. Karnatak Agricultural Show, Belgaum, held in January 1938.

The grading and marketing of agricultural products, together with a model of a regulated market and distribution of consumer's rupees, etc., were demonstrated.

In the Southern Division agricultural shows and demonstrations were held mainly through the taluka development associations from time to time. These were connected with improved implements and crops in particular. District shows at Chikodi, Kanbargi and Bijapur were arranged by local taluka development associations in 1934 and 1935 and 8 more fairly big agricultural and cattle shows were held during 1936 and 1937. Numerous village demonstrations of improved crops and implements and of methods of control of plant pests and diseases were held by the district staff in their jurisdictions with good results. A divisional show was held at Belgaum which was opened by His Excellency the Governor of Bombay. This was a very successful show and was attended by about 2 lakhs of people.

Horticultural exhibits were arranged at four shows in 1936 and three shows in 1937. These stalls were much appreciated by the visitors and had the desired educative effect, as in the past. Horticultural leaflets issued by the department were freely distributed to the visitors.

Central Provinces and Berar.—Farmers' Days are held annually on almost all Government farms. Agricultural shows are held annually at departmental farms and are advertised as Farmers' Days. Shows are also given on a small scale at all the important fairs.

Coorg.—Agricultural shows are held in the cattle fairs in the Provinces.

Delhi.—Agricultural stalls are a regular feature of rural fairs and exhibitions and of the one-day cattle shows which are held from time to time in the winter.

Madras.—Agricultural exhibitions are staged by the Agricultural Department on several occasions such as Co-operative District Conferences, Health and Baby Week celebrations every year. The various village fairs and festivals provided opportunities for conducting agricultural shows for the benefit of the rural population. The department participated every year in the Park Fair Exhibition at Madras and in the exhibition held at Srirangam. During the last year the department co-operated also in the Congress Exhibition held at Madras. The department had a separate stall where all the agricultural implements were exhibited. Agricultural dramas drawing pointed attention to drawbacks in certain local systems of agriculture and suggesting at the same time methods to overcome the defects were staged. Model cattle-sheds, poultry yards and apiaries were put up and shown. The demand from the public for assistance in organizing exhibitions is increasing year by year and the department is rendering necessary assistance as well as monetary help.

North-West Frontier Province.—Agricultural shows combined with Horse and Cattle Shows are being held every year in each district of the province.

Orissa.—At an industrial and agricultural exhibition held at Banki in district Cuttack, a section was organised in which the cultivation and rotation of the various crops under the coastal conditions were demonstrated by actually growing the crops

in the exhibition grounds and by posters. Other items were a model house for the cultivator, model cow-shed and poultry yard and horticulture. The Department also participated in a number of minor shows. Cultivation of fodder was actually demonstrated in some of these shows.

Punjab.—A permanent Agricultural Stall exists in the Lyallpur Mandi. It attracts a large number of visitors.

Show cases and samples of improved seeds, implements and machinery, insects and fungus pests are exhibited. It has been made the centre of the Department's local seed agency.

Agricultural produce exhibitions are arranged in many districts of the Province and prizes given both in kind and in money.

Sind.—Numerous local agricultural shows and large demonstrations of agricultural improvements and material of agriculture are being organised every year throughout the Province, and are widely attended both by agriculturists and others.

United Provinces.—Work on the lines reported previously was carried on successfully.

A combined industrial and agricultural exhibition was held at Lucknow in 1936-37 for demonstrations on a large scale.

21. Other Forms of Propaganda (paragraph 141).

Ajmer-Merwara.—Three Agricultural Assistants aided by 9 demonstrators, paid from the Rural Development grant, toured the villages and did propaganda and demonstration work for the improvement of agriculture and sanitary conditions; trials were carried out in the cultivators' own fields in selected villages.

Assam.—Many leaflets and bulletins on different crops, insect pests and other agricultural matters were distributed.

Baluchistan.—Funds have been allotted for the conduct of campaigns against insect pests and fungoid diseases and leaflets have been distributed free of cost among the agricultural population explaining the methods of eradicating such inroads.

An exhibition of local handiwork, arts and crafts is now held annually at the Sibi Fair.

Bihar.—A reference to other forms of propaganda has already been made under recommendation no. 14. In addition to those, the Department still continues to publish the illustrated quarterly journal "Kisan" published under the auspices of the Bihar Provincial Agricultural Association to disseminate agricultural improvements to the cultivators. Attempts are being made to make the journal self-supporting.

Bombay.—Leaflets on useful agricultural subjects such as mango-cultivation, sugar-cane-cultivation and tree-planting were got printed and widely distributed in the North Central Division. The number of articles published in the Marathi papers and copies of easy and simple literature sold to cultivators during the two years 1936 and 1937 came to 86 and 150 respectively.

Lectures on useful agricultural subjects at the Revenue Department jamabandi meetings and in training classes for village patils and at various shows and demonstrations were general and were continued in the Southern Division.

Central Provinces and Berar.—Three motor lorries equipped with cinema films, exhibits of seeds, manures, implements, insecticides and fungicides, are available for touring the villages.

Coorg.—A booklet containing brief articles on various subjects, including agriculture, was published during 1937 and distributed widely.

Delhi.—A large supply of printed leaflets is available and full use is made of it. Crude "advertising" by the painting of "slogans" on the walls of village houses is also employed to some extent. An Agricultural Association was formed during 1937, and at its meetings, which are fairly regular, papers are read on subjects of interest to the practical farmer, and questions are asked and answered. A party of members of this Association was sent to the Punjab to study the progress made there by means of consolidation, co-operative cattle breeding, and so on. This "conducted tour" was very successful. Members have also been shown round the Imperial Agricultural Institute. A rural newspaper ("Dihat") is published in Urdu and Hindi.

Madras.—Propaganda was also done with the help of demonstration motor vans which tour throughout the Presidency. The vans are equipped with a full set of exhibits and they are displayed at each halting place. The agricultural demonstrator accompanying the van explains the exhibits to the cultivators and delivers lantern lectures.

The exhibits are changed from time to time and thus kept up to date. Lectures in elementary agriculture were delivered in the Y. M. C. A. Summer School held at Sular in Coimbatore district for five weeks in April and May 1936.

North-West Frontier Province.—Vast propaganda is being done through the Broadcasting station, circulars, letters and the agricultural staff.

Orissa.—A new scheme for getting the agricultural classes familiar with the work done in the Government farms was started in 1936. Buses were chartered and persons interested were brought twice a week to certain farms where all the activities were explained to them by the officers in charge. These trips became very popular. Propaganda was also carried on by notices in the newspapers and wide distribution of leaflets in the vernacular containing simple instructions in respect of particular crops or particular phases of agriculture.

A scheme of subsidised farms has been adopted where private owners are given free the services of Kamdars and other agricultural officers and seeds and grafts at cost price to cultivate their land according to the rotational programme drawn up for the land by the Department.

Punjab.—A large number of Agricultural Shows and Exhibitions is held on the occasion of important fairs when lectures are delivered on the use of improved seeds and like subjects. Campaigns against various insect pests and crop diseases such as ear-cockle, Kutra, Top-Borer, Pyrilla, San Jose Scale, Root-Rot, etc., are carried out. Ploughing matches are held and members of the staff hold conferences in villages and deliver lectures while on tour with a view to getting into closer touch with the people and ascertaining their needs.

Sind.—Leaflets and posters dealing with agricultural matters have been printed in considerable numbers and widely distributed.

United Provinces.—Work on the lines reported previously was further extended.

22. Formation of Divisional Boards and Taluka Development Associations. (Paragraph 145.)

Assam.—Several district and rural Agricultural Associations were organised.

Bihar.—An attempt has been recently made to form local agricultural committees by enlisting the co-operation of influential cultivators and zamindars in assisting the Department to develop agricultural improvement in the villages.

Bombay.—There are thirty taluka development associations and four unregistered associations in the North Central Division which continued to supplement the work of the department. These bodies are guided and controlled by the Divisional Board. They keep implement, seed and manure depots and also stock insecticides, fungicides, spray pumps, etc., and give them out for use to the cultivator. The three taluk development associations of Jalgaon, Jamner and Shirpur are running cattle breeding farms.

In the South Central Division, owing to the financial stringency, the work of the formation of the taluka development associations received a check. The existing associations have been doing useful work in agricultural and co-operative propaganda. Many of these associations are handicapped for want of sufficient funds. During the year 1934, three new associations were organized, in addition to the existing number of 22. During the year 1935, 20 new associations were organized which were registered in the year 1936. The total number of associations till 1936 was 45 and in the year 1937 the number increased to 49. The new associations have not got sufficient finances to push on the work of agricultural propaganda efficiently.

In the Southern Division a Divisional Board of Agriculture was inaugurated in the year 1922 and it has been holding its quarterly meetings regularly. 15 taluka development associations have been organised and they have been doing good work excepting a few. Registration of a new association at Halyal is being considered.

Four more taluka development associations have been organised in Kaira district thus making the total number of 10 associations in the division.

The Southern Gujarat Fruit and Vegetable Growers' Association registered under the Co-operative Societies Act and with its headquarters at Pardi in Surat district is doing very useful work in arranging the despatch of garden produce at a cheaper rate by procuring facilities from the railway authorities for booking fruits and vegetable in wagon-loads.

Central Provinces and Berar.—District and Taluk Agricultural Associations are already in existence.

Coorg.—No boards or associations have been formed

Delhi.—No Board or Association has been established on Bombay lines.

Madras.—Firka associations were formed in the Guntur, Kistna and Nellore districts. Three associations were formed in the Rajahmundry division of the I Circle for general agricultural improvement and one for supply of milk to Rajahmundry. The Tanjore Delta Mirasidar's Association continues to issue its journal. The Trichinopoly District Agricultural and Industrial association holds annual agricultural exhibitions. The Agricultural Improvement Society at Melur in Madura district maintains more than 100 acres under cotton seed farms. The agricultural association at Palghat organized an agricultural exhibition and financed its members for the purchase of green manure seed. The district economic councils started during the year 1936 helped to bring the existence of the Agricultural department to the notice of the ryots.

North-West Frontier Province.—Agricultural Associations in each district are working satisfactorily to improve the agriculture in rural areas.

Orissa.—No boards or associations have yet been formed.

Punjab.—There are now Agricultural Associations at almost all Districts Headquarters in the Province. These associations are real live institutions and a great help in local agricultural development. Tahsil Agricultural Associations have been formed, as a tentative measure, in the districts of Jullundur, Hoshiarpur and Ludhiana.

Sind.—The Taluka Development Associations which were formed in 1931 continued at first to do good work for some time but were considerably handicapped by lack of funds. They have now been replaced by District and Taluka Agricultural Committees consisting of officials and non-officials. On the separation of Sind from the Bombay Presidency, a separate Provincial Board of Agriculture has been constituted with the Hon'ble Minister in charge of Agriculture as its chairman. Conferences of the Heads of the Agriculture, Veterinary and Co-operative Departments are held periodically. An Agricultural Research Committee for Sind has also been constituted.

United Provinces.—Better farming and better living societies have been organized in almost every district in the eastern part of the province and their number is increasing every year. The Rural Development Scheme has given great impetus to the work.

23. Use made of Co-operative Societies in Demonstration Work (paragraph 147).

Assam.—Some use is made of the societies for distribution of seeds. The first problems are, however, the organisation of the societies themselves for their main purpose, the provision of cheap credit and education on the principles of co-operation: these have already engaged the attention of Government.

Bihar.—The officers of the Department continued to work in close collaboration with the central co-operative banks and co-operative societies. A majority of the co-operative banks in the Chota Nagpur Range have done a great deal of good work in the distribution of improved seeds. In pursuance of a recent scheme, the Director of Agriculture has been supplying trained Kamdars and Agricultural Overseers to be in exclusive charge of cane development work in compact groups of cane-growers' co-operative societies. The work of this special staff will be to give free demonstration of improved varieties of sugarcane and to distribute seeds of improved varieties and supervise their cultivation. Besides this, the regular field staff of the Agricultural Department gave assistance to members of co-operative societies.

Bombay.—The agency of the co-operative societies is being availed of as far as possible in extending the propaganda work of the Agricultural Department.

Central Provinces and Berar.—The departmental staff attend rallies and conferences of Co-operative Societies and give lectures and demonstrations on the improved methods of agriculture. The continued economic depression, however, precludes agriculturists from adopting improved methods. One co-operative farming society has already been formed and attempts are being made to form others on similar lines.

Coorg.—The Agricultural Department disseminates the results obtained in demonstration farms through the co-operative organisations.

Delhi.—Good co-operators are usually good farmers, and for this reason alone the work of the co-operative and agricultural departments has always been to a great extent interlocked. Use is made by the officials of the Agricultural Department of the Co-operative organisation, and Thrift and Credit Societies assist their members to purchase improved seed, etc. A more systematic connection between the two departments is however possible and this is now (1938) being arranged through a newly established "Officers' Committee".

Madras.—The utility of the co-operative agency for agricultural improvement was realized and the closest touch maintained with it. Many agricultural improvement and loan and sale societies are in active operation throughout the Presidency. They help in the sale of seed, manure and implements and in maintaining breeding bulls. Agricul-

tural demonstrators attend the meetings of these co-operative societies to disseminate agricultural intelligence. Some societies maintain warehouses for stocking produce with a view to obtaining better price later on. The societies emphasize the need for good manure and good seed to the ryots. In some cases they also encourage the pursuit of subsidiary industry such as bee-keeping, etc., by the member and render the necessary assistance therefor. Loans are given by the societies for the cultivation expenses to needy members. A pointed instance in the successful operation of co-operative endeavour is the Tirupur Co-operative Trading Society through whose instrumentality there is now a wide area under superior Cambodia cotton. The Lalgudi Sivagnanam Co-operative Agricultural Society in the Trichinopoly district owns a farm in which it multiplies its own seed and demonstrates agricultural improvements. The demand for agricultural officers for assisting loan and sale societies is on the increase and efforts are being made to meet these increased demands.

There were 16 agricultural demonstration societies on 30th June 1929 while there were only nine on 30th June 1937. It may be desirable to form more societies of the kind preferably at places which are the headquarters of the agricultural demonstrators so that the Agricultural department can best work up their suggestions and reach the ryots more easily through these societies.

North-West Frontier Province.—About 3,00,000 lbs. seed of improved wheats have been distributed through the Co-operative Department.

Orissa.—The Agricultural Department and the Co-operative Department worked in close union for the introduction of improved seeds, manures, implements and methods of cultivation.

Sind.—The closest association exists between the Agriculture and Co-operative Departments in carrying on propaganda work. A magazine called the "Sind Co-operator" containing articles on Agriculture and Co-operation is issued with the joint support of both departments.

United Provinces.—Demonstration and propaganda work were conducted by the Agriculture Department in close association with the co-operative societies.

The need for better farming societies was also explained and emphasized through group conferences whose number rose to 426 during the period under report.

A number of seed unions were formed in various parts of the province.

24. Appointment of a Special Officer for the organisation and systematisation of propaganda work (paragraph 148).

Assam.—No necessity has yet been felt for the appointment of a special officer as the seed distribution and propaganda have been concentrated in the hands of the Deputy Directors.

Bihar.—An additional Assistant Director of Agriculture has been recently appointed under the sugarcane improvement scheme to assist in the organisation and systematisation of work for the improvement of sugarcane cultivation.

Bombay.—No such officer has been appointed in this Province.

Central Provinces and Berar.—No such officer has yet been appointed.

Coorg.—There is no necessity for the appointment of an officer in this small Province for this purpose.

Delhi.—An Agricultural Assistant is in charge of Agricultural Development work in the Province. His work is supervised by the Deputy Director of Agriculture, Hansi, Punjab.

Madras.—Towards the end of 1929 a Deputy Director of Agriculture was appointed at headquarters for devoting special attention to propaganda work but with the abolition of the post of Personal Assistant to the Director of Agriculture as a measure of retrenchment in 1932, the Deputy Director gradually began to function as Personal Assistant with the result that he has not found it possible to devote sufficient time for his legitimate work. The question of reviving the post of Personal Assistant is now under consideration.

Orissa.—No special officer has yet been appointed.

Sind.—No such officer has been appointed. The work is being done by the Publicity Section of the Agricultural Department under the supervision and control of the Director of Agriculture.

United Provinces.—A senior Deputy Director in the United Provinces Agricultural Service Class I has replaced the Assistant Director of Agriculture who looked after the organization of propaganda work till July 1936.

A forest officer has also been appointed on special duty to carry out investigations into the possibilities of creating village fuel and fodder bags and improving grazing facilities and fodder supplies in waste lands and of developing cottage industries dealing with timber grasses, etc.

CHAPTER VII.—Animal Husbandry.

25. Work on sheep and goat breeding (paragraphs 158-159).

Andamans.—Goats thrive and breed well in the Andamans and no special measures are considered necessary to encourage the introduction of other than local breeds. Many years of trial have proved that sheep will not thrive in the Andamans, possibly because of the excessively damp climate.

Assam.—The experiment with the flock of Bikanir sheep under observation in the Upper Shillong Farm (rainfall about 100 inches per annum) continued. Six ewes and a ram imported in 1933 have increased to a flock of 63 in addition to some 20 that have been sold. The health of the flock continued surprisingly good and there have been only two deaths (including lambs) in 4 years. The following figures were recorded during 1936-37 :—

Average wool yield—rams	..	..	..	6 lbs.
Average wool yield—ewes	..	..	..	4.4 lbs.
Average live weight of lambs at birth.	..	..	..	6.6 lbs.

Bihar.—A small flock of sheep as an experimental measure is being maintained at the Gaya Farm primarily with the object of obtaining preliminary knowledge on the management and feeding of sheep. This work will be further developed when a Live-stock Expert is appointed.

Bombay.—The Sheep Breeding Station financed by the Imperial Council of Agricultural Research was started in November 1937. During the last two months half the foundation stock of Deccani sheep has been brought on the farm. Also 15 Wagenella Merino Sheep consisting of 10 ewes and 5 rams have been imported. The preliminary work of laying out the construction of buildings and paddocks was taken in hand this year.

Coorg.—Colonel Sir Arthur Olver, the Animal Husbandry Expert to the Imperial Council of Agricultural Research has given Coorg a scheme to improve the breed of sheep and goats in the Province but it has not been put into operation for want of funds.

Delhi.—Goat and sheep breeding is by tradition confined to the "lower classes", the land-owner being interested mainly in cattle. It is reported, however, that the views of land-owners on this subject are beginning to change. During the two years under report three rams and three he-goats were bought by the District Board from the Hissar Farm and allotted to *bona fide* breeders.

Madras.—Work on sheep on the lines recommended is being carried on at the Livestock Research Station at Hosur where a flock of 130 of Bellary breed is thriving. The aim of the experiments is to evolve a white wool-bearing sheep which will breed true to type and produce good white wool and also fatten quickly. But the experiments carried out so far have not fulfilled this dual purpose. It is found that of the type bred, the one with a black face and white body is fairly vigorous, gives good wool and fattens quickly but does not breed true. The type of sheep produced all in white color is pure but not vigorous, the lambs being small in size with only a few of them surviving.

To carry on further breeding experiments, a scheme for breeding sheep was sent to the Imperial Council of Agricultural Research for financial aid. The Council has recently sanctioned the scheme and work will be started shortly. The chief objects of work under the scheme are—

- (1) To breed a type of white wool sheep as far as possible ;
- (2) to produce a type suitable to the climate of Southern India which will give better wool and also fatten easily ;
- (3) to ascertain if sheep can stand two lambing periods in a year without suffering in constitution and physique ; and
- (4) to investigate diseases of sheep.

In regard to goat breeding, a scheme of work proposed by the American Arcot Mission Institute, Katpadi, was recommended to and sanctioned by the Imperial Council of Agricultural Research. It is now awaiting allotment of funds.

North-West Frontier Province.—A breed evolved by the cross of Hastnagar and Pushtikoh is gaining popularity among the Agriculturists. Stud rams are issued every

year to the District Boards for breeding purposes. Male goats have also been stationed at Tarnab Farm for free servicing of goats owned by the zamindars.

Efforts were made to demonstrate the approved sheep breeding operation. The existing stock of Hissar Dale rams and ewes located in Kaghan Valley worked satisfactorily. 12 pure Merino rams were imported from the Union of South Africa and located at suitable places. 15 more Hissar Dale rams were located in Kohat and Bannu Districts. 19 Pushtikoh rams produced at the Agricultural Farm Tarnab were distributed in Hazara and Peshawar Districts. Their regular records were maintained to watch the results which were promising.

Production of Mohair in places like Kaghan and Kurram valleys was found full of possibilities and the Civil Veterinary Department is arranging to import Angora Goats, Bucks and ewes from America. Jamna Pari Bucks were purchased from the Government Cattle Farm Hissar and located at suitable places to improve the milk yields.

Orissa.—An experiment was made at a Government farm to improve the local goats by crossing with large sized he-goats of South India. The results were not promising as the progeny was mostly very weak in the legs and without much vitality. Attempts are now being made to grade up by careful selection of both the parents from the local breed.

Punjab.—The Imperial Council of Agricultural Research sanctioned a grant of Rs. 43,800 to be spread over a period of ten years for the scheme regarding the investigation of Bikaneri sheep which matured during the year 1937-38. The main objects of the scheme are—

- (1) to improve the quantity and quality of both the fleece and the carcass,
- (2) to supply High Class Bikaneri pedigree rams to the breeders,
- (3) to work out such economic factors as are responsible for the highest net results.

The Punjab Government sanctioned a scheme for the improvement of Lohi sheep at the Government Cattle Farm, Hissar. It was started in December, 1937, and is progressing satisfactorily.

A sheep breeding scheme has also been started in Rakh Dhand, district Jhelum, where plots of land were allotted to breeders on certain conditions proposed by the Veterinary Department. The scheme is working satisfactorily and has aroused great interest among the breeders. The District Board, Mianwali, has also sanctioned funds for the improvement of sheep in ilaka Thal and of fat-tailed *Dumba* sheep of the hilly tract.

From the flock of sheep maintained at the Government Cattle Farm, Hissar, rams and ewes are issued at concession rates to certain selected districts in the Province towards improving the local indigenous breed.

Very satisfactory progress has been made in the work on goat breeding at the Government Cattle Farm, Hissar. By careful grading and selective breeding, the farm has been able to raise the over-all average milk yield from 1 lb. in 1932-33 to 2 lbs. in 1936-37. With a view to improving the milk yield and the size of the local goats, male goats are issued to breeders from time to time from the Hissar Farm.

During the calendar years 1936 and 1937 three indigenous breeds of goats in the Lahore and the Jullundur Divisions, i.e., the Jamna Pari, the Chighu and the Lohi were studied. The Jamna Pari goat has received the foremost attention both at the hands of *bona fide* breeders in the Gurdaspur, Sialkot and Gujranwala districts and the Government Farm, Hissar. The animals of this breed are noted for milk strain.

Sind.—Hitherto no work on sheep or goat breeding has been carried out. A scheme for surveying the possible extension of sheep breeding has been prepared and will be considered after it has been examined by a Live Stock Officer, who has been recently appointed.

United Provinces.—A grant of Rs. 11,000 was made to the Mission Poultry Farm, Etah, for goat breeding and useful work is being carried out there under the supervision of Dr. A. E. Slater.

A survey of sheep breeding in Garhwal and the districts of Bundelkhand was made by the Director of Veterinary Services. His reports are under the consideration of Government.

26. Improvement of Grazing Facilities (paragraphs 181-183).

Assam.—The system of "Notifying" state grazing reserves for control under the Assam Grazing Rules was extended. The reduction or exclusion of buffaloes from over-grazed reserves suitable for cattle was pressed. The area under control reached 45,000 acres affecting 12,000 cattle.

Bihar.—Steps are contemplated to form a Provincial fodder and grazing committee to take up the question of improving the production of improved types of fodder as well as to provide better grazing facilities.

Bombay.—A scheme for research on improvement of grass lands by rotational system of grazing and the ecological study of forest grasses has been prepared by the Agricultural Department in consultation with the Forest Department and has been submitted to the Imperial Council of Agricultural Research for their approval.

Coorg.—Some work is being done in this direction in the growing of guinea grass. A great deal of the grazing ground in Coorg is covered with lantana which is difficult to eradicate.

Delhi.—In Delhi as in most other plains districts the tendency has been to break up to cultivation and even to partition areas formerly reserved for common purposes. Grazing grounds are therefore as a rule inadequate. Departmental exhortations to improve them by rotational closure, etc., have not met with any real response.

Madras.—There has been steady progress in the improvement of departmental grazing grounds. Large areas overrun by prickly-pear have been cleared by the cochineal insect and this has opened up new areas for grazing. Experiments are afoot to arrest the spread of lantanas by chemical sprays.

Experiments for the introduction of better strains of grasses have been carried on in several divisions with results varying with the soil and rainfall. With a view to ascertaining the best strains of grasses a study of the various species in the forests was carried out jointly by an officer of the Agricultural Department and the District Forest Officer, Kollegal division.

Experiments on rotational grazing are being carried on. The system which consists in dividing a grazing area into parts and permitting grazing by rotation to allow regrowth in the area grazed over is being tried in Salem North with satisfactory results so far. It is proposed to try it methodically in Coimbatore North.

Penning of cattle within grazing grounds (subject to the payment of a small fee) is encouraged. Graziers are permitted to take from the forests materials required for putting up sheds in cattle pens.

A controlled system of grazing known as the kancha system has long been in force in the Nellore division. Under this system a kancha or grazing ground is leased and the lessee is required to close the kancha to grazing for three months after the monsoon and to restrict cattle to the grazing possibility. The department itself is now managing these areas.

Existing water-sources in grazing lands were repaired and fresh ones provided as far as funds permitted. The ryots too were freely permitted to improve them.

Punjab.—Investigations have been carried out on the feeding values of some of the hill grazing tracts under the charge of the Forest Department in the Kangra district. Efforts were made to improve grazing facilities in the Murree Hills, but the people themselves in that locality were generally apathetic. The work had, therefore, to be discontinued.

Sind.—This question is receiving the attention of the Agricultural Department. Government have foregone grazing fees in Revenue waste lands in the entire Province, except the Kohistan Mahal and Karachi taluka and have reduced the annual grazing fees in forests with effect from 1st April 1938 as under :—

	Rs.	A.	P.
Buffalo	1	0	0
Cow and Bullocks	0	8	0

United Provinces.—Varieties of grasses such as Elephant and Napier which are grown on the cattle and Agricultural farms in the Bundelkhand circle were demonstrated and their roots sold to the public for cultivation which was encouraged.

A provincial Fodder and Grazing Committee which includes representatives of the Forest, Agriculture, Irrigation, Veterinary and Revenue Departments, as well as non-official members of the Assembly was constituted in June, 1937. The Committee prepared a 5-year research programme which was submitted to the Imperial Council of Agricultural Research.

The Committee is also in close touch with the work carried out by the officer on special duty mentioned in item 24 above.

27. Promotion of the use of silage (paragraph 185).

Assam.—Pit silage was made on 4 Government farms from all kinds of wild grasses and fodder crops. Experimental pits were made in villages using surplus wild grasses. The main difficulty experienced was that the time for silage making coincides with that for growing paddy crops. A system of planting fodder gardens in cultivators' lands accompanies the supply of bulls in groups. Silage making was demonstrated with the produce of these fodder gardens.

Bengal.—Silos were successfully introduced on Government farms. Demonstrations of silo making were conducted in the villages and illustrated leaflets published by the Department were distributed.

Bihar.—Experiments on many farms have demonstrated that silage can be made very successfully in *kutchra* pits. Attempts are now being made to get the practice adopted in various villages. For demonstration in chaffcutting for silage 3 bullock-driven fodder-cutting outfits have been obtained and are in use.

Bombay.—Propaganda for the manufacture and utilization of silage is being carried out. Every conceivable agency such as taluka development associations and village improvement committees are helping in this propaganda. Many farms and large farmers have taken to silage. A scheme for the manufacture and sale of silage by forest contractors was suggested through the Collector of West Khandesh.

Coorg.—Silopits have been dug at the five dispensaries and at Fraserpet and a few ryots have prepared silage in their lands.

Delhi.—The use of silage is still in the stage of propaganda and demonstration.

Madras.—Intensive propaganda was carried on as before by the departmental officers for the promotion of silage. Silage making was demonstrated with fodder crops and hill grasses. Advantage is taken of the heavy cuts of fodder obtained from the Central Farm at Coimbatore to demonstrate the preparation and use of silage for the dairy herd. This silage comes in handy in the summer months as succulent cattle food. Silage making was successfully demonstrated in the West Coast.

North-West Frontier Province.—Experiments regarding silage have been started and are in progress.

Orissa.—A leaflet on silage both in the vernacular and English was printed and copies were widely distributed. Demonstrations continued to be given in the villages. Veterinary officers have been trained in preparing silage and they too, are employed in giving demonstrations.

Punjab.—In addition to the siloing of ordinary farm crops investigations were made regarding the possibility of converting inferior grasses and other waste plants into silage. It has been found that ensilage is unnecessary in irrigated areas, since green fodder can be produced at any time of the year. In dry areas it would be valuable if there was sufficient grass. Co-operative Societies should take it up but it is doubtful whether any large quantity of surplus grass is available.

United Provinces.—Grass and Juar are turned on a large scale into silage at all the agricultural and cattle farms and those interested are invited to the farms, but large scale demonstration of the methods has not yet been undertaken due to lack of funds.

28. Investigation of the correct period at which to harvest cereals (paragraph 186).

Assam.—No experiments have yet been made.

Bihar.—Conclusive results from the experiments conducted on paddy have not been arrived at.

Bombay.—No action in this line of work has so far been taken in this Province, except at the Jalgaon farm where experiments were conducted on the harvesting of jowar at different periods.

Sind.—Research work is being carried out under the Botanical Section, Agricultural Research Station, Sakrand.

United Provinces.—An experiment of the nature was carried out with Paddy at the Rice Research Station at Nagina. The results show that early rice for seed may be harvested prematurely without damage whereas late types must be given the full period for development.

29. Encouragement of the cultivation of Leguminous Fodder Crops (paragraph 187).

Assam.—The importance of the *Ochoa* husks of rabi crops as cattle feed was impressed by the Department. One of the main items of the works of the department is to encourage the growing of rabi crops wherever suitable conditions can be found. The acidity of Assam soil makes this work difficult in the old alluvium soils but the new cultivations are free from it. Some progress however was recorded.

At the Jorhat farm cowpea was grown to serve partly as fodder crop. Groundnut and other legumes were successfully grown. Propaganda was made exhorting cultivators to feed their cattle with green fodder of pulses and groundnut stalks wherever available.

Bengal.—Demonstration and propaganda were made for the introduction of leguminous fodder crops. The agriculturists have adopted the cultivation of Jowar, Kalai, Khesari, Cow-pea and field pea as fodder crops and Dhaincha for green manuring.

Bihar.—The cultivation of berseem and that of lucerne is being carried out on the central farms. Steps are also being taken to encourage the growing of soya bean as a suitable fodder for livestock.

Bombay.—In the South Central Division, lucerne—a leguminous fodder crop—has been extended in the Deccan Canal tract and under well-irrigation, wherever there are facilities. The crop of berseem has also been recommended in the canal tract, since the year 1934, but no progress has been made. The area under lucerne is slowly increasing.

Some progress in this direction has been achieved with the trials of varieties of soyabeans at the Cattle Breeding Farm, Bankapur, district Dharwar and of berseem at the Northcote Cattle Farm, Chharodi, district Ahmedabad.

After several varietal trials at Bankapur the varieties known as mammoth yellow and large yellow were found doing well, the latter yielding at the rate of 735 lbs. of grain per acre on an average of three years' results. During the year 1936-37 it yielded at the rate of 682 lbs. of grain and 1,200 lbs. of stalks per acre.

Growing of soyabeans is being taken up gradually by the cultivators especially in certain parts of the Deccan such as the Satara district but they find no market for growers.

Berseem is being tried on a small scale on the Chharodi farm and the yield has been found to go up as much as 67,000 lbs. per acre after a period of three years of its being raised on the same plot where facilities exist for its propagation. A few people have taken to it, an instance being the gowshala belonging to Sheth Haridas Morarji at Borivāli, Bombay.

Delhi.—Some progress has been made, and cultivators are now beginning to realise the importance of berseem, lucerne, guara, peas, etc.

Madras.—New fodder crops like "pillipēsara," "toesinte," "kollagajeru" and "lucerne" were introduced. Stimulus was given to the spread of "kolukattai," elephant and guinea grasses. The Government have directed that no water-cess should be levied for the irrigation of fodder cholam. The Madura Municipality maintains a sewage farm where a large area was grown under Guinea grass. Trials with various fodder crops for the benefit of the dairy cows and working animals have proved that maize is by far the best green fodder for increasing the milk yield. In all the experimental stations trials of different fodder crops suited to the locality are being made and seeds and cuttings are supplied to ryots. A large quantity of seeds of various fodder crops was also distributed.

North-West Frontier Province.—As the North-West Frontier Province is one of the few parts where seed of Berseem can mature the cultivators have found it profitable to grow this crop for fodder and seed, large quantities of which, find its way to down provinces every year and there has thus been considerable increase in area under the leguminous crop. Guara and cow peas are also now gaining popularity.

Orissa.—The introduction of leguminous fodder crops in new sets of villages every year is a regular feature of the work of the Department.

Punjab.—The concession for supply of canal water at reduced rates has been continued. As a result of the work done by the Fodder Specialist important fodder crops like Berseem, Sudan grass, cowpeas and Elephant grass have been introduced. Much useful work is in progress with many other fodder crops such as Guara, Methra, Senji, Japan rape, Lucerne and pasture grasses. The provision for an adequate supply of good seed of various new fodders is occupying the attention of the Agriculture Department. Particular success has been obtained by the bacteria inoculation of berseem. Investigations on similar treatment of other legumes are in progress.

Sind.—This forms part of the programme of the experiments on the lands of cultivators.

The cultivation of Berseem (*Trifol Alexandrium*) as a leguminous fodder crop in the Rabi season is extending in the Barrage areas.

Special Agricultural leaflets on the subject have been issued.

United Provinces.—In areas where water facilities exist the area of lucerne and berseem is extending. These crops have been introduced on a large scale in Sarda Canal areas. Formerly the seed of these crops was obtained from outside the province but

arrangements have now been made to grow these seeds on a large scale at the Agricultural and Cattle farms. In order to encourage the cultivators in the precarious area of Muttra 20 maunds berseem seed was distributed free.

30. *Progress made in establishing pure and improved types of good cattle (including buffaloes) with special reference to the policy of producing "dual purpose cattle" (paragraphs 188-198).*

Ajmer-Merwara.—8 bulls (4 belonging to the District Board and 4 purchased from the Rural development grant) were maintained for breeding purposes.

Andamans.—Imported bulls and buffalo-bulls are maintained by the Supply Department to serve milch cattle belonging to the Government Dairy Farm and privately-owned cattle. No fee is charged for service. In 1936 a Young Stock Farm was opened for rearing buffalo and cow-calves born at the Government Dairy Farm. It now consists of 63 calves from a variety of good imported and local animals. The object of this Farm is to provide better types of acclimatised cattle for stud, draught and milch purposes for Government Departments and private individuals.

Assam.—Assam has no pure breeds and no breed or type with any milking powers.

The breeding of European $\times$ Indian grades for milk production in the hills was continued at the Shillong Farm. The average lactation per cow has reached 7,000 lbs. the highest lactation being 11,000 lbs. A breed of about 1,000 cows exists in and around Shillong, mainly derived from this herd. There is no pure hill breed in the neighbourhood which could be spoilt by mixing with these cattle.

At the Khanapara and Sylhet Farms the breeding of Scinde $\times$ local grades was continued. The lactations of the grades run from 2,000 to 3,000 lbs. as compared with the 600 to 1,000 lbs. of the best local cows.

At the Jorhat farm a herd of Haryana grades is bred, specially designed to produce bulls of draught type suitable for the herds of professional graziers in the 'Notified' controlled grazing reserves. Incidentally an average lactation of 1,800 lbs. is recorded, with individuals reaching 3,000 lbs.

An endeavour to select and procreate a definite type known as the Marangia is in action by control of 4 large professional grazing reserves by selection of bulls and castration of surplus and unsuitable bulls before reaching breeding age. The area concerned is approximately 45,000 acres and the number of cattle under control is about 12,000.

A scheme of supply of bulls to selected villages in groups of 12 bulls per group is in operation. Maintenance is provided for each bull and a Stockman supervises the group. Six such groups are in operation, and further expansion is provided for. Demonstrations of fodder growing in 'Fodder Gardens' are included in the work in each group.

Bengal.—Considerable progress was made in the improvement of live stock. Thirty Live Stock and Assistant Live Stock Officers have recently been appointed and one thousand and four hundred stud bulls have been issued.

Bihar.—The Sahiwal and Tharparkar herds at Kanke continue to show satisfactory progress and a high standard of production is being maintained. A small herd of representative cows and bulls of the Hansi-Hissar type of cattle is now being developed at Pusa.

The progress of the Murra buffalo herd at Sepaya continues to be satisfactory.

Bombay.—The continuation of breeding operations of Sindhi cows and Surti buffaloes at the Poona Agricultural College Dairy has effected further increase in the annual yield of milk. This work will be continued.

One of the methods of establishing pure and improved types of good cattle is by resorting to registration of such animals. The following statement shows the progress achieved in this direction :—

					Number of animals registered up to 1935-36.	Number of animals registered during 1936-37.	Total up to the end of July 1937.
Northern Division	..	—	..	..	921	127	1,048
North Central Division	..	—	..	..	175	..	175
South Central Division	..	—	..	..	429	330	759
Southern Division	..	—	..	..	559	29	588
Total	—	—	—	—	2,084	486	2,570

The registration of cattle slackened a bit during the year 1936-37. A considerable ground has since been covered in this direction and new births and stray animals that were overlooked before, have been procured for the purpose.

Issue of pure-bred breeding bulls.—Great strides have been made in this direction through the issue of gift bulls as a result of His Excellency the Viceroy's appeal for breeding bulls. The appeal resulted in as many as 496 such offers. During the year 1936-37, the following bulls were made available by the Live Stock Section towards this scheme.

Division.	Number of gift bulls given out.
Northern Division	22
North Central Division	39
South Central Division	7
Southern Division	22
	90

In the last couple of years owing to the appeal of His Excellency the Viceroy a large number of bulls has been supplied to non-intensive areas. The bulls are under the control of territorial Deputy Directors of Agriculture.

The improvement of the buffalo by testing buffaloes for their milking qualities by actually supervising milking and maintaining a daily record has been in progress in four different parts of the Province. Bull-calves from good recorded buffaloes are purchased, reared on farms and later placed out in villages. All buffalo bulcalves from the College Dairy are purchased and eventually placed out in villages for further village improvement.

Application of Livestock Improvement Act 1933.—The District Local Boards, Dharwar, East Khandesh and Sholapur approved our proposal to apply the Act to a few villages in these districts. Accordingly the Live Stock Improvement Act has been applied to four villages, viz., Motebennur and Sidenur of Dharwar district and Shirsolli and Mhaswad of East Khandesh district.

The act is working well in the Dharwar district and the people now appreciate the application of the act as it has protected the pure cows against breeding from undesirable bulls and 22 such bulls have been castrated. In East Khandesh, however, some difficulty was experienced in providing sufficient breeding bulls. 62 undesirable bulls have been castrated.

Scheme for improvement of the buffalo.—The scheme provided for testing a large number of a cultivator's buffaloes for milk and butter fat yield periodically, with a view to ascertain for the cultivator which of his buffaloes paid and which did not, secondly, for selecting bull calves for breeding purposes from the best milkers and thirdly for demonstrating to the people the best way of disposing of their milk. The scheme came into operation in November 1935.

Centres of work.—Thirty-six villages were selected as under :—

Seven villages were selected near Anand in Kaira district, 13 near Jalgaon and Phulia in Khandesh, six near Pandharpur in the Deccan and ten villages in Bijapur and Belgaum districts in the Southern Division.

Breed and number of animals tested.—In all 1,037 animals of three chief breeds were tested. These were :—

374 Surti breed in Gujarat.

309 Malvi breed in Khandesh.

286 Pandharpuri breed at Pandharpur and Bijapur.

68 Jowari (local) breed in Belgaum district.

Results of the test :—

- The cultivator in Gujarat keeps a greater proportion of better producers, about 70 per cent. of the animals tested yielding 3,500 lbs. of milk and above per lactation.
- In Khandesh 49 per cent. of the Malvi animals tested yielded 3,500 lbs. of milk and above per lactation.
- In Pandharpur and Bijapur centres only 18 per cent. of the Pandharpuri animals tested gave 3,500 lbs. of milk and above per lactation.
- In Belgaum centre only 15 per cent. of the Jowari animals tested yielded 3,500 lbs. of milk and above per lactation.

Coorg.—In order to give effect to the recommendations of Colonel Sir Arthur Oliver, Animal Husbandry Expert to the Imperial Council of Agricultural Research, for the improvement of the cattle in Coorg, a survey of the Province was conducted and a cattle breeding map prepared for the three breeds best suited to the country, namely Sindhi, Gir and Amrit Mahal. The Murra breed of buffaloes was recommended for the whole of the Province. In 1937 the Government bought four adult bulls (one Sindhi, one Gir, one Amrit Mahal and one Murra adult bull buffalo) and nine bull calves (five Sindhi, three Gir and one Murra calf buffalo). Two Sindhi bulls were already in service. At the end of the year one bull was stationed at each of the five dispensaries, one bull and two calves were in the nursery at Fraserspet and the remaining five were given free of cost to private persons under certain conditions prescribed by the Chief Commissioner of Coorg. One of the bull buffaloes was stationed at the Mercara dispensary. The other was given to a Co-operative Society on the same conditions as the bulls were given and afterwards transferred to a private gentleman. It is proposed to purchase some more breeding bulls in 1938 and one Amrit Mahal and four Sindhi have actually been purchased. Service of Government bull is given free of cost.

Delhi.—The local breeds are the Haryana for plough cattle and the Murrah for buffaloes. There is no breeding farm in Delhi. Haryana type bulls are purchased from the Hissar farm, or marked locally as fit for breeding purposes, and Murrah buffaloes are purchased locally. During the period under review Rs. 21,800 were spent by the District Board on the purchase of stock, and the position at the end of 1937 was as follows :—

	Purchase by or presented to the District Board.	Certified as suitable for breeding.		Total.
		District Board.	Privately owned.	
Bulls	114	114	69	183
Buffalo Bulls	30	30	89	119

Two bulls included in the total were given by His Excellency the Viceroy and are kept at stud at Nangloi and Mahrauli. The remaining bulls are managed by the villagers themselves. No attempt at dual purpose breeding has been made, the Hissar type being generally more suited to draught than to dairy purposes.

N.-W. F. P.—Improvement of cattle breeding received the best attention of the Civil Veterinary Department in this province. In 1928 there were only 20 odd bulls in the whole of the province but there is now a well advanced cattle breeding scheme with a regular record keeping in view the policy of producing "Dual purpose Cattle". 306 more stud bulls and 12 subsidy cows were entertained in scheme during the period under report. Out of this lot 70 bulls were purchased from His Excellency the Viceroy's Appeal Fund for Livestock improvement (some more purchase for this year is still in hand). The number of stud bulls on scheme increased to 393 on the 31st December 1937. They covered more than 37,360 cows and were kept in proper condition under the close supervision of the Department.

Orissa.—The breeding experiments carried in the Cuttack farm definitely showed that by introducing Montgomery blood the progeny of the local cows could be improved considerably, so far as the milk yield was concerned. But the male calves on account of their heavy build were found unsuitable in this province for draft purposes. It was, therefore, decided to discard Montgomery bulls in favour of the small type of Haryana known as Metwali which has a lighter body. A herd of twenty Haryana cows and one Haryana bull are being maintained at Cuttack farm. The intention is to breed pure Haryana bulls for introduction in the villages for stud purposes.

In response to the appeal of the Viceroy for improvement of cattle, a private association called the Utkal Go-Mangal Samiti has been formed with His Excellency the Governor as the patron for the improvement of the cattle of the province. A number of breeding centres has been opened by the association where pure Haryana bulls purchased from the Punjab are maintained for breeding purposes at the cost of the association.

Punjab.—The Punjab Government have continued their policy of supplying pedigree bulls to breeders at concession rates from the Government Cattle Farm, Hissar. Live-stock improvement schemes subsidized by Government are in operation in areas most suited to cattle breeding including the Dajal, Haryana and Dhanni tracts. The Veterinary Department's scheme for the concentration of bulls in selected areas is also receiving special attention.

A special effort is in progress to foster the dual purpose type of cattle by supplying pedigree bulls from the Government Cattle Farm, Hissar, and also from the grantee farms on the Lower Bari Doab Canal Colony to various districts in the Province.

It is encouraging to note that there has been a great response from the big landlords of the Province to His Excellency the Viceroy's Gift Scheme for the improvement of cattle in India.

The following programme for the development of buffalo breeding is in force :—

- (1) to increase the number of high class male buffalo bulls ;
- (2) to organize Civil Veterinary Department Breeding Societies around each bull.
- (3) to organize one day village shows in the selected areas,
- (4) to finance the above measures to start with through District Boards and subsequently to move Government for an allotment of funds on an equal basis.

As many as 47 societies (13 Co-operative and 34 Civil Veterinary Department) are at work in some districts of the Province with 851 members and 1,228 animals.

Sind.—A scheme for the improvement of the Thar Parkar breed of cattle as a "dual purpose" breed and for the distribution of stud bulls of this breed, approved of by the Government of India and financed by this Government, is working satisfactorily. A nucleus pedigree herd of Red Sindhi Breed is being maintained at Mirpurkhas.

A start has been made in the improvement of indigenous poultry.

United Provinces.—Cattle breeding operations continued on (1) Dual purpose herd and (2) Milking herd at the four cattle farms.

Dual purpose herd work was continued at the Madhurikund and Bharari farms with regard to Hissar breed. Bulls produced at these farms were distributed in selected districts for grading up village herds. The demand for this breed is increasing and cows of this breed were also purchased and distributed on *taqavi*.

Milking herd of Sahiwal breed was maintained at the Manjhra farm, the milk yield of which showed steady increase. Cows of this breed have also been kept with His Excellency the Viceroy's Body Guards' herd at Dehra Dun. In addition to this, intensive breeding with Murrah buffaloes was in progress at the two farms.

31. Improvement of the urban Milk and Ghee (clarified butter) supply (paragraphs 199—201).

Assam.—Co-operative milk supplies in four small towns continued. As stated in the previous report it has been found that the local cow cannot produce milk sufficient to cover loan repayment, interest charges, her own feed, and some income for the owner, all at the same time. Where an existing supply has been organised on a co-operative basis regarding quality, transport, and sale, without credit loans, success has been achieved. Where rice growing cultivators have taken up milk production as a new sideline with the aid of co-operative credit loans, the majority have failed.

Of the twenty-five milk societies which were working till 1935, the registration of five has since been cancelled and they are now under liquidation. No such society has been organized during the last two years. There are at present twenty milk societies and two milk unions.

Bihar.—The provisions of the Bihar and Orissa Municipal Act already give the Municipal Commissioners the power to carry out the Royal Commission's main recommendation, namely, the establishment of municipal dairies and the distribution of milk from them. They have also power under the rules to license places for the sale of milk, control their sanitary arrangements, prohibit the import of milk into a municipality except under a license, and to require notices to be given of the outbreak of contagious diseases amongst milch cows and buffaloes. The main sources of milk supply in towns are cows kept by Goalas both inside and outside municipal limits. It would be not only useless but definitely harmful to hamper the development of dairies by licensing restrictions unless other sources of milk supply can be controlled. It is impracticable to control the management of milch cattle inside the town unless the milch cattle kept outside the town can also be controlled. It is not practicable to control the management of Goalas' cattle, even inside the town without the employment of a Special Veterinary staff and without the supply from the municipal funds of facilities to the Goalas for keeping their cattle in sanitary surroundings. Municipalities in this Province are short of funds and cannot afford such expenditure. Government have come to the conclusion that nothing further can be done until the municipal revenues expand and public opinion is educated to appreciate the value of a pure milk supply.

With the assistance of the Marketing Staff steps are being taken to start ghee grading stations all over the Province. Preliminary investigations are being pursued.

Bombay.—The problem of the improvement of the urban milk supply is being tackled by setting aside grass lands near Palghar which are given out to the Bombay City milk stable owners on their undertaking to remove all their stock from the city to such a site on certain terms. Two of the stable owners who were amenable and who were prepared to abide by such conditions are thus allotted an area of 1,045 acres and 382 gunthas in all. There are about 20,000 buffaloes in the City of Bombay and it will naturally take time before any arrangements can be made for the removal of all of them from the city. The Municipalities in this province are competent to take action as recommended by the Commission. The recommendation is being brought to the notice of the Municipalities.

Rule 8 (b) of the revised Adulteration of articles of Food Rules recently issued provides that no article of food which resembles either butter or ghee shall be sold; offered or kept or exposed for sale except under the names and conditions set forth in the Rules. The Rules also provide how articles resembling butter or ghee shall be sold.

Coorg.—Pedigree bulls of heavy milk strain, viz., Sindhi and Gir are stationed according to the cattle breeding map at rural and urban areas and it is hoped that the quality and quantity of milk will improve.

Delhi.—Very little progress has been made. Attempts by an active Public Health Department to insist upon proper standards under the Punjab Pure Food Act, 1929, have provoked open hostility on the part of the trade, which (oddly enough) can count on public opinion in its opposition to authority. The radical remedy is large-scale production or collection and distribution but the market for pure milk is so uncertain that it is doubtful whether the necessary organisation can be set up by municipal or other agency. A recent effort to popularize the supply of sound milk to urban schools met with a disappointing response.

Madras.—*Milk supply.*—The Madras Milk Supply Co-operative Union which started work in 1929 has been doing work for the improvement of milk supply to the Madras City. The Union receives its supplies of milk from milk supply societies composed of milkmen in the City and the neighbouring Chingleput district. It has a number of depots throughout the City for the sale of milk to the public. Besides, the Union makes supply to three Government hospitals in the City. The average daily sale of milk increased to 1,502 measures in 1937. With the help of pasteurising plant, which the Union proposes to instal shortly, it is expected that the Union would increase its sales and make itself more useful to the public in the City.

Attempts are being made to form milk supply unions on the City model in certain important centres in the districts. A union was formed at Coimbatore in 1937 and it has opened depots in several centres in the town and begun work. It has secured the contract for supply of milk to the local Government hospital.

Milk supply societies have been formed at Ellore in the West Godavari district and Mannargudi in the Tanjore district and it is expected that these societies will ultimately be developed into unions.

Ghee supply.—There are no ghee supply societies as such but attempts are made through co-operative societies to make supply of unadulterated ghee to the public. The Rasipuram Co-operative Sale Society in the Salem district and the Madras Milk Supply Union are doing such work. The Rasipuram society arranges to collect pure ghee and its sale through the Provincial Marketing Society at Madras. Recently a butter supply society has been organized in the Tanjore district, the object of which is to collect butter and sell it either as butter or ghee through the marketing society.

The Madras Prevention of Adulteration Act which is enforced in this Presidency for the control of adulteration of ghee and other food products was extended further to the areas of 27 more local bodies in 1936 and 1937 making in all 84 areas. The Act is now in force in almost all important urban areas. A total number of 3,779 samples of ghee and 4,993 of milk were analysed during 1936 and 1937 disclosing an adulteration of 32.7 per cent. in ghee and 62.2 per cent. in milk.

North-West Frontier Province.—Services of the Montgomery, Dajal and Sindhi bulls and of approved Buffalo Bulls were utilized by people. Small dairies attached to Islamia College, Peshawar, and Police Training Centre, Hangu, were also working.

Orissa.—Ghee making has been taken up at the Cuttack farm and it has been found that higher outturn per pound of milk is obtained by the 'cream' method than by the local method. The ghee manufactured at the farm has been made available for sale to the public of Cuttack town.

Punjab.—No improvement is possible unless strong legislation is passed and enforced. Milk is generally adulterated and ghee nearly always so. The Veterinary Department is, however, impressing upon the municipalities the need of providing cow bulls and buffalo bulls of high milking strain to improve the milk and ghee supply of Urban areas. The response in this behalf is not very encouraging.

Sind.—No action yet taken.

United Provinces.—The milk supplying schemes in Allahabad, Lucknow, Agra and Jhansi are working satisfactorily. The Katra Dairy of Allahabad which introduced more buffaloes and cows of heavy milking breeds sold milk worth Rs. 32,785 during 1936 and 1937.

The *ghi* supply work also has developed considerably, the number of *ghi* societies is now 153 against 35 in 1934-35 and made a profit of Rs. 18,476 during 1937.

The number of samples of milk and *ghi* taken by public health officers under the United Provinces Prevention of Adulteration Act rose from 1986 in 1935 to 2,197 in 1937 and from 4,572 to 5,468 respectively. The fines imposed per case rose from Rs. 37.5 in 1934 to Rs. 41.16 in 1936.

32. Organisation of Co-operative Breeding Societies (paragraph 202).

Assam.—This is a matter still for the future.

Bengal.—Co-operative breeding societies organised by the department a few years back have not been successful owing to the apathy of the members.

Bihar.—As a result of His Excellency the Viceroy's appeal towards the improvement of cattle, district cattle breeding associations have been formed.

No Co-operative Breeding society was organised during the years under report.

Bombay.—Cattle breeding societies have been organised from time to time and there are in all 14 societies at present working in the southern division. Those situated in tracts having good grazing facilities as in Hirekerur taluka are doing fairly well. Premium bulls have been issued to many of these societies from the Bankapur farm.

Central Provinces.—Two such societies—one in the Raipur district and the other in the Drug district have been organized.

Coorg.—There are no societies of this type in Coorg but Government is contemplating the supply of bulls to deserving societies.

Delhi.—There are two co-operative breeding societies in the province. Of 63 members 53 own cows of good stock. This is not of course a measure of the interest in breeding in the Province as a whole, which is now very general.

Madras.—Steps are taken to organize such societies wherever there are facilities. Two cattle-breeding societies have now been organized, one in the Madura district and the other in Salem district. The Madura society has applied to Government for a subsidy for the construction of a paddock for bulls, a dairy room and purchase of dairy implements. The ordinary credit societies are also interesting themselves now in cattle improvement. The Government have recently permitted co-operative unions and the bigger primary societies to utilize their Common Good Fund for the purchase and maintenance of breeding bulls.

Punjab.—The Cattle and Sheep Breeding Societies have continued to expand both in number and activity. Mule Breeding Societies of which 3 were registered in 1937 is a new enterprise. The Amritsar Cattle Breeding Societies show an active life. In Buffalo Breeding Societies the members are keen and active. The Veterinary first-aid scheme has been worked in co-operation with the Veterinary Department and has been successful particularly in Ferozepore district, where as many as 40 Veterinary first-aid centres have been established. The number of animals treated by them was 8,460.

Sind.—No such societies have been formed.

United Provinces.—No co-operative breeding societies were formed but breeding bulls were supplied to some co-operative societies.

33. Live-stock Shows and Fairs (paragraph 203).

Assam.—Departmental cattle were exhibited in shows wherever possible and competitions were organised. The idea of competition in cattle breeding is spreading slowly in villages.

Baluchistan.—Horse and Cattle Shows are held at Sibi and Usta annually.

Bengal.—As usual live stock shows and fairs were held along with agricultural shows. Such shows were encouraged by financial contributions and by loan of departmental exhibits.

Bihar.—An excellent livestock show was staged at Sonepur last year for the first time. The results have been encouraging and it is intended to hold this event annually. A similar show is held every year at the Sitamarhi Cattle Fair where the Department participates in the award of prizes and the judging of cattle. The Society for the Prevention of Cruelty to Animals held an exhibition of cattle at Ranchi where representative cows of the Sahiwal and Tharparkar breeds from the Kanke Farm were exhibited.

Bombay.—Cattle shows were arranged in the Southern Division from time to time, and prizes were awarded to good animals. Four cattle shows in 1931, 23 in 1932 and 1933, 18 in 1934 and 1935 and 6 during 1936 were arranged in this division. In 1937 five preliminary shows were held for selective animals of all three breeds for the buffaloes' divisional show at Belgaum.

The cattle shows have become another function in intensive cattle breeding societies. The local bodies are taking more and more interest in these shows. Village shows organised by taluka development associations are increasing annually.

Coorg.—Cattle shows were held at four centres in 1936 and in five centres in 1937 and prizes amounting to Rs. 210 and Rs. 520 respectively were distributed to the owners of the best animals.

Delhi.—Six monthly fairs at which a good deal of business is done are held at Nan-gloi. One day shows (which are not fairs) are held elsewhere (e.g., at Narela, Badarpur, Nazafgarh, Mahrauli, etc., with good results.

Madras.—Cattle shows are held throughout the Presidency for sale of cattle. An annual cattle show is being held at Valparai (Coimbatore district). In Tiruppur, a cattle show is held biennially, the Government making a money grant towards the cost of the prizes awarded at the show. Cattle shows are arranged in a few towns under the auspices of the Society for Prevention of Cruelty to Animals. The cattle show at Ongole has been revived. Efforts are made to organize new cattle shows wherever possible.

North-West Frontier Province.—Eight annual cattle Fairs and Horse Shows were held at Peshawar, Bannu, Kohat, Haripur and Dera Ismail Khan in addition to small village shows where prizes were awarded for good specimens.

Orissa.—In 1937 the Utkal Go-Mangal Samiti took up the question of holding cattle shows. With the help of grants from the Samiti, shows were held in four districts in the early part of 1938.

Punjab.—The number of cattle fairs is increasing every year. During the calendar years 1936 and 1937, 447 cattle fairs excluding one day shows were held in the various districts of the Province. Cash prizes are awarded at live-stock shows to stimulate interest amongst breeders.

To stimulate further the interest of breeders, classes of sheep, goats and rams are especially being included in the schedules of prizes relating to cattle shows and separate shows for these animals are also held wherever possible.

Sind.—A large Cattle Show is being held at Jacobabad in conjunction with the Upper Sind Horse Show. Another show is held at Sajan Sawari (Lower Sind). It is proposed to organise one more Cattle Show in the Thar Parkar District (East Sind).

United Provinces.—A cattle show was organized at the United Provinces Agricultural and Industrial Exhibition at Lucknow where selected cattle of different breeds were exhibited. A big cattle show is held annually at Etawah. Smaller cattle fairs are held at various centres in the province.

34. Castration (paragraph 207).

Assam.—Castration is generally done by the Veterinary staff. Livestock Inspectors castrate surplus bulls in the neighbourhood of Government bulls in their charge only when Veterinary staff is not available. About 600 bulls per year were castrated by the Agricultural Department.

Extensive castration of weedy bulls was continued during the period. In 1935-36 the number of castrations of weedy bulls was 24,094 and in 1936-37 it was 26,835.

Bengal.—Castration of scrub bulls was carried out extensively.

Bihar.—One Kamdar was trained in the use of the Burdizzo castrator at the Kanke Farm. It is contemplated to train more hands with a view to extending the activities of this work in the villages.

Bombay.—A few districts have agreed to apply the provisions of the Live Stock Improvement Act, 1933. These are the districts of Dharwar, East Khandesh and Sholapur.

In the former, the Act has been applied to two villages, viz., Motebennur and Siddenur and in the latter to the two villages of Shiroli and Mhaswad. In the former 22 bulls had to be castrated and in the latter this number was 62.

Applications have been submitted for approval to implement the Act in other villages.

Central Provinces.—During the calendar years 1936 and 1937, 155,187 and 165,720 castrations respectively were performed against 152,308 and 164,723 during 1934 and 1935.

Coorg.—The number of castrations performed with Burdizzo's bloodless castrator was 1,340 in 1936 and 1,250 in 1937.

Delhi.—Castration is now carried out as a matter of routine. 13,903 castrations were performed during the two years 1936 and 1937.

Madras.—The use of Burdizzo castrator is becoming increasingly popular in this Presidency. The touring veterinary staff and that in charge of institutions has been able to perform a large number of castrations by means of propaganda. When the question of introduction of compulsory castration arose in 1933, the Government decided that it was desirable that ideas of castration by means of modern appliances should be allowed to become popular among cattle-owners rather than force the pace by means of legislation. This policy is however being re-examined now.

North-West Frontier Province.—One lakh forty seven thousand three hundred and sixty-two castrations were performed. This helped a good deal in the improvement of local cattle.

Orissa.—This work was vigorously carried on. A large number of scrub bulls and undesirable bull calves were castrated and Burdizzo's method was invariably employed.

Punjab.—The castration of inferior male stock amongst cattle, sheep and goats was carried on as zealously as before. 12,03,537 castrations were performed by the subordinate staff during the calendar years 1936 and 1937. In selected breeding areas, special attention is paid to this work by the district staff by organizing special castration campaigns.

Sind.—Castration by the Burdizzo method is increasing in popularity. The rules framed under the Live Stock Improvement Act, 1933, for compulsory castration have not yet been brought into force in this Province.

United Provinces.—Castration work was taken up in four districts where about 8,000 inferior bulls were castrated during the years 1936 and 1937.

35. Control of Livestock improvement (paragraph 208).

Assam.—A permanent Deputy Director of Agriculture, Livestock, has been maintained. He has a staff of 5 Agricultural Inspectors, and a staff of Stockmen under them.

Bengal.—The Live Stock Officers and the Assistant Live Stock Officers appointed under the scheme for the improvement of livestock, financed by the Government of India's grant, did good work.

Bihar.—A reference has been made to this under recommendation 32. Until a Livestock Officer is appointed, work in connection with control of livestock improvement cannot be taken up.

Bombay.—Local district committees for improvement of cattle are organised in all districts. These are being guided by the department in bringing about desired improvements.

Central Provinces.—The control of livestock improvement is in charge of the Director of Veterinary Services.

Coorg.—Control of livestock improvement was placed in charge of the Veterinary Department.

Delhi.—No remarks. The arrangements are the same as those in force in a Punjab district.

Madras.—There is a whole-time officer of the grade of Deputy Director in charge of livestock improvement work in this Province. There is a livestock research station at Hosur (Salem district) which was started in 1924 where work in important breeds of cattle, e.g., Kangayam Scindhi, Hallikar and cross-breeds, is carried on under the direct supervision of a gazetted Superintendent. Work on sheep and poultry is also carried on. A cattle farm was started in 1919 at Chintaladevi (Nellore district) specially for carrying on work on the Ongole breed. This station had however to be closed as a measure

of retrenchment in 1932, when a portion of the stock was transferred to Guntur where a research station for the improvement of buffaloes was opened in 1923. Proposals have also been formulated for opening a buffalo-breeding station in the Kistna district and another for the improvement of Ongoles in the Guntur district and are under consideration.

The Livestock Section which was under the control of the Agricultural department since 1916 has from 1st April 1938, been transferred to the Veterinary Department. The Government felt that the transfer was justified in view of the closer affinity between livestock and veterinary operations and the practice obtaining in certain countries where much progress has been made by the organization of animal husbandry departments dealing both with veterinary and livestock work. The view that the Veterinary Department, constituted as it is, provides a more adequate basis for building up a provincial animal husbandry department was also shared by Colonel Olver, Animal Husbandry Expert of the Imperial Council of Agricultural Research, and also by Dr. N. C. Wright.

Orissa.—The question of control of animal husbandry work was considered in 1937. No final decision has yet been taken.

Punjab.—The number of castrations performed by the members of the subordinate veterinary staff shows the extent to which the Veterinary Department is taking interest in this direction. Steady progress is being maintained.

Sind.—Government have sanctioned the appointment of one Live Stock Officer with technical and office staff and it has since been filled up.

United Provinces.—The control of livestock improvement remained in charge of a Deputy Director of Agriculture.

CHAPTER VIII.—Forests.

36. Grazing on Forest areas and Fodder supplies from those areas (paragraphs 218-219).

Assam.—The proposals for wild buffalo sanctuary in North Lakhimpur have been formulated and are now being finally examined for submission to Government for notification.

The introduction of controlled grazing in plantation areas in Nowgong has been successfully initiated.

Since the report submitted up to June 1935, 7,604 acres of additional land were reserved for village grazing in the Province up to the end of June 1937. 1,233 acres of land out of the professional grazing reserves were excluded and thrown open for settlement.

The additional village grazing grounds referred to above fall in the two Divisions of the province as shown below :—

- (i) In the Surma Valley Division there was an addition of only 25 acres in Cachar district in 1936, while 480 acres of land were reserved for grazing in Sylhet district up to the end of June 1937.
- (ii) In the Assam Valley Division 7,099 acres of land which were reserved for grazing up to the end of June 1937, were distributed among the following localities :—

District.	Sub-division.	1936. Acres.	1937. Acres.
Goalpara	Dhubri	1,154	668
Kamrup	Gauhati	343	1,533
	Barpeta	545	323
Darrang	Tezpur	152	76
Sibsagar	Jorhat	6	..
Lakhimpur	Dibrugarh	175	162
	North Lakhimpur	1,110	206
Nowgong	(No Subdivision)	268	378
Total		3,753	3,346

Baluchistan.—There has been no change in the policy with regard to the opening of State Forests for grazing for rightholders; a system of rotational grazing is being enforced to improve grass and grazing in State Forests. The people, it appears, have begun to realise that haphazard grazing is detrimental in the way of up-keep of the waste land and other grazing grounds for flock keeping which is their main occupation.

The area opened during the period under report was 208 square miles as compared with 216 square miles during the period ending the 31st December 1935. The decrease is due to the introduction of rotational system.

The number of animals is increasing gradually. A scheme has been under consideration for some time for the improvement of sheep-breeding and efforts are being made to get it sanctioned.

An average of 1,28,000 animals grazed during 1936-37 in State and other Forests. Sheep and goats form about 75 per cent. of the whole number.

Bengal.—The establishment of Bathans and the introduction of stall feeding in the Kalimpong division could not be given effect to owing to scarcity of funds.

Napier grass was propagated from cuttings in the Kurseon division, but has not become popular.

Bihar.—The Royal Commission recommend that grass cutting should be encouraged as an alternative to grazing. The fees for grass cutting in reserved forests are already as low as they can be made and in the protected forests the cutting of grass is generally free. Distance is also the governing factor. No action on this recommendation is therefore possible.

Government consider that the recommendation for the discouragement of the grazing of inferior cattle in the forests is impracticable for reasons which the Commission itself has admitted. They therefore do not propose to take any action.

Investigation regarding the intensity of grazing consistent with the proper development of the forest and the preservation of desirable grasses is unnecessary in this province. The reserved forests are mostly far away from the areas of close cultivation, and the Conservator of Forests is of opinion that the demand for grazing is not heavy, is well within the capacity of the forests and is unlikely to increase in the near future. The problem anticipated by the Commission has not arisen and the local Government therefore do not propose to take action.

Owing to the situation of the Government reserved forests at a long distance from the areas of close cultivation and to the unfavourable lay-out of the railway communications, the export of fodder from the forests is generally impracticable in Bihar. Government have decided that the investigation proposed by the Commission into the possibilities of fodder export would serve no useful purpose.

Bombay.—The experiment of rotational or controlled grazing started in 1931 in Loni Kalbhor in Poona division was continued. The rotational system of grazing is also being introduced wherever possible in the districts of Khandesh, Satara and Dharwar. Grass cutting as an alternative to grazing was encouraged in some parts of Kanara. Some coupes in Badami range of the Dharwar-Bijapur division were selected in consultation with the cattle breeding societies and the Agricultural Department for the purpose of determining the intensity of grazing consistent with the preservation of desirable grasses, but owing to unusual drought in Bijapur district the experiment had to be postponed. It is proposed to try the experiment of ensilage in Nasik district through the village improvement committee. In North Thana division grass has been cut and stored in silo pits, as an experimental measure, in several villages. In the Northern Circle steps have been taken to propagate in suitable areas *anjana* (*Hardwickia binata*) which is a very valuable fodder species and useful in times of fodder scarcity. Government have recently abolished grazing fees in the case of cattle belonging to residents of the Province, the other restrictions hitherto in force being retained.

Central Provinces.—A liberal policy of providing grazing facilities in the reserved forests of the province has been steadily pursued and as each working plan comes up for revision a completely revised grazing settlement is made. The grazing settlements of all the forests of the provinces have now been revised to make them conform with the reclassification of reserved forests ordered in 1933. During the last two years the principal new grazing settlements have been concerned with Damoh, four ranges of South Chanda division, the Melghat and Yeotmal division. Features of recent settlements have been the rotational closures and the special efforts made to relax irritating restrictions and to meet the grazing demand to the fullest extent possible.

The economic depression continued unabated up to the end of the period under report and in spite of the increased facilities afforded the number of cattle resorting to the forest for grazing continued to decrease. As a gesture to help the agriculturist a further reduction in concessional rates has been sanctioned. Efforts to encourage stall-feeding by allowing the removal of grass at free nominal rates are being continued.

Experiments laid out to determine the optimum grazing closure cycle on trap in Yeotmal (1934) and on sandstone in Saugor (1935) are beginning to yield results.

securing satisfactory response from ryots to any special scheme in this direction. Leaflets have, however, been circulated encouraging ryots to grow trees on porambokes. Attempts are now being made to induce village communities in the Nilgiri district to plant village forests to supply their fuel requirements.

Orissa.—Most of Orissa is a well wooded country. It is unlikely that railways can play much part in the distribution of wood fuel. Communications within forest areas are being steadily improved with a view to facilitating extraction of produce by carts, which must remain the principal form of transport. The possibility of using certain rivers for the transport of fuel and poles required by the agricultural population is under investigation.

One fuel plantation has been successfully established near Puri town and steps are now being taken to extend it. Experiments are being undertaken in the afforestation of bare lands with pole and fuel species.

Punjab.—Preliminary investigations have been made into the cost and efficiency of cow-dung, coal and charcoal. Results seem to indicate that cow-dung is the most suitable material to use as fuel from the cultivators' point of view.

Besides Changa Manga which is an old irrigated plantation in the Punjab the others started subsequently are at Chichawatni, Arafwala, Dipalpur, Khanewal, Miranpur, Daphar and Tera. Of these Chichawatni and Khanewal have been almost completely stocked and the others are still in course of formation.

Sind.—An Irrigated Plantation Scheme for 6,500 acres in North Sind on the lines of the irrigated plantations in the Punjab has recently been sanctioned, the trees in question being Tali (*Dalbergia Sissoo*) and Mulberry (*Morus alba*).

United Provinces.—In this province, the cultivator cannot afford to buy wood, charcoal or coal imported from far away and so their relative cost and efficiency is immaterial. Millions of tons of cowdung, the only source of cheap fuel, are burnt annually and the problem is how to create an alternative supply of cheap fuel in the villages. Accordingly the creation of village fuel and fodder plantations by the taungya method on poor culturable soil was actively explored by a Forest Officer who was placed on special duty. The technique of such plantation work has been established in the forest areas and the possibility of zamindars and tenants applying the methods in the plains districts has to be tested.

38. Initiation of new and development of existing Forest Industries (paragraph 224).

Assam.—A Forest Utilisation Officer was appointed from July 1st, 1935. He has got into touch with the principal Indian markets not only for timber but also for the large number of articles of minor produce that our forest can supply. Enquiries from Europe have already been received.

Baluchistan.—A large quantity of Ephedra which grows in abundance in Baluchistan was exported to firms in India and Europe during the year 1937. Steps are being taken to exploit other drugs and efforts are being made to establish a market for Balu drugs and if the market can be extended considerable income will accrue to tribesmen in hilly tracts and to Government.

Bengal.—1. In the Darjeeling division, three experimental silo pits were constructed and filled with fodder cut from reserved forests. The objects of the experiments were:—

- (1) to see what types of fodder from the forest will yield good silage;
- (2) to encourage the people to resort to the silage system; and
- (3) to increase the supply of cattle food during the dry season and to discourage over-cutting of fodder plants and lopping of trees during the dry season.

The silage was sold at a low rate to induce local cattle owners to try it for feeding their cattle.

2. Jute seed (*Capsularis*) was grown in Sal taungyas in the Kurseong division. Two hundred and forty-six maunds and 35 seers of jute seed were sold through the Government seed agent.

3. The common method of burning charcoal in open pits in the Dacca-Mymensingh Division is wasteful. As an experiment charcoal was burnt in kilns in that division and stumps, branch wood and brushwood were all utilised.

Bihar.—First in importance among the forest industries of this Province is the paper pulp industry. Large quantities of bamboos are taken by Messrs. Heilgers and Company and the Indian Paper Pulp Company, while Messrs. Balmer Lawrie and Company take some 80,000 maunds of sabai grass. The total annual export of bamboos from the forests of this Province is some 8,000,000 maunds.

The manufacture of sabai grass rope in the Singhbhum district is being fostered. This is a local industry in Singhbhum and some 12,000 maunds of sabai grass are used annually for rope and mat making.

The revenue from *kendu* leaves, used by manufacturers of *biris*, is increasing.

The *kutch* and catechu industries are increasing in importance, mainly in the Palamau district. The new processes recently discovered at the Dehra Dun Research Institute are being tried by contractors in that district. Efforts are being made to establish the manufacture of broom handles in parts of this Province.

Other industries which are being developed are the use of cane and bamboo for furniture work, mat making, wooden comb making, the supply of wood for match factories and the Calcutta Pen and Pencil industry, the development of local timbers for box wood and veneer work.

At the Industrial Exhibition held in Patna in February 1936 arrangements were made for the display of a series of exhibits and for lectures by Forest Officers, to draw the attention of the public to the forest industries of the Province.

Bombay.—A wood distillation factory has recently been started in Belgaum division by certain contractors formed into a company under the name of "The Bharat Wood Distillation Factory", and four blocks covering an area of 2,800 acres have been allotted to the company at concession rates for this purpose. The results of the working of this factory are being watched.

An experiment was made by the purchaser of cinnamon leaves from Kanara in the distillation of oil from the leaves. The results are reported to be encouraging.

Commercial uses of Salai (*Boswellia serrata*) found in the Forests of North Khandesh are being investigated at the Forest Research Institute, Dehra Dun.

Central Provinces.—The possibility of using a producer gas plant to run a portable sawmill for sawing sal scantlings is being investigated—

- (i) *Lac.*—Departmental propagation and collection of lac are still carried out in Damoh and Saugor, but profits are now small owing to the low prices that have prevailed since the slump.
- (ii) *Gum (karaya).*—Tapping of *Kulla* (*Stereulia urens*) trees for gum has been an important development of recent years and one that is yielding an expanding revenue. The gum is used for sizing cloth and in the confectionary trade, and is exported to America and Germany.
- (iii) *Match manufacture.*—Owing to the larger importation of light woods from elsewhere, the demand for *semal* (*Bombax malabaricum*) has fallen off. A small private match factory has been started in Chanda and *semal* timber is supplied by the Forest Department at reduced rates to encourage this local enterprise.
- (iv) *Bidis.*—The demand for young leaves of *tendu* (*Diospyros melanoxylon*) is steadily increasing. The country cigarette industry has now become so important that attempts are being made to increase the production of *tendu* leaves.
- (v) *Sawmills.*—The Government sawmill at Allapilli continues to work at a profit.

Coorg.—No forest industry exists in Coorg, nor is there any scope for such industries.

Madras.—Long leases of raw material from reserved forests required for paper and match-making were given. The Andhra Paper Mills Company, Rajahmundry, were granted a monopoly to extract bamboos in the Rekapalle forests in Godavari Upper Division. Steps were taken to increase the supply of wood required for the manufacture of hair combs in Chittoor. In Anantapur attempts were made to interest the villagers in the manufacture of palmyra jaggery but without success.

The use of soft woods for toys and fishing boats is encouraged. The Yerukulas of Guntur are granted free permits for the removal of date leaves for making mats and wild creepers for basket-making. Supply of soft woods for making slate frames was made to slate manufacturers in Markapur.

Lac cultivation has been expanded and lac polish is manufactured and supplied to jails and manufacturers of furniture. The use of pine poles as posts in electric transmission lines and the supply of bamboos for a paper pulp factory at Mettur are under investigation. To give employment to jungle tribes, the collection of certain minor forest products in Sriharikota in the Nellore division and of cardamoms in Palghat division is being done by the department.

North-West Frontier Province.—Resin tapping is the only existing forest industry in this Province (Hazara District) and the output which depends on the market demand for turpentine and colophony has gradually increased from 20,666 maunds in the two years 1934 and 1935 to 23,260 maunds in 1936 and 1937.

This industry is a great boon to the local village population in the chir areas of Siran and Khanpur in providing them employment near their homes. The price of resin sold and the share of profit from the Jallo Turpentine and Resin Factory in 1936 and in 1937 were as under :—

Year.	Price of crude resin.	Share of profit.
1936 ..	.. 36,147	Rs. 7,896.
1937 ..	.. 48,826	Figures not received.

It will appear from these figures that the contribution of resin tapping to the wealth of Province is no mean one. The collection of medicinal herbs such as violet, maidan hair and belladonna is encouraged.

Orissa.—The development of forest industries forms part of the duties of the Research Officer, and all likely avenues of development will be or are being explored.

Punjab.—A very flourishing resin industry has been built up in the Province to the limit of available resources and gives part-time employment to a considerable number of agriculturists in Rawalpindi, Kangra and Hoshiarpur districts. As attempt was made to introduce lac cultivation in Hoshiarpur and Rawalpindi districts, but the people did not take to it with interest.

In other respects the Punjab is badly off for minor forest products as compared with other Provinces and so the scope is very limited.

Sind.—A scheme for starting a paper mill at Rohri is under consideration.

United Provinces.—The main forest industry is (1) the conversion of *sal* and *chir* timber into railway sleepers and constructional timber and (ii) resin industry in Kumaund which supplies the Turpentine Factory at Clutterbuckganj with raw material.

Owing to development of match industry the demand for *semal* timber is now much in excess of the quantity which can be produced by the forests of the province.

The demand for *baib* grass for paper industry has also increased considerably and a long term lease was given to the Paper Mills at Saharanpur of all the *baib* areas of the Western circle.

The possibility of developing cottage industry, using timber for carts and agricultural implements, grass for *ban* ropes is being investigated by the Forest Officer on Special Duty and the Forest Utilization Officer.

39. Disforestation of Forest Lands required for construction of small irrigation works (paragraph 225).

Assam.—There is no demand for this.

Baluchistan.—A strip of land measuring a few acres in Gulu Shahr (Sibi District) was handed over to the Railway authorities for construction of a water channel.

Bihar.—The local Government are experimenting with a scheme for damming up streams in forests of a dry type to prevent the rapid run of water from steep hills, by diverting it along contour channels. It is intended to spend a sum of Rs. 10,000 in these experiments. It is hoped that the results will be of value not only to the forests but to the agricultural land in the locality. The stream water will be prevented from running to waste and water trickling down the hill sides will be arrested at the contour channels, whence it can reach the main stream only by percolating through the soil in contact with the roots of trees. The indirect benefits expected to be derived from the scheme are the lessening of flood damage, the retention of the water in the soil and the possibility of irrigating land in the vicinity of the forests.

Coorg.—There has been no demand for this.

Madras.—There has been no demand in this Presidency for disreservation for the construction of small irrigation works.

Orissa.—The construction of irrigation works within forest areas is being encouraged. It is rarely necessary to disforest areas where such works are constructed.

Punjab.—The need for disforesting forest lands for the construction of irrigation works has seldom arisen. In two instances where demand was received in this connec-

tion from the Jhelum Forest division the necessary facilities were granted to the people concerned.

In Kalachitta which is an arid tract an attempt has been made to improve protection by excluding goats from areas in which their browsing is unauthorized. Judging from the vigorous growth of new olive coppice shoots which previously were subjected to heavy browsing, the position seems to be much better.

The reports on the experimental areas in Jhelum, Gujrat, Ambala and Gurgaon districts show that effective soil conservation can be effected by means of rotational closures combined with grass cutting, contour ridging and where necessary by gully-plugging. In such closed areas the plant growth re-establishes itself leading to gradual improvement in the fertility of exhausted soils, although the species themselves are economically of no great value.

Sind.—The question does not arise in this Province.

United Provinces.—There has been no fresh demand for this beyond the areas of forests in the Gonda Division which, as reported in the last report were cleared and leased to the Balrampur Estate for the construction of dams and storage tanks for irrigation.

40. Control of Shifting Cultivation (paragraph 228).

Assam.—So far as the Forest Department is concerned such cultivation is only permitted under the 'taungya' system where plantations are created along with 'jhumiers' field crops. Regarding hill areas outside the control of this Department, a Hill Officers' Conference was convened this year. In the Lushai Hills the pressure of population is not great and denudation does not appear to be serious. In the Naga Hills the population in some areas is greater than the land can carry. The jhuming rotation is therefore too short and there are signs of serious denudation and impoverishment of the soil. The chief remedies proposed are increase of non-shifting cultivation on irrigated terraces and investigation of the possibility of assisting the quick recovery of jhums by suitable planting. In the Garo Hills no control is possible owing to the admitted rights to Garo customs and the position appears to be grave. The Garos themselves have been brought to realise this by an appreciable shortening of the jhuming rotation and a proposal is under consideration to encourage terraced cultivation. In the North Cachar Hills investigations have been made and proposals submitted for reservations which have not been accepted. Proposals are however now under discussion to establish "protected forests" in areas where reckless jhuming and burning is doing damage. In the Khasi and Jaintia Hills reckless burning and disforestation have deprived large areas of all humus. Shifting potato cultivation is carried on on the gentler slopes and on pockets of soil in the gullies, but deterioration is progressing in what is the most seriously denuded area in the Province.

Bihar.—Shifting cultivation exists only on a very small scale and no further measures to control it are necessary or possible.

Bombay.—Shifting cultivation or "Kumri" is now restricted to a very small area in this Province and is well under control.

Lopping is freely allowed under certain prescribed methods in regions where rab beds are used for agricultural purposes.

Central Provinces.—Shifting cultivation is allowed in the Baiga Chak in the Mandla division under strict control. In addition, afforestation by agri-sylvicultural methods is practised in several divisions.

Coorg.—The only shifting cultivation in Coorg is that of Kurugas who cultivate ragi in a few forest departmental kumris.

Madras.—Shifting cultivation which was formerly practised by the jungle tribes in some of the hill areas has almost stopped. The activities of these tribes are being diverted to raising plantations of teak and other timber species by the Kumri or Taungya system, under which a clear felled area is handed over to them and they are required to burn the debris of the felled trees, sow their food crops and plant teak stumps supplied by the department.

Orissa.—Control over shifting cultivation is one of the most important problems facing the administration, and various methods of coping with this evil are under trial. It is at present prevalent throughout the Agency tracts of Ganjam and Koraput. The areas of forest reserves in these tracts are being steadily extended.

Sind.—The problem does not exist in this Province.

United Provinces.—The forest department exercises control over shifting cultivation in the Government forest and utilizes the method for improving forest and not for destroying them.

41. Classification of Forest Areas (paragraph 229).

Assam.—Good progress has been made in Sylhet.

Bihar.—The Provincial Government do not consider any general reclassification of forest areas necessary, as the present division of their forests into reserved and protected forests has been made on principles which follow very closely the classification recommended by the Commission.

The Conservator of forests has investigated the question of altering the classification in two possible areas, Sambalpur and Palamau, but here also he does not recommend any change. Government have however issued instructions that the question of forming separate fodder reserves or grazing working circles should be kept in view when the working plans are prepared or revised.

Bombay.—The forest areas have already been classified. The question of disafforesting suitable areas in favour of cultivation is under investigation.

Central Provinces.—The subjoined statement shows the results of the revised classification by divisions :—

Name of Circle and division.	A		B		Other.	Total.
	Tree forests.		Scrub forests.			
	(I)	(II)	(I)	(II)		
	Moist type.	Dry type.	Pasture forests.	Open pasture forests.		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Eastern Circle.</i>						
Jubbulpore	..	369	292	80	65	806
Mandla	495	383	397	44	204	1,523
Saugor	..	261	419	60	13	753
Damoh	..	3	600	250	4	857
Balaghat	240	614	69	10	..	933
Raipur	480	409	32	4	47	972
Bilaspur	376	424	149	..	93	1,042
<i>Central Circle.</i>						
Seoni	..	644	79	174	28	925
Chhindwara	..	341	201	85	35	662
Bhandara	27	355	138	7	5	532
Nagpur-Wardha	..	329	225	121	39	714
North Chanda	..	1,046	53	145	20	1,264
South Chanda	220	220	606	314	32	*1,392
<i>Western Circle.</i>						
Yeotmal	..	469	248	26	428	1,171
Melghat	432	280	279	..	186	1,177
West Berar	..	170	240	..	340	750
Amraoti	..	95	73	84	199	451
Betul	..	715	142	3	75	935
Nimar	..	863	666	10	143	1,682
Hoshangabad	55	632	6	5	329	1,027
Total	2,325	8,622	4,914	1,422	2,285	19,568
	10,947		6,366			

Coorg.—No classification of forest areas is done in Coorg.

Madras.—The reserved forests have already been classified into (i) forests to be retained by the Forest Department comprising timber, fuel and sandalwood forests and climatic forests and (2) local or ryots' forests (forests intended to meet the local demand for grazing, fuel and manure leaf) to be managed by panchayats under the control of the Revenue Department.

Orissa.—No major reclassification of forest lands is necessary. With the exception of the demarcated Protected forests in Angul and Puri districts, and of forests in the Agency tracts, all forests, the permanent preservation of which is considered essential, have already been reserved. The reservation of most of the demarcated protected forests in Angul is under the consideration of Government. It is also under examination whether a few existing blocks of Reserved Forests or portions thereof, should not be disforested.

*(Includes 174 sq. miles of Aheri Leased forests).

Punjab.—The scope for reclassification of areas suitable for the growth of grass, fodder reserves, grazing grounds and cultivation is limited. Much has already been done. With the extension of irrigation, practically all the plain forests in the newly developed canal colonies, have already been handed over for cultivation. In connection with the Haveli Project now in hand an area of nearly 35,000 acres of Government rakhs in the Multan Forest division is being disforested. The remaining areas which are in charge of the Forest Department are either commercial or, what is more important, protective forests situated in the high and low hills. It is essential that these should be jealously preserved in the interest of the welfare of the Province and for that purpose should remain in the hands of the Forest Department.

With regard to other areas, in 1936, a special staff of revenue and forest officials was appointed for the division of village waste lands (Shamlats) in the Murree and Kahuta hill tracts into areas suitable for the growth of timber and grazing grounds or cultivation. The work is still in progress. There is considerable reluctance on the part of proprietors to fall in with this measure and after much persuasion some of them have agreed to it. Much will depend on the co-operation of the people.

Sind.—No re-classification has yet been attempted. An inquiry is, however, being started for the purpose of determining what area of the "inland forests" should be given up for cultivation in exchange for riverain areas. In Thar Parkar district an area of 44,951 acres which was in the past notified for forest has been released for cultivation.

United Provinces.—Forest areas are already classified in these provinces. The question of classifying culturable and uncultivated waste lands outside the forest is under the examination by the Provincial Fodder and Grazing Committee.

42. Establishment of village forests (paragraph 230).

Bihar.—In those parts of this Province in which a considerable area of forest is found, the tenants as well as the landlords usually have rights in the forests. The extension of cultivation and the increasing demand for timber and fuel have led to destructive competition between landlords and tenants, each party attempting to establish its rights and to get as much produce out of the forests as possible ahead of the other. The result was that forests, especially in the Chota Nagpur Division, were rapidly disappearing or being seriously impoverished. In order to prevent this competition and to give an incentive to the villagers as well as to the landlords to look after their own property it was decided, when the revision settlement operations were started a few years ago in the district of Ranchi, to attempt a form of partition of the forests by amicable arrangement between landlords and tenants. Where no partition of this kind could be effected, the parties have, in some cases, been induced to set aside certain areas of forests as a common reserve, in which both parties will have rights and obligations. In view of the impoverished condition of the forests, the parties have agreed in nearly all cases, including the cases of common reserve, that there shall be no cutting of timber for a period of 15 years in the forests, and that after that time the forests will be exploited only subject to the advice of officers of Government. In all cases the parties have agreed that there shall be no further destruction of forests in the reserved blocks for the purpose of cultivation.

In most villages a panchayat has been appointed for looking after those portions of forests which fall in the villagers' share, and in order to ensure that these village forests shall be properly looked after, Government have appointed a special staff of forest rangers, who are aboriginals of the district and whose duty will be to tour round inspecting village forests and to give advice. These rangers are now undergoing forest training.

The total area thus set aside as village forest in the Ranchi district is 268 square miles. The area set aside as common *rakhat* in which landlords and tenants have equal rights is about 33 square miles. Experiments on the same lines have been made in other districts of the Province.

Bombay.—The Bombay Village Panchayats Act and the rules issued thereunder provide for the transfer of village forests to panchayats and for their regulation and management by them. There are already some village panchayats in Kanara but their work is not very satisfactory. No advance could be made owing to the general apathy of the villagers to undertake responsibility and manage the forests efficiently.

Central Provinces.—Ryotwari forests were declared "protected" forests under the Indian Forest Act in 1933.

An attempt made to manage certain forests by village panchayats in Berar failed.

Madras.—Ryots' or village forests covering an extent of about 3,300 square miles are being managed by forest panchayats under the control of the Revenue Department. The revenue staff specially employed for assisting the panchayats in controlling and working these forests to the greatest advantage of the villagers to whose care the forests have been handed over had to be disbanded some years ago as a measure of economy but is

now being again appointed gradually. The Forest Hill Village System is in force in the Malayalee Hill villages of the North Arcot and Salem districts. Under this system the hillmen are required to protect sandalwood areas allotted to them and maintain the boundary lines in return for which they are allowed to graze their cattle at a concessional fee, which too is refunded to them if protection is satisfactory. They are also granted money rewards. Endeavours are now being made to induce village communities in the Nilgiris district to plant village forests to supply their fuel requirements so that the damage they now do to valuable forests may be lessened.

North-West Frontier Province.—The present classification of the village forests in the Hazara District into 'Mahduda' and 'Ghair Mahduda' is not very helpful for the purposes of forest conservancy. A working plan for some of the chir guzaras (village forests) has been prepared but has not received Government's sanction. A considerable headway however remains to be made in this direction; a pasture land has to be separated from areas to be managed for tree growth and separate treatment given to the two classes of areas if the greatest benefit is to accrue to the villagers and these areas are to be saved from total destruction.

Orissa.—The subject of handing over undemarcated forest areas to village panchayat management is under examination. Such management is already in existence in Sambalpur district.

Punjab.—There is plenty of scope for improving village management in the shamlat forests which are not under the control of the Forest Department, but past experience in this direction has been far from satisfactory. However, the question of establishing a few village forests in the Kangra district is receiving consideration in connection with the Forest Commission appointed by the Punjab Government in 1937.

Sind.—No village forests have been created, and there is no scope for them in Sind. The forests are almost entirely for the production of fuel and timber on a commercial basis and villages are also of a very scattered nature.

United Provinces.—The formation of village Panchayat forests in Kumaun was extended; the total number of such forests was 186 up to the end of 1937 covering 33,000 acres as against 114 at the end of 1935 covering 14,493 acres. The Forest Department helps in the technical management of these forests.

43. Creation of minor forest divisions (paragraphs 231-232).

Assam.—No further such divisions have been created.

Bihar.—In view of the existing classification of forests referred to in paragraph 41 above the local Government do not consider it necessary to create any special agency for the management of minor forests. Minor forests are already mostly in separate divisions. In any case the Province could not afford any duplication of staff.

Bombay.—Owing to financial stringency this question could not be taken up.

Orissa.—Commercial and other forest areas are so intermingled that it is not considered practicable to separate the management thereof. The duplication of staff involved would prove most costly.

Punjab.—In 1934, one Imperial Forest Officer and two Deputy Rangers were attached to the Revenue Department in Hoshiarpur and Ambala districts to assist and advise in the management of forest land belonging to private persons in these districts. Much progress has been made in checking erosion by inducing villagers to cut and make hay for stall feeding instead of promiscuous grazing. Fruit plants have been distributed free of charge to zamindars in the Kullu valley and utility plants including shade and ornamental trees as well as their seeds have been supplied to various public bodies such as Boy Scouts, Municipalities and District Boards. The propagation of *Prosopis juliflora* as a means of general afforestation of waste lands in the Punjab has been undertaken over selected portions of the North-Western Railway track throughout the Province.

Sind.—In view of the small area of forest, this question does not arise.

United Provinces.—No action in this respect was taken as the afforestation division corresponds to a minor forest division.

44. Institution of short courses in agriculture for newly recruited forest officers (paragraph 233).

Assam.—There does not appear to be any necessity for this.

Bihar.—The Provincial Government have accepted the recommendation in principle but they have decided that the matter should wait until an agricultural college has been established in this Province as the deputation of Forest Officers for training at an

agricultural college in another Province where conditions differ from those in Bihar is unlikely to serve the end in view.

Bombay.—The Agricultural Department is unable to undertake the work of training the forest officers in agriculture without an augmentation of the existing staff. Owing to financial stringency it is not possible to give effect to this recommendation.

Central Provinces.—No officers have been recruited to either the Imperial or Provincial Forest Service since 1929.

Madras.—The Advisory Committee which considered this question in 1929, did not support the recommendation and no action was taken.

Orissa.—Forest officers on the whole live in closer touch with the people than those of any other department, and consequently they are acquainted with the general needs of cultivators. It is doubtful whether they would benefit from undergoing a course of instruction at an Agricultural College sufficiently to justify the cost. It would be more advantageous to give forest officers training in Land Settlement procedure.

Punjab.—Six Forest Officers were deputed during the years 1930, 1931 and 1932 to attend the course of rural economy instituted at the Punjab Agricultural College, Lyallpur. Since then there has been no recruitment in the gazetted ranks of the Forest Department.

Sind.—No action has so far been taken on this recommendation.

United Provinces.—There has been no recruitment of forest officers in the last six years.

CHAPTER IX.—Diseases of livestock and their control.

45. Adoption of Serum-simultaneous method of inoculation against Rinderpest (paragraphs 237--241).

Assam.—This method of inoculation was undertaken only in the Government Farm at Upper Shillong in respect of English or cross bred English cattle. Goat tissue vaccine inoculation is now being undertaken to combat rinderpest. By this method 70,081 animals were inoculated in 1935-36 and 111,859 in 1936-37.

Bengal.—The principle has been accepted by Government, that the control of contagious disease in animals is a provincial charge.

Inoculation to protect cattle against contagious disease is free in Bengal except under the Calcutta Corporation and the Howrah Municipality. In Cooch Behar and in other Indian States the actual cost of sera is charged. Since the introduction of Goat Tissue Vaccine for the control of rinderpest, this vaccine has been supplied free to all within the area of Bengal including Cooch Behar and Tripura State.

From 1934-35 Goat Tissue Vaccine alone has been used in place of Anti-rinderpest serum for the control of outbreaks of rinderpest. It has not only proved successful but of infinitely greater value than serum, and the cost is about 1/50th of that of serum, and still less than the cost of the Serum Simultaneous Method. The failures work out at 5 per cent. and the mortality at 1/2 per cent.

On hill cattle which used to receive 90 c. c. of serum alone, Goat Tissue Vaccine has been used for Serum Simultaneous Inoculation, the routine simultaneous dose of serum being reduced from 90 to 60 c. c. This represents a 30 per cent. economy and confers permanent immunity.

A Goat Tissue Vaccine producing station for the preparation and issue of Goat Tissue Vaccine was established on a permanent basis in July 1936.

Bihar.—This method of inoculation has gradually been replaced by the new method of immunising cattle with Goat Tissue Virus for the reason that the latter method is cheaper, simpler and at the same time confers permanent immunity. It is for this reason that the new method is now much appreciated by the cattle owners. During the period under review as many as 683,522 animals were protected by this popular method.

In addition to the above, 56 animals of the Government Cattle Farm, Patna, were also immunised with spleen tissue virus with satisfactory results. The immunity of the farm animals vaccinated with goat blood and goat tissue viruses on different dates during the years 1934 and 1935 was tested against bull virus and found to be solid.

Bombay.—In the province of Bombay inoculation with goat virus has been adopted as a prophylactic measure against rinderpest. The virus is now prepared at the Bombay Veterinary College. Serum-simultaneous inoculation is only used in exceptional cases for the protection of imported cattle.

Central Provinces.—This method of protecting cattle against rinderpest has been discontinued and Goat and Tissue Virus Vaccination was carried on extensively throughout the Province. 125,463 and 790,569 Goat and Tissue Virus Vaccinations have been performed during the years 1936 and 1937.

Coorg.—The spread of rinderpest was prevented by the serum-simultaneous method of inoculation with goat virus and goat tissue virus. The treatment is generally free. The co-operation of the public is encouraging.

Delhi.—The methods followed are the same as those employed in Punjab districts. In 1937, 20,780 "goat virus" vaccinations were performed.

North-West Frontier Province.—Goat Tissue virus was widely used in the field before the seasonal outbreaks of cattle plague during the period under report. No less than 69,414 cattle were vaccinated.

Orissa.—The 'serum-simultaneous' method was completely replaced by 'goat virus alone' method as it was more convenient and economical.

Punjab.—The serum-simultaneous method of inoculation has almost completely been replaced in the Province by the Goat virus vaccination, which is being employed as the sole control method in dealing with the Rinderpest outbreaks, the vaccine used being the tissue vaccine. This method was extensively employed in the face of the outbreaks as well as in the absence of the disease.

Sind.—The Goat Virus Tissue method is being used in nearly all outbreaks and is gaining popularity among cattle owners who were at first sceptical on the subject. The Goat Virus Producing Station established in Karachi in December 1935 is doing good work.

United Provinces.—The serum-simultaneous method of inoculation against rinderpest was adopted in 1,409 cases, while inoculation by tissue virus was carried out in 351,575 cases. The tissue virus method of immunisation recently introduced is giving satisfaction and is now firmly established for general use. Inoculation is carried out free of charge.

46. Compulsory inoculation (paragraph 244).

Andamans.—In 1936 an outbreak of Rinderpest in a mild form started amongst a batch of slaughter cattle imported from Calcutta, and spread to several villages. All Government owned cattle were inoculated with anti-Rinderpest serum and private owners of cattle were advised to take this precautionary measure. The local Cattle Disease Rules do not provide for compulsory inoculation of either affected or contact cases, with the result that a very small number of owners availed themselves of the offer of free inoculation, believing that the treatment affects an animal's milk-yield. The question of making inoculation compulsory in infected areas is under consideration.

Assam.—There is no legislation for compulsory inoculation.

Bihar.—It is satisfactory to note that this important question of legislation was at last considered at the Advisory Board meeting of the Imperial Council of Agricultural Research held in November 1937. The final decision of the Central Government on the subject is being awaited.

Bombay.—No action has yet been taken in this direction.

Central Provinces.—It is proposed to establish during the next financial year nine quarantine stations on the borders of Saugor and Hoshangabad districts where animals on entry into the Central Provinces will be vaccinated against rinderpest and other contagious diseases.

Coorg.—No occasion for compulsory inoculation has arisen.

Delhi.—Inoculation is not compulsory.

Madras.—One of the difficulties which stood in the way of Government considering the question of introduction of compulsory inoculation was that of an assured supply of serum. The establishment of the Serum Institute in Madras has now made it possible to extend protection to cattle by the serum simultaneous method and the question of introducing legislation for compulsion is now engaging the attention of Government.

Sind.—No legislation has been introduced. Government are of opinion that it is not necessary in the case of city milk sellers and that such action in the case of the rural population would require the employment of Veterinary police on a large scale.

United Provinces.—Compulsory inoculation is not considered practicable.

47. Increased provision of veterinary hospitals and dispensaries (paragraph 248).

Assam.—There was no further progress under this head during the period except that the North Sylhet Local Board re-entertained in 1937 one of the two Veterinary Assistant Surgeons withdrawn from their Board in 1933.

Baluchistan.—No extension has been possible owing to lack of funds.

Bihar.—The financial conditions of most of the local bodies which hindered the progress in this direction in the past having improved, as many as eleven new veterinary institutions were established during the past two years, viz., 2 each in Shahabad, Santal Parganas and Purnea districts and 1 each in Bhagalpur, Darbhanga, Muzaffarpur, Monghyr, and Ranchi districts. In addition to these, the District Board, Ranchi, has provided funds in its budget for opening another new veterinary dispensary during next year. Two additional posts in the (leave) reserve cadre were also added.

Field veterinary dispensaries started at different centres in the rural areas continued to afford great facilities for treatment of live-stock belonging to the ryots. These dispensaries proved of greater utility in propagating the activities of the Department and have gained much popularity with the result that cases requiring attention are increasing day by day. There is great demand for these outlying dispensaries but owing to the shortage of staff it is not possible to increase the present number, viz., 2 under each touring veterinary assistant surgeon.

Bombay.—Seven new dispensaries were opened during 1936-37 bringing the total number of dispensaries to 113.

Central Provinces.—No new veterinary dispensary as a permanent measure has been opened though proposals in this connection have been submitted. One hundred and seventy-six outlying veterinary dispensaries have been opened during the last two years in the province with a view to impart veterinary aid to remote areas. The opening of more dispensaries is under consideration.

Coorg.—Weekly dispensaries were opened at Fraserpet, Virajpet and Srimangola.

Delhi.—There are three Veterinary Hospitals (one belonging to the Society for Prevention of Cruelty to Animals and two municipal) in the urban area of Delhi. There are three such hospitals in the rural areas, and during 1937, the Government of India sanctioned the opening of two more rural hospitals (one in 1938 and the other in 1939). Outlying dispensaries or "clinics" are established in connection with the rural hospitals and are visited at fixed intervals by the Veterinary Assistants.

Madras.—The opening of new veterinary institutions in new areas continues to be part of the policy of Government but on financial considerations and in view of the Commission's recommendations in paragraph 249, they laid it down recently that the local bodies concerned should contribute not less than half the total cost towards the equipment and maintenance of new institutions in their areas. It is also the object that as far as funds permit, preference should be given to the provision of more touring staff rather than dispensaries.

North-West Frontier Province.—Twenty more hospitals and 43 touring dispensaries were opened in all. There were 73 hospitals and 139 touring dispensaries on 31st December 1937.

Punjab.—The total number of regular and permanent Veterinary hospitals in the Province is 304. There is still a big demand for the opening of more Veterinary hospitals, but on account of the dearth of qualified staff, it has not been possible to meet the demand. As an alternative the Veterinary Department is opening rural dispensaries under retired Veterinarians or trained compounders. The work of the latter is being supervised by the Veterinary Assistant or Veterinary Assistant Surgeon in charge of the ilaqa Veterinary Hospital.

Sind.—One dispensary was opened in 1930 at the cost of the District Local Board concerned. Since then, Government have initiated a programme of opening one stationary and 2 itinerating Veterinary Dispensaries each year.

United Provinces.—Five new veterinary hospitals were opened during the last two years.

48. Reorganisation of Provincial Veterinary Departments (paragraphs 249-254).

Assam.—Nothing further has yet been done in this respect. A reorganisation scheme is now under the consideration of Government.

Baluchistan.—Nothing has so far been done in regard to the re-organization of the Civil Veterinary Department. The matter will be taken up as soon as funds are available.

Bihar.—The new Chota Nagpur Sub-range comprising of Ranchi, Manbhum and Singhbhum districts, which was created during the year 1935-36, was opened at Ranchi in April, 1936, and placed in charge of an Assistant Director of the Bihar Veterinary Service, class II. The remaining two Chota Nagpur districts, viz., Hazaribagh and Palamau were subsequently added to this sub-range. The Central Range which remained in partial charge of the Director, Veterinary Services, was also formally separated with effect from the 1st December, 1937, as a result of which the temporary post of Special Officer hitherto held by Mr S. K. Sen, M.R.C.V.S., was abolished and a new post of Deputy Director of the Bihar Veterinary Service, Class I, was created instead for this range.

Bombay.—The Civil Veterinary Department was reorganised from 1st April 1932. The Superintendent, Civil Veterinary Department, has been made the Director of Veterinary Services and is placed in charge of the Veterinary Department including the Bombay Veterinary College. The designation of Deputy Superintendent, Civil Veterinary Department, has been changed to the Deputy Director of Veterinary Services and he has been appointed Personal Assistant to the Director with touring duties. Three Inspectors have been placed in charge of ranges. Two posts of Veterinary Inspectors and the post of Chief Inspector, Bombay City and Harbour Veterinary Department, have been abolished.

After the reorganisation the gazetted and non-gazetted appointments in the Veterinary Department are :—

Gazetted	1 I. V. S.	Director of Veterinary Services.
	1 Provincial Veterinary Service, Class I . . .	Principal, Bombay Veterinary College.
	6 Provincial Veterinary Service, Class II . . .	1 Deputy Director of Veterinary Services and 5 posts of professors.
Non-gazetted	1 Miscellaneous gazetted post . . .	Deputy Superintendent, Bombay City and Harbour, Veterinary Department.
	3 Veterinary Inspectors . . .	
	138 Veterinary Assistant Surgeons.	

A Disease Investigation Officer has been appointed by the Imperial Council of Agricultural Research.

Central Provinces.—Owing to financial stringency one post of Assistant Director of Veterinary Services has been kept in abeyance during the calendar year 1937.

Coorg.—The Veterinary Department which was under the Deputy Director of Land Records and Agriculture was transferred to the Veterinary Inspector under the direct control of the Commissioner in 1936 and the designation of the Veterinary Inspector was changed to that of District Veterinary Officer. A Leave Reserve Veterinary Assistant Surgeon was appointed in 1936.

Madras.—Provision of staff for the control of contagious diseases and of local veterinary service (paragraphs 249-250).—The provision of district controlling staff and touring subordinate staff is now entirely a charge on Provincial revenues and it is the declared aim of Government to provide one touring assistant for each taluk. In the matter of opening of new veterinary institutions, the main consideration has been the ability and willingness of local bodies which serve the localities concerned to contribute towards their maintenance. But on account of obvious advantages, the management of such institutions is retained in the hands of the provincial veterinary staff itself. In a few exceptional cases, the larger zamindars are allowed to maintain institutions under their own management. Some municipalities maintain veterinary staff for meat inspection work and inspection of municipal livestock.

Reorganization of Provincial Veterinary Departments (paragraphs 249-254).—The supervising staff of the department has been reorganized and there are now 12 District Veterinary Officers, each in charge of roughly two districts as against seven Circle Officers in 1928. The Livestock Section which was hitherto under the control of the Agricultural department has, as already stated, been transferred from 1st April 1938 to the Veterinary department.

The establishment of a superior grade of Provincial Veterinary Service was considered unnecessary in this Province.

Punjab.—Effect was given to the recommendation of the Royal Commission in 1928. The Chief Veterinary Officer of the Punjab is styled "Director, Veterinary Services, Punjab". The Civil Veterinary Department is an Independent Department. The position of the Principal, Punjab Veterinary College, Lahore, to the Director, Veterinary

Services, Punjab, is the same as that of the Principal, Punjab Agricultural College, Lyallpur, to the Director of Agriculture, Punjab.

Under the Director, Veterinary Services, there are at present four Superintendents, Civil Veterinary Department. The ultimate aim of the Veterinary Department is to have one Superintendent for each Revenue Division. To make this quota complete the question of opening of a new divisional office and the appointment thereto of a Superintendent is under consideration. There are 15 posts of Deputy Superintendent. One Deputy Superintendent is required for each district. 14 more posts will be created gradually according as funds permit. Each of the Deputy Superintendents controls a certain number of Veterinary Assistant Surgeons and Veterinary Assistants.

Sind.—This has not been done for lack of funds.

United Provinces.—There has been no change in the position of veterinary inspectors and veterinary assistant surgeons. The province is divided into three circles each in charge of a Veterinary Superintendent, a member of the Provincial Class II service. The Director of Veterinary Services, who is in general control, belongs to the Indian Veterinary Service.

49. Separation of Agricultural and Veterinary Departments in the Punjab (paragraph 251).

Punjab.—The Veterinary Department was separated from the Agricultural Department in 1928 and is now under the administration of the Director, Veterinary Services, Punjab.

50. Training of Veterinary Surgeons and Veterinary Assistant Surgeons (paragraphs 255-258).

Assam.—No Veterinary Assistant Surgeon was trained during the period. The Veterinary Investigation Officer, Assam, underwent a short course of further training in 1937 at the Imperial Veterinary Research Institute, Mukteswar.

Bihar.—The Post-Graduate Class attached to the Bihar Veterinary College was held in the year 1936 and 6 students, viz., 5 from the Civil Veterinary Department, Bihar, and 1 from the Central Provinces, took up the course. The opening of this class was temporarily suspended during the year 1937 as no subordinate veterinary officer could be spared for such training.

Bombay.—The recommendation of the Reorganisation Committee to close the Bombay Veterinary College has not been accepted.

The number and value of scholarships have been reduced and tuition fees increased. Proposal for the extension of the course of instruction at the college to four years is under consideration.

Central Provinces.—Owing to financial stringency no new scholarships were granted. One Veterinary Assistant Surgeon was deputed to Patna Veterinary College for Post-Graduate Course during the calendar year 1936 and 58 Veterinary Inspectors and Veterinary Assistant Surgeons were trained in the technique of Goat Virus Vaccination work at the local Veterinary Laboratory.

Coorg.—There is no Veterinary College in Coorg. Candidates are sent to the Madras Veterinary College for training.

Madras.—Since the time when the Royal Commission made its recommendations, there has been an improvement in the standard of teaching in the Madras Veterinary College. The teaching staff has been increased, the institution has been better equipped and important subjects like Pathology and Bacteriology have been included in the curriculum. The curriculum was revised in July 1930, in the light of the recommendations of the Royal Commission. The college has been affiliated to the University of Madras since 1st July 1936 and the degree of B.V.Sc. has been instituted. The diploma course has been extended from three years to four with effect from 1st July 1938. The reorganization of the degree course with a view to extending it to five years is also under contemplation.

North-West Frontier Province.—Twenty-one more students of this Province were sent to the Punjab Veterinary College, Lahore, and 2 students to the Bengal Veterinary College, Calcutta.

Arrangements were made to train all the sub-staff in the technique of Goat Tissue Virus Vaccination against Rinderpest. One Veterinary Assistant Surgeon was deputed to undergo post Graduate Training at the Imperial Institute of Veterinary Research, Muktesar. A Veterinary Assistant Surgeon was sent to Jullundur for training in the art of flaying of hides and skins. One veterinary Stock Assistant was deputed to the

new Egerton Mills, Dhariwal, for training in the art of cleansing, grading and packing of wool. Another Veterinary Stock Assistant was sent to Kulu to receive training in Bee-Keeping.

Punjab.—Training of Veterinary Assistant Surgeons is being conducted at the Punjab Veterinary College, Lahore, where a four years' course of studies is provided.

Sind.—This has not been done for lack of funds.

United Provinces.—There is no veterinary college in the province, but scholarships are awarded to United Provinces students for veterinary education in Indian Veterinary Colleges. Twelve such scholarships were granted during the years 1936 and 1937.

51. Research work in Provincial Veterinary Colleges (paragraph 261).

Assam.—The following research work was done during the period :—

- (i) Short course curative treatment of Equine Surra.
- (ii) Study into the Chemotherapy of Anthrax, Haemorrhagic Septicæmia and Bovine Surra.
- (iii) Value of mineral feed in Johne's disease.
- (iv) Further study into Cutaneous Filariasis in cattle.
- (v) Acute Amphistomiasis.

Bihar.—During the period researches on Aetiology of Kumri Haemoproteins in Peacock, Coccidiosis, Distomeasis, Doyle's disease, Buffalo Otorrhœa, Johne's disease and Foot and Mouth disease were carried on. A paper on Haemoproteins n.sp., causing fatal disease in Indian peacocks, was prepared and submitted for publication in the journal of the Imperial Council of Agricultural Research.

Over and above this, investigation was made in 1936 by the V. D. I. O. into an outbreak of encephalomyelitis among the Mounted Military Police horses at Jamshedpur. This outbreak was the first of its kind in this Province. Cases of co-existing heavy infestation with liver flukes at the Kanke Farm were satisfactorily treated with carbon tetrachloride. Johne's disease at the Central Jail, Hazaribagh, was detected and treated. A severe outbreak of Bovine Surra was investigated in the district of Palaman. Consequent on the occurrence of Anthrax among Mounted Military Police horses the entire lot of the horses was protected with Anthrax Spore Vaccine, a stuff obtained from Burma. Smears from the sores of cases of hump sore among certain South Indian bullocks at Jamshedpur revealed microfilarias in large numbers, while a case of Actinomyces in a bullock was detected in Palaman. Further work done consisted of investigation into incidence of abortion and sterility, search for cases of warble fly infestation, a typical outbreak of Rinderpest at the Government Agricultural Farm, Kanke, an outbreak of contagious ecthyma among goats, outbreak of Doyle's disease, Fowl Pox and Fowl Cholera.

Investigations into the previous year's outbreak of equine encephalomyelitis among the Mounted Military Police horses at Jamshedpur were continued by the same officer. The herd of the Tata Dairy Farm, Jamshedpur, was satisfactorily immunized with goat tissue virus against Rinderpest, while experimental inoculation of buffaloes was carried out in the field. A condition among the conservancy bullocks at Puri characterised by a puffy swelling of the hock joints and opacity of the cornea yielded on investigation evidence suggestive of Vitamin A deficiency. Histological examination of growths from a number of horn cancer cases in bullocks was carried out. The Mounted Military Police horses were re-vaccinated against Anthrax with the Burma spore vaccine. Prophylactic treatment with trypanblue in outbreaks of Doyle's disease proved disappointing. Other work done included investigations into outbreaks of tick-fever among dogs at Darbhanga, Jowar poisoning in cattle in Biharsharif and Foot and Mouth disease among goats and sheep in Hazaribagh.

Bombay.—The question of providing a suitable laboratory at the Bombay Veterinary College has been deferred for financial reasons. Preparation of virus for the protection of cattle against rinderpest has been undertaken at the college.

The Veterinary Investigation Officer continued his investigations into diseases of live-stock.

Central Provinces.—There is no Veterinary College in this province but research work in the field was undertaken by the Veterinary Investigation Officer employed in this province by the Imperial Council of Agricultural Research. Investigations into the blood protozoan and bacterial diseases, Bovine Trypanosomiasis, Rinderpest, Coccidiosis, contagious abortion in cows, skin diseases and diseases of fish were carried out by him.

Madras.—The following are the items of research work done at the Madras Veterinary College since the report of the Royal Commission :—

- (1) Further study on Bovine Lymphangitis and the efficacy of its vaccine.
- (2) Study on the Leptospiral Jaundice in Hounds.
- (3) A study of the endemicity and incidence of Surra in an infected locality.
- (4) A study of the effects of vaccine against rinderpest recommended by different workers.
- (5) A study of pseudo-fowl pest with special reference to establishing protection by a suitable vaccine.
- (6) A study of the cercaria from fresh water molluscs and the incidence of their infection in snails.
- (7) A survey of ticks on cattle in the Presidency.
- (8) A study on Sarcoma and Carcinoma in animals.
- (9) A study of the methods of infection and immunity against Anthrax with a view to plan out a scheme for research in that direction.
- (10) Trypanosomiasis—A study of the morphology of the small trypanosomes of the domesticated animals found in the Madras Presidency.
- (11) Piroplasmiasis—Transmission experiments of Babesia bigemina and Babesia canis were done with Ornithodoros savignyi while cases of Babesia mutans and Babesia gibsoni were successfully treated, the former with trypanflavine and the latter with Novarsanobillon.
- (12) Production of Anti-Rinderpest serum under an experimental scheme was continued until a separate Serum Institute was opened.
- (13) Experiments connected with the modes of infection in Anthrax on small experimental animals.
- (14) Preparation of a suitable vaccine for use in the field in respect of avian cholera.
- (15) Studies in Bovine Nasal Schistosomiasis.
- (16) Life-history of Nasal Schistosome.
- (17) Comparative study of S. Spindalis and S. nasalis.
- (18) Study of some cercaria and helminths new to science.
- (19) Study on the immunity problem in bovine nasal schistosomiasis.
- (20) Study of Cutaneous Myiasis in animals.
- (21) Treatment of Bovine Nasal Schistosomiasis.
- (22) Life-history of E. Malayanam in dogs and cats.
- (23) Life-history of P. Cervi in cattle.
- (24) Life-history of F. Elongatus in cattle.
- (25) Study of parasites in pigs.
- (26) Study of life-history of Gnathostomum Spingerum.
- (27) Several original anatomical findings were studied and recorded in the bovine type.

Orissa.—One scholarship was awarded to a student for studying in the Bihar Veterinary College, Patna. There is no veterinary college in the province.

Punjab.—Research was conducted at the Punjab Veterinary College, Lahore, as under :—

1. Albinisms in buffaloes.
2. Supernumerary teats in buffalo cows.
3. Atrophic cirrhosis of the liver and composition of Ascitic fluid in a ram.
4. Congenital Corneal Dermoid in a calf.
5. A scheme in connection with the investigation into the helminthiasis of cattle, sheep and goats in the Punjab is receiving attention.

Sind.—There is no Veterinary College in Sind. An Investigation Officer for Sind and Ajmer-Merwara was sanctioned by the Imperial Council of Agricultural Research and started work in July 1937. He is at present engaged in the investigation of Warbles, Liver Fluke and Parasitic Gastritis. Quarterly reports of his work are forwarded to the Imperial Council of Agricultural Research.

United Provinces.—Research and experimental work continued to be carried on under the supervision of the Veterinary Investigation Officer in the departmental laboratories and research station at the headquarters of the department.

Experiments on the computation of the minimum dose of ordinary anti-rinderpest serum, simultaneously with goat tissue vaccine in goats and sheep were repeated at the Central Laboratory, Lucknow. Experiments on "contagious ecthyma in goats" were also carried out in collaboration with the staff of the Imperial Veterinary Research Institute, Mukteshwar.

With a view to determine the minimum curative and prophylactic doses of Naganol for combatting surra in equines, experimental work was undertaken at Aligarh and Shamli (Muzaffarnagar) but the work has not been completed.

Obscure infection amongst goats at Etah farm which was responsible for a heavy mortality amongst its Jumnapari stock was investigated in collaboration with the Imperial Research Institute, Mukteshwar.

CHAPTER X.—Irrigation.

52. Review of position in regard to outstanding Irrigation Projects (paragraph 275).

Assam.—The extension of irrigation from small streams and bheel land was strenuously pushed on by the department through the installation of power pumps. Up-to-date, 24 pumps were purchased for demonstration purposes and 3 were let out on the hire-purchase system.

Bihar.—The list of outstanding projects is nil at present.

Bombay.—The Superintending Engineers of Circles were consulted and this Government have decided that projects already prepared should be divided into (a) those likely to be highly remunerative but with which it is not possible to proceed on account of lack of funds, (b) those that might be made remunerative under special conditions and (c) those that are never likely to prove remunerative.

Projects under (a) should be reviewed once a year as regards the feasibility of their being proceeded with due to change in circumstances.

Projects under (b) should be reviewed similarly once every five years. The above instructions should be attended to by the Superintending Engineers.

When projects under (c) are submitted to Government and finally abandoned, a press note should ordinarily be issued to that effect.

Central Provinces.—The work of the Irrigation Department was reviewed by a committee in 1927—29. The recommendation made was that until cultivators in the areas commanded showed by results that they appreciated the advantages of irrigation and paid for them no new projects should be undertaken. The position is that the cultivators have not appreciated the advantages and consequently no new works have been undertaken.

Sind.—There are no outstanding Irrigation Projects in Sind at present. The question of constructing a Barrage at Jherruck is still under investigation.

United Provinces.—The remodelling of Mat and Hathras branches of the Ganges Canal, including an extension of 43 miles of channels was almost completed at an approximate cost of Rs. 10 lakhs. This is expected to irrigate an additional area of 145,000 acres annually.

The tube-well project on which work was started in 1934 was nearly completed and 1,423 electrically operated tube-wells were in use in 8 districts.

Another scheme (Fyzabad) which is designed to pump 160 cusecs from the Gogra river and to irrigate 43,348 acres annually by means of 120 miles of canal was expected to be ready by March, 1938. The results of the operations of this scheme will be studied before it is decided to have similar schemes for irrigation by pumping in the eastern districts.

The Eastern Grid Hydro-electric project designed to develop 7,700 K. W. in Rewa State in order to electrify the towns in Mirzapur, Allahabad and Benares districts and to pump water for irrigation from the Tons and the Ganges is under consideration. A survey of a new branch of the Sarda canal to carry 400 cusecs for irrigation in the Bara Banki District is also in progress.

The two projects, one for a reservoir at Khutgaon on the Dhasan river to supplement the storage for the Dhasan Canal and the other for the construction of the Ahraura Canal and the Nindeh Reservoir in Bundelkhand were held in abeyance.

53. Investigation and experiment on sale of water by volume (paragraph 277).

Assam.—The province is hardly concerned. The rainfall being high throughout Assam, the problem is generally rather the disposal of surplus water than irrigation properly so called, and there is no irrigation branch.

Bihar.—Some progress has been made as regards extension of long-term leased area on the Champaran Canals only.

Bombay.—No satisfactory practical method of selling water by volume for irrigation having been evolved, the present procedure of assessing the area irrigated will continue for the present, every effort being made to promote and encourage economy in the use of water by modulating the outlets and educating the cultivator in the more thrifty use of water.

The Royal Commission's recommendation that no reduction in the capacity of an outlet should be made if irrigation is done over a larger area than that for which the outlet was designed is accepted subject to the proviso that the designed capacity of an outlet may be liable to be reduced on technical grounds.

Central Provinces.—The sale of water by volume in the province is impracticable.

N. W. F. P.—A contract has been made for 6 years from Kharif 1934 with K. S. Abdul Matin Khan of Takhti Bhai to irrigate 1,109 acres of land from outlets on Distributory no. VIII of the Lower Swat Canal on payment of fixed water rate of Rs. 4,450 per annum and another contract to irrigate 1,134.9 acres of land in Manga village from outlet at R. D. 31198-R. of Distributory no. 8 of the Lower Swat Canal on payment of fixed water rate of Rs. 4,500 per annum, irrespective of the area irrigated and crops sown.

In addition to the above two contracts the Military Grass Farm Department is entering into a similar contract for 1,549 acres of lands under the Grass Farms at Mardan and Nowshera commanded by the Lower Swat Canal for 5 years.

Sind.—No satisfactory method of selling water for irrigation by volume has been evolved. Accordingly, the present procedure of assessing the area irrigated is being continued, and every effort is being made to promote and encourage economy in the use of water by modulating the outlets and educating the cultivator by demonstrations through the Agricultural Department in the more thrifty use of water.

United Provinces.—As expert opinion strongly indicates that there is no practical method of measuring canal water at outlets on a large scale, the effort of the Irrigation Department are now directed towards the perfecting of the present system under which a flat rate per acre is charged.

54. Formation of Irrigation Panchayat (paragraph 278).

Assam.—Please see remarks under item 53 above.

Bengal.—During the years under review the Damodar Canal was brought under the operation of the Bengal Development Act (Bengal Act XVI of 1935). The working of the canal under the Act was watched in relation to the question of the formation of Irrigation Panchayat. (The Act was withdrawn from the Damodar Canal area with effect from the year 1938.)

Bihar.—The question of the formation of irrigation panchayats for the management of and distribution from village field channels was considered in 1916 when it was decided that owing to lack of communal spirit in irrigating villages, the establishment of panchayats or irrigation boards for the distribution of water was not a practicable proposition in this Province. Another objection raised at that time was that because water is supplied under a personal agreement between Government and each individual cultivator, Government are legally bound to supply water to the land of each signatory to the lease and cannot therefore make over their responsibility to an irrigation board. The same reasons still hold good and the recommendation is therefore not acceptable to the local Government.

In actual practice, however, Government seldom interfere in the contribution of the water after it leaves the outlet in the Government channel and distribution is managed by the cultivators themselves under the supervision of a headman or lambardar selected from amongst the more influential persons concerned with each lease and appointed by the Subdivisional Officer in consultation with the lessees. The lambardar receives a fee from Government in proportion to the assessment of water-rate for various duties connected with distribution, assessment and collection, but he is not really a Government servant and what Government want to encourage is a better recognition by the cultivators of the lambardar as their own representative and leader and of the advantage of a bidding by his decisions in the matter of distribution of water.

Bombay.—The experimental transfer of responsibility for internal distribution to panchayats in the Deccan has not hitherto been successful but experiments in this direction are being continued whenever suitable opportunity arises.

Central Provinces.—Irrigation panchayats have been formed.

Delhi.—Nothing of importance has been done in this direction.

Orissa.—Irrigation, in the districts of Cuttack and Balasore, is being managed by village representatives.

United Provinces.—The system of disposal, through village panchayats, of complaints concerning irrigation measurements and wastage of water is still in the experimental stage. The results are so far encouraging and it is hoped that the system will be developed further in co-operation with the Rural Development Department.

55. *Establishment of a special agency for minor irrigation works (paragraph 279).*

Assam.—Please see remarks under item 53 above.

Bihar.—The Bihar Minor Irrigation and Drainage Works Bill will be introduced in the Legislative Assembly as soon as possible and when passed it will enable minor irrigation schemes to be taken up. The Bill is now under the consideration of Government.

Bombay.—In this province minor irrigation works are in charge of officers of the Revenue Department. The post of the Superintending Engineer, Minor Irrigation Works, which was abolished owing to financial stringency has not been revived.

Central Provinces.—The establishment of special agency for minor irrigation works is considered unnecessary in this province.

Delhi.—The *bunds* in the Delhi Province which are fairly numerous are managed by the District Board.

Orissa.—The proposal to constitute a new T. R. S. (Tank Restoration Scheme) subdivision for the investigation of the minor irrigation basins in the district of Ganjam is under examination.

Punjab.—The demand for large and small power operated tube-wells installed by the Agricultural Department is increasing. With the expansion of the Hydro-Electric distribution system this demand is likely to expand considerably.

United Provinces.—No special agency for the construction of minor irrigation works has been established as at present there is neither scope nor demand for new works of this class on a scale sufficiently large to justify a special agency. In the Partabgarh District 100 bundhis were surveyed and designed and of these 47 were built. In Bundelkhand new bundhis and small canal schemes are under consideration out of the Government of India's grant for rural reconstruction. A sum of Rs. 1,11,920 was distributed among the district officers for the development of water supply including provision of drinking water, well-boring and minor irrigation projects such as earth embankments and reservoirs.

56. *Pumping and Boring Operations and Tube Wells (paragraph 280).*

Assam.—Nothing has been done by Public Works Department. The project of irrigation from tube wells was considered in 1929-30 but dropped owing to financial stringency. Work on irrigation by pumping has been done by the Agricultural Department.

Baluchistan.—A small pumping set was installed in 1934 at the Sultan Mohd. Karez at mile 14 Quetta-Chaman Road. This has not proved successful, as the Persian Wheels originally installed are totally unsuitable and very inefficient. It is proposed to replace them by modern deep-well pumps at an extra capital cost of Rs. 5,000. This work will only be carried out after an assurance has been received that the requisite extra revenue will be obtained; it is anticipated that the scheme with modern pumps will be quite successful.

Bihar.—A calyx rock drilling plant has recently been purchased and arrangements are being made to carry out experimental borings in the Gaya district.

The Department possesses two 8 H. P. portable power pumping sets for testing tube-wells installed by the Department and pumping demonstrations from tanks and rivers.

Six 3 H. P. portable pumping sets have been placed under the control of the Range Officers for pumping demonstrations at selected sites on rivers and tanks.

During the years under report 338 borings and 69 tube-wells with necessary pumping machinery have been installed by the Department for cultivators and zemindars.

Bombay.—Owing to financial stringency boring activities have been suspended. No action on the lines of the recommendation can therefore be taken at present.

Central Provinces.—The value of pumping and tube well irrigation is not sufficient to cover the capital cost in the Central Provinces.

Delhi.—As under many other heads, Delhi is for this purpose practically part of the Punjab. Very useful work has been done for individual landowners by the Boring Section employed under the Agricultural Engineer, Punjab.

Madras.—The pumping and boring operations are under the control of the Industries Department in this Presidency which has an engineering staff with experience in this work. The department possesses a number of portable pump sets which are lent on hire to ryots at nominal rates.

Over 8,182 borings were put down by the department in the Province and most of them were successful. The total depth bored in these cases was over 476,589 feet. These borings included several powerful artesian borings, put down in the various parts of the Presidency in the districts of Godavari and South Arcot and have resulted in the spontaneous discharge of water above ground level. As a result of these borings several hundreds of acres which were previously either fallow or dry have been transformed into fine wet lands.

Increased powers were delegated to local authorities in the grant of loans.

Wherever owners of land are prepared to sink wells on this site they are encouraged to do so by the grant of a loan under the Loans Acts. Instructions have also been issued that such applications should be disposed of without delay.

Orissa.—Demonstrations were given in lift irrigation from rivers by a Petter Pumping set.

A small well-boring section was maintained for sinking tube-wells for irrigation at the cost of private parties on receipt of applications for such work. The section is being re-organised and strengthened.

Punjab.—The Engineering Section of the Agricultural Department provides the equipment and skilled labour for sinking tube-wells and undertakes this work for agricultural purposes when required to do so.

Sind.—In the year 1932-33, three boring machines were transferred from the Bombay Presidency to Sind for work in the rice area of the Karachi District. This work is being carried out by the Agricultural Engineer who assists the Rural Propaganda Officer and other local bodies with his advice in the construction of tube-wells in rural areas.

United Provinces.—Three hundred and seven large wells and 596 small wells were completed during 1936 and 1937.

57. *Ordinary Wells (paragraph 281).*

Assam.—Please see remarks under item 56 above.

Baluchistan.—The idea of installing Persian wheels has been given up, as the Zamindars do not seem to be interested in these. However, a Wind-mill was erected at Bostan in March 1937 at a cost of Rs. 4,815, as an experiment, to ascertain if it is practicable to use this method of raising water to the surface and utilize it for irrigation.

Bihar.—The Provincial Government agree that the construction of ordinary wells is essentially a matter for private enterprise but that there are many ways in which the Agricultural and Irrigation Departments can help the landholder. At present the Agricultural Engineer assists the owners of ordinary wells in the following ways:—

- (a) By test borings, when necessary for the construction of new wells;
- (b) By sinking open tubes through the foundation clay to enable a better water-bearing sand to be tapped or by the addition of small strainer tubes to existing masonry wells for the same purpose;
- (c) By the supply and fitting of Rahat bullock pumps suitable to various sizes of masonry wells;
- (d) With advice in difficulties.

At present no new proposals are needed and steady development on existing lines is called for. Government have recently sanctioned an addition to the number of small size boring plants employed on the improvement of village wells.

Work is at present in progress on small tube-wells for co-operative societies and the recommendation for encouraging the co-operative sinking and working of wells has been accepted.

There are only four districts in this province where well irrigation is of any importance. The Provincial Government have no information to indicate that there has been any abandonment of well irrigation on a large scale. If such a movement had taken place, it could not have escaped notice. They do not consider, therefore, that any investigation into the causes of abandonment of wells is necessary in Bihar.

Bombay.—No action on the lines of the recommendation has so far been taken in this province.

Central Provinces.—Irrigation from wells is not done by the Irrigation Department.

Delhi.—The number of ordinary wells in use has risen from 2,465 to 2,652 at the present time. Development is fairly steady, and is financed by taccavi loans when necessary. In parts of the Delhi Province, however, the water is brackish and well-sinking is a gamble.

Punjab.—Well boring operations for the augmentation of water supplies in open wells are carried out as usual.

United Provinces.—Boring was carried out in 5,191 masonry wells of which 4,373 were successful.

The number of co-operative societies for facilitating and improving irrigation resources rose from 27 to 45. Credit societies finance the construction of irrigation wells.

In the Balrampur Estate 35 tube-wells and 6 river pumping schemes, all electrically operated, and 2 large and several small bundhis were built by the Estate under the supervision of the Irrigation Branch.

58. *Establishment of close relation between Agricultural and Irrigation Departments paragraph 283).*

Bengal.—Close relation was kept between the officers of the Agriculture and Irrigation Departments, especially in regard to the conduct of crop cutting experiments in the areas served by the Damodar Canal. During the year 1936 the crop cutting experiments in the Damodar Canal area were conducted by the officers of the two departments.

Bihar.—The Provincial Government have accepted the recommendation that closer relations should be established between the Agricultural and the Irrigation Departments. The Director of Agriculture is already consulted in new irrigation projects and gets helpful suggestions from the Chief Engineer, Irrigation Department.

The recommendation for the interchange of courses on agriculture and irrigation has been accepted in principle and reserved for action at some future date, when an Agricultural College is established in the Province.

Bombay.—The Agricultural Department is consulted fully at the earliest possible stages before initiating any irrigation project. There exists a co-ordination between the officers of the Agricultural and Irrigation Departments. The officers of the Irrigation Department preside over several demonstrations and the reports of these meetings are submitted to the heads of the Irrigation and Agricultural Departments. Several problems are also discussed in the Irrigation Conferences held under the Commissioner, Central Division, and in such conferences, the officers of both the departments freely exchange their views. The Agricultural Department is co-operating with the Irrigation Department in the conduct of short courses in agriculture held by that department.

Central Provinces.—The Agriculture Department is consulted before a new project is undertaken. The programmes for demonstration and experimental work of the Agricultural Department are prepared to meet the requirements of and in consultation with the Irrigation Department. Plots are also opened in commanded areas to demonstrate the growing of irrigated crops.

Delhi.—The Agricultural Department sends a representative to the local Canal Advisory Committee, and co-operation has been close and satisfactory. In particular, where crops fail, joint tours are arranged and the views of the officers of the Agricultural Department are given due weight.

Madras.—Close relations are maintained between the two departments in regard to problems of irrigation especially in the investigation of new projects. Irrigation experiments were also conducted at several agricultural research stations with regard to water requirements of crops in consultation with the Irrigation Department.

North-West Frontier Province.—Close connections continue. Various schemes have been examined by both departments, viz., sale of timber on Canal Banks, sale of marble stone obtained from the quarry, etc., etc.

Punjab.—Co-operation between the Agricultural and Irrigation Departments has been increased by Irrigation officers being deputed to attend the Rural Economy Course at the Agricultural College and the inclusion of lectures on Irrigation policy at this course.

Sind.—The closest relations exist between the Agricultural and Irrigation Departments in general, particularly in respect of problems relating to irrigation and water requirements of crops.

United Provinces.—Close relations continue between the officers of the Agriculture and Irrigation Departments. They meet frequently to discuss matters of common interest.

59. *Establishment of Irrigation Advisory Committees (paragraph 284).*

Bihar.—Experience has shown that Advisory Committee in this Province has not been useful and hence further action in the matter is not considered necessary.

Bombay.—The local Government has appointed a committee designated the "Deccan Irrigation Advisory Committee" consisting of the bagayatdars associations in the Deccan in order that a closer connection between Government and the irrigators may be established and to facilitate consideration of the latter's requirements and difficulties. The functions of this Committee are strictly advisory.

Central Provinces.—A Standing Committee for Irrigation has been constituted.

Delhi.—The Delhi Province is represented on the Advisory Committee both of the Western and of the Eastern Jumna Canal.

Madras.—The Irrigation Development Board constituted in 1930 is still functioning and irrigation projects are taken up on the advice of the above Committee. The Agricultural Department gives advice in regard to the agricultural aspects of irrigation projects.

North-West Frontier Province.—Formerly there was one committee for all the canals. Lately a separate committee has been established for each Canal Division.

Orissa.—Not yet taken up as the Settlement and the Survey of India maps, serve the purpose.

Punjab.—The Deputy Directors of Agriculture are members of the Canal Advisory Committee in the Province.

Sind.—The Government of Bombay had set up, in the beginning of 1930, two Committees in Sind, one Standing Committee consisting of officials and the other an Advisory Committee consisting of non-official gentlemen to assist Government in the prosecution of the Lloyd Barrage and Canals Construction Scheme.

The Standing Committee out-lived its usefulness and was abolished in 1933 and a new Advisory Committee was appointed with the same functions as before but with the modification that the Committee should offer advice on any matter referred to it by Government or by the Commissioner in Sind.

On the separation of Sind from Bombay in 1936, and the consequent change in the administration, Government considered that Advisory Committee was not necessary after the expiry of its triennial term and therefore abolished it from December 1936.

United Provinces.—All canal divisions now have local advisory committees which meet regularly and do useful work particularly in providing opportunities for non-official members to put forward suggestions.

60. *Research on Irrigation Problems (paragraph 287).*

Bihar.—The possibilities of tube-well irrigation on a large scale are under consideration.

Bombay.—The recommendation has been accepted. Irrigation research work is being carried out by the Irrigation Research Division.

Madras.—The Agricultural Department has rendered the necessary help in the selection, lay-out and harvest of plots in regard to experiments on the duty of water. Such experiments are in progress at different agricultural stations. Irrigation experiments were started by the Agricultural Department in collaboration with the engineering staff in connexion with the Lower Bhavani Project in the Coimbatore district to study the water requirements of crops and duty and loss by seepage. The agricultural aspects of the Tungabhadra Project are under investigation and an agricultural station was opened at Siruguppa in the Bellary district in 1937 to study the water requirements of crops in connexion with the project. A station has also been started at Pattukkottai (Tanjore district) in the Cauvery-Mettur Project area to demonstrate to the ryots the advantages of taking water for irrigation from the project channel.

Punjab.—An Irrigation Agricultural Research Committee is functioning. It is expected that funds for the establishment of an Agricultural Research Station on the water requirements of crops to be financed jointly by the Punjab Government and the Imperial Council of Agricultural Research will be made available in 1939.

Sind.—The research work in irrigation problems is being carried out by the Research and Development Division of the Irrigation Department with the co-operation of the Agricultural Department. Water requirements of crops are being studied at the Agricultural Research Station, Sakrand. Experiments to determine the "Duty" of water for rice crop on the Fuleli Canal System, have been carried out and leaflets dealing with the irrigation of crops in the Barrage and non-Barrage areas together and containing time-table for agricultural operations and distribution of irrigation water have been issued.

United Provinces.—In the United Provinces research work on irrigation problems is being carried out by the Irrigation Research Section. The most important investigation was the "Lacey Theory of Silt Transportation and Design of Channels" which has received general recognition and has been adopted in the United Provinces and in several other provinces in India and in foreign countries.

Measuring devices have been designed and constructed for discharges ranging from 1 to 1,740 cusecs and a new field for the more exact distribution of canal supplies opened up. Falls have been calibrated on various canal systems of the province.

The relative merits of various types of lining suitable for the reduction of percolation losses in canals were also investigated and valuable results were obtained.

In addition to this a laboratory was built at Lucknow in which model tests are carried out for new structures and for structures needing modification. Expensive repairs to some of the canal works have thereby been obviated and works have been built with a confidence that they will fulfil their functions at the minimum of cost.

The Irrigation Research Station of the United Provinces receives invaluable assistance and guidance from the Central Board of Irrigation; the work done by the scientific staff of the University of Lucknow has also been of some value.

61. Preparation of drainage maps (paragraph 289).

Assam.—No action can be taken until a Waterways Division is formed.

Bihar.—Not yet taken up.

Bombay.—Soil classification maps of perennial sections of all the major Deccan canals have already been prepared and where necessary drainage schemes are being prepared for these areas.

Central Provinces.—No trouble due to waterlogging is experienced.

Delhi.—Maps showing the existing drainage system exist.

Sind.—No drainage maps have been prepared, but the question of drainage has received and is receiving very careful attention of Government. Soil and sub-soil surveys and investigations have been undertaken over the area affected or likely to be affected by water-logging and suitable measures are being taken to prevent it.

United Provinces.—Each canal division is responsible for the drainage systems in its area and village and other maps usually available in these divisions are sufficient for preliminary investigation of new problems as they arise.

Preparation of drainage maps could not be undertaken for lack of funds.

62. Irrigation in Sind (paragraphs 290-291).

Sind.—The problem of irrigation in Sind under perennial conditions of water-supply is receiving the attention of Government. A Provincial Board of Agriculture with local Committees has been constituted to tackle the Agricultural problems of the Province. Experiments are being conducted on the suitability of crops under perennial irrigation, and demonstration tests are being made on the water requirements of crops. Experiments are also being carried out on the reclamation of soils.

63. Irrigation in Bengal (paragraph 292).

Bengal.—During the year 1936 the rainfall was much in excess of the normal, being 80.25 inches, while in 1937 the rainfall, though normal, was not well distributed. The result was that there was a great demand for canal water especially during the months of June and October. The supply of canal water was adequate and ensured a bumper crop in the areas served by the canal.

The total area irrigated during 1936 and 1937 was approximately 1,33,101 and 1,34,430 acres respectively. A length of 213 miles (=5,012') of canals and distributaries was in operation during the period under review.

The slight increase in the area irrigated during the year 1937 was mainly due to the construction of additional regulators in the distributaries' pipe outlets.

Crop experiments were made during the years. The average outturn of paddy, as ascertained, was favourable.

Mr. R. C. H. Johnston, I.C.S., late District Magistrate, and Collector, Burdwan, invented and patented a water lifter known as the "Johnston water lifter" for lift irrigation. On experiment the lifter was found useful only in places where the water level is more or less constant such as in small distributaries and minor channels. It has a capacity of about 0.5 cusecs. Considering the cost of its construction, the lifter does not appear to be economical.

64. Hydro-electric development (paragraph 295).

Assam.—A survey was undertaken in 1923, but has little bearing upon agricultural problems in Assam.

Bihar.—The scheme is under consideration.

Bombay.—No action is called for at present.

Central Provinces.—Recently an expert was employed to advise the Provincial Government. His report is awaited.

Madras.—The Pykara Hydro-Electric Scheme which has been in operation from 1st April 1933 has entered on the sixth year of operation. The scheme serves the whole of the Nilgiris and Coimbatore districts and parts of Malabar and Madura districts for not only lighting but also for irrigation and industrial purposes. A net work of rural distribution lines for agricultural and other purposes has been laid in the Coimbatore district and similar distribution of power to rural areas in other districts is being undertaken. The number of pumps installed for agricultural purposes in the Pykara system during the period ending 31st August 1937, was 702 aggregating 4,353 H.P. Work on the extension of the supply of Pykara power from Madura to Virudhunagar, Rajapalayam and Kovilpatti is in full swing. The Mettur-Hydro-Electric Scheme is nearing completion but the operation of the system commenced even from November 1937. Salem, Trichinopoly and Tanjore districts which were first served by the Pykara power have been transferred to the Mettur system. The other districts served by Mettur power are South Arcot, North Arcot, Chittoor and part of Chingleput. Work on the extension of transmission lines to Villupuram, Conjeevaram, Arkonam, Dharmapuri and Krishnagiri is in progress.

The Papanasam Hydro-Thermal Project which will meet the requirements of the Madura, Ramnad and Tinnevely districts is proposed to be taken up for execution in 1938-39.

The possibility of sinking deep bore wells in the Ceded districts for lifting water for irrigation by electric pumping is under investigation. Sites were selected near Cudadah and boring was done in one of the sites. Tests made with high capacity pumps show that the experiment will prove successful. Investigation will be made in other places and if they also prove successful small thermal stations can be established for pumping water for irrigation and drinking purposes which will be a boon to the people in the area suffering from periodical famine and failure of rains.

North-West Frontier Province.—The Malakand Hydro-Electric Scheme has been completed and the power is available.

United Provinces.—A detailed survey of a hydro-electric project for Kumaun was undertaken. The project aims at supplying electricity to be generated at the main Gola canal to Lalkua, Haldwani, Kathgodam, Bhowali, Ranikhet and Almora, with a link to Naini Tal.

A preliminary survey of a hydro-electric project for the eastern districts of these provinces was carried out. The scheme provides for a power station on the Tons river in Rewa State with transmission lines to Allahabad, and thence to Mirzapur, Benares and Moghalsarai. It also provides power for energizing (a) a pumping station on the Tons, 30 miles south of Allahabad, to supply a canal system for irrigating 26,000 acres annually, (b) a pumping station near Manikpur on the north bank of the Ganges in Partabgarh District, and (c) another at Kara on the south bank of the Ganges opposite Manikpur, for pumping 220 cusecs at each station for irrigating annually 44,000 acres each. The scheme was examined by a committee of experts whose recommendations are under consideration.

Almost all the tube-wells in the Hydro-Electric grid area have been provided with electric plant.

CHAPTER XI.—Communications and Marketing.

65. Constitution of Road Boards (paragraph 305).

Assam.—The Road Board created in 1926 has since been reorganised on a wider basis as Assam Communications Board to include representatives of the Legislative Assembly, Tea Industry, Railways and Steamer Companies operating in Assam, and of the recognised local transport associations interested in the development of communications in Assam. The function of the Board is advisory only and the conferment of administrative powers has not yet been considered.

Several programmes of road improvement financed from the sources noted against each item below have been prepared under the advice of the Road Board or Communica-

Bihar.—So far it has not been possible to do anything in this connection. The results of the marketing survey, which is being carried out by Provincial Marketing Officers, will indicate what steps should be taken.

Bombay.—The two cotton markets at Dhulia and Amalner continued to do good work. Two more, one at Jalgaon and the other at Dondaicha in West Khandesh, have been sanctioned and they would begin to function from the season of coming year of 1938.

Arrangements are in progress to establish regulated markets at Bavla in Ahmedabad and at Broach in Broach district.

In the Southern Division a regulated cotton market at Bailhongal was established in 1937 and it is working very successfully. Efforts are being made to establish these at Bijapur, Gadag and Nargund.

The grade standards specifications and contract terms on an India basis for wheat, groundnut and linseed have been prepared by central staff in consultation with the representatives of trade associations and mills as far as the above commodities are concerned.

Central Provinces.—Regulated cotton markets have been in existence in Berar for many years. Legislation with the same object was applied to the Central Provinces in the Central Provinces Cotton Market Act, 1932, which was subsequently amended in 1936 to empower the Local Government to establish regulated cotton markets on its own initiative instead of on the initiative of the local bodies. There are now 9 regulated cotton markets in the Central Provinces.

There is also the Central Provinces Agricultural Produce Market Act of 1935 which deals with the better regulations of markets for produce other than cotton which was subsequently amended in 1936 to provide joint cotton and grain markets wherever conditions were not favourable for the establishment of separate markets.

Madras.—The Madras Commercial Crops Markets Act was passed in 1933 for the better regulation of the buying and selling of commercial crops (cotton, groundnut and tobacco) and securing fair prices and fair weighments to the growers of these crops. Under the Act, Government could notify an area where no person shall set up any place for the purchase and sale of a commercial crop except under a licence granted by the Government and except in accordance with the provisions of the Act. It is now two years since the Tiruppur Municipality in the Coimbatore district was declared as a notified area under the Act in respect of cotton marketing. A Market Committee has been formed and the services of an agricultural demonstrator have been lent to the Committee as its Secretary. The following improvements have resulted in cotton trade since the introduction of the Act in the notified area, viz., Tiruppur :—

- (1) All buying and selling take place only in licensed premises ;
- (2) All buyers, sellers, brokers, commission agents and weighers are licensed by Government ;
- (3) Unauthorized deductions in trade have been prohibited ;
- (4) Standard weights have been in force ;
- (5) Information regarding rates for cotton in Bombay, New York and Liverpool is furnished through a "Daily Market Report" ;
- (6) Statistics about cotton are collected and made available to the public ;
- (7) Arrangements have been brought into force for the settlement of disputes under the Act.

In the light of experience gained in the working of the Act at Tiruppur, the extension of the Act to other places and to other commercial crops as groundnut and tobacco was considered by Government and it is now proposed to extend it to South Arcot for groundnut and to Guntur and Kistna districts for tobacco.

A proposal is under consideration for the grant of a loan to the Tiruppur Market Committee to acquire a building to serve as a market yard.

North-West Frontier Province.—In addition to the marketing of Government orchards, marketing of fruit at Tarnab Farm and marketing of Berseem seed continued as reported previously.

Orissa.—No action has yet been taken. The results of the marketing surveys are being awaited.

Punjab.—Proposals have been made by the Indian Central Cotton Committee from time to time in the past that regulated cotton markets should be established in the Punjab on the lines similar to those which exist at some centres in other provinces. The Department of Agriculture, however, took the view that it would not be economical to establish regulated markets for the sale of one commodity only. The better way would be to

introduce the necessary reforms in existing markets which deal with all kinds of farm products. Accordingly it is proposed to make an intensive survey in order to determine all the directions in which reform is needed in respect of each commodity.

Sind.—The question is under the consideration of a Sub-Committee of the Sind Cotton Committee.

United Provinces.—No action has as yet been taken for the establishment of regulated markets, but the matter is under the consideration of Government.

68. *Efforts to secure improved quality from producers with special reference to encouragement of Co-operative Sale Societies (paragraphs 340-342).*

Assam.—In the absence of a properly qualified staff the Co-operative Department has been unable to undertake the organization of non-credit societies. The most important attempt at a sale society was that of the Nowgong Co-operative Jute Supply and Sale Society which was unfortunately started without a solid foundation in business experience and collapsed early. Owing to the continued financial stringency the Government are still unable to appoint experts to undertake the work of organising Producers' Societies. Attempts are, however, being made to see whether such societies can be organized in suitable localities with the present staff.

Bihar.—It is not considered desirable to start co-operative sale societies at present, because all experiments in this line have so far ended in failure owing to lack of training of members and want of funds for the requisite supervising staff.

Bombay.—Fullest possible help is given to the Cotton Sale Societies in the Southern Division, in grading and sale of cotton by auctions and there is close co-operation between these societies and the Department. The other sale societies are the Chilly Sale Society at Byadgi, and Tobacco Sale Society at Nipani which are also receiving attention.

Central Provinces.—There are no regular co-operative sale societies in the province. The department has, however, undertaken the pooling of verum cotton in conjunction with the Co-operative Taluk Agricultural Associations and the produce of cultivators is assembled, graded, processed and sold by this organization, which has functioned very successfully. Arrangements for the co-operative marketing of improved varieties of rice are under consideration.

Coorg.—There are at present seven Co-operative Crop, Loan, Sale and Supply Societies and seven provision stores including one Central store.

Delhi.—No appreciable progress has been made, though experiments in the grading and marketing of wheat have been carried out by the Co-operative Department.

Madras.—Good progress has been made in regard to the distribution of improved seeds and production of improved strains through the efforts of co-operative sale societies. The Tiruppur Co-operative Sale Society continued its work in seed multiplication of Co.2 Cambodia cotton. Other societies which co-operated in agricultural development were those at Rasipuram in the Salem district and Idigarai in the Coimbatore district, which concerned themselves with the improvement of cotton. The work of the Lalgudi Sivaganam Co-operative Agricultural Society (Trichinopoly district), the Kumbakonam Co-operative Society, the Co-operative Stores, Kadiramangalam, and the Co-operative Manure Society, Nidamangalam, in Tanjore district require special mention. This work is referred to in more detail under item 97 "Encouragement of purchase and sale societies" (paragraph 387).

Punjab.—The increasing disloyalty of members is still a great hindrance in the way of Commission Shops, but some of them are showing signs of improvement in their business.

Sind.—The matter is under consideration.

United Provinces.—Cane supply has increased tremendously during the years 1936 and 1937. There were 514 societies, of which 15 were central organizations ; they handled about a crore of maunds of cane during the year 1937 and made handsome profits.

The Basmati Rice Producers Society (Dehra Dun), which stocked finer qualities of rice, sold 600 maunds of rice during the first six months of its existence.

In 1936, the Bilgram Cotton Sale Society (Hardoi) purchased 5,800 maunds of C-402 cotton and ginned and pressed it and made a profit of Rs. 3,929. In 1937 however due to abnormal rains which damaged the crop, the society handled only 1,169 maunds of C-402 cotton and earned a profit of Rs. 2,298.

A society for the marketing of better quality mangoes and other fruits was also started at Malihabad (Lucknow District) in 1936.

69. Auction sales by Agricultural Departments (paragraph 343).

Assam.—The province is not sufficiently advanced for these recommendations to have any practical application.

Bihar.—The recommendation for auction sales has been accepted as a general principle. No such sales are contemplated or needed at present.

Bombay.—In the Southern Division auction sales of cotton were arranged through the Co-operative Cotton Sale Societies where cotton graded by departmental officers was sold in different lots under a new scheme sanctioned by the Indian Central Cotton Committee and the Government. Auction sales were also arranged in other centres in co-operation with cultivators and commission agents and they were all very successful. During the years 1932 to 1937, 38,866 dokras of Jayawant and 98,925 dokras of upland cotton were graded and sold by open auction.

Central Provinces.—No selling by auction is done.

Madras.—The Agricultural department conducted auction sales of lint produced from improved strains of cotton in important cotton growing tracts such as Tinnevellys, Cambodia, Western and Northern areas and distributed the seeds to ryots.

Punjab.—Auction sales by Agricultural Department are restricted to one circle and are confined to cotton.

Sind.—No such auction sales are held, but assistance is being rendered to selected cotton growers by ginning their produce at the Government Ginning Factory and selling the produce direct to mill owners and export merchants at competitive prices.

United Provinces.—No auction sales have been resorted to.

70. Experiments with containers (paragraph 345).

Assam.—Please see remarks under item 69 above.

Bihar.—In the Horticultural Section experiments have been made to find out a suitable yet inexpensive container for the transport of mangoes of Bihar to outside markets.

Bombay.—Experiments were made to find out suitable and better types of packing materials for sending mangoes from the Konkan to Bombay. A leaflet explaining the advantages of packing mangoes in boxes over bamboo baskets has been issued by the Agricultural Department.

Madras.—Investigations showed that wet hides and skins get damaged and stained when transported in iron wagons. Iron wagons were also found not suitable for the carriage of fruits for long distances. Wooden wagons minimize the damage in transport of perishables when sent to long distances.

Punjab.—With a view to improving the methods of marketing Punjab fruits, model packing cases for the despatch of graded fruits to markets have been supplied to Fruit Growing Associations.

Sind.—No such experiments have been conducted.

United Provinces.—For lack of funds no experiments with containers could be carried out.

71. Market Surveys (paragraph 347).

Assam.—A Marketing Officer and two Assistant Marketing Officers were appointed with the financial assistance of the Imperial Council of Agricultural Research. They are still continuing marketing surveys for a number of agricultural commodities and are working under the guidance of the Agricultural Marketing Adviser to the Government of India under the direct control of the Director of Agriculture.

Bihar.—The Provincial Marketing Scheme came into operation in March 1935. As a preliminary to any scheme for the proper development of agricultural marketing in India, the Provincial Marketing Staff in collaboration with the Central Marketing Staff is at present engaged in comprehensive surveys of the production and the marketing of different commodities throughout the Province.

Bombay.—The marketing of several agricultural commodities has been studied during the last 2½ years and preliminary reports on the surveys of the marketing of the following commodities have already been submitted :—

1. Tobacco.
2. Bananas.
3. Grapes.
4. Strawberries.

5. Coffee.
6. Potatoes.
7. Citrus fruits.
8. Linseed.
9. Groundnuts.
10. Markets, Fairs, Paints, Hats and produce exchanges.
11. Mustard and rapeseeds.
12. Cattle.
13. Milk.
14. Eggs.
15. Hides and skins.
16. Ghee and butter.
17. Wheat.
18. Rice.
19. Co-operative Marketing.

Surveys on the marketing of the following commodities are in hand and their reports will be submitted in due course :—

1. Pineapples.
2. Apples.
3. Cashewnuts.
4. Mangoes.
5. Coconuts.
6. Wool and hair.
7. Sheep and goats.
8. Fish.
9. Lac.
10. Barley.
11. Gram.
12. Maize.
13. Gul and sugar.

Central Provinces.—With the aid of the grant from the Imperial Council of Agricultural Research surveys of twelve commodities had been completed by the end of February 1938 : others are in progress.

Madras.—Marketing surveys on wheat, linseed, eggs, rice, groundnut, cattle, hides and skins, milk, tobacco, grapes, plantains, pine-apple and coffee and of potato, ghee and butter, pear, apples and plums and peaches, citrus fruits and markets have been completed.

Data have also been compiled for the market report on markets and fairs in the Presidency. Pending publication of the survey reports by the Central Marketing staff, summaries of the reports are being issued in the form of press notes for the information of the public in this Presidency. With the publication of the All-India Wheat Report the provincial wheat report has been released for publication.

North-West Frontier Province.—This work has been taken up by the Marketing Officers and is in progress.

Orissa.—The work of survey of the production and marketing of different commodities is under the supervision of a Joint Marketing Officer for the two provinces of Bihar and Orissa. Before the creation of the province, consolidated data and information for the old composite province of Bihar and Orissa, had been collected and draft reports prepared. Figures and information are now being separated for preparation of separate reports for Orissa.

Punjab.—Towards the end of March, 1935, effect was given to a five-year marketing scheme which is being financed jointly by the Punjab Government and the Imperial Council of Agricultural Research as a part of an all-India Scheme. Marketing surveys of some of the products have been completed and others are in progress.

Sind.—This work is being carried out by the Special Marketing Staff. Surveys of principal products have been completed and attention is now being directed towards development work.

United Provinces.—Some marketing surveys have been made.

72. Appointment of Expert Marketing Officers (paragraph 348).

Assam.—Please see remarks under item 71 above.

Bihar.—Please see remarks under item 71.

Bombay.—The Live Stock Expert to Government was entrusted with the work of marketing officer in addition to his own duties up to February 1937. This work has since been transferred to the Professor of Agricultural Economics, Agricultural College, Poona, who has been designated as Provincial Marketing Officer. He is working under the instructions of the Agricultural Marketing Adviser to the Government of India. Four officers of Provincial rank have been appointed under him. Each of them is entrusted with a separate problem of investigation. Marketing surveys are now being conducted by these officers for dairy products, plantation crops, oil seeds, staple crops, cotton and sugar.

Central Provinces.—A Provincial Marketing Officer has been appointed. His staff consisting of four Assistant Marketing Officers and the necessary office establishment is financed entirely by the Imperial Council of Agricultural Research.

Madras.—A Provincial Marketing Officer was appointed for this Presidency early in 1934 as a preliminary step to an intensive programme for development of marketing facilities for crops and animal husbandry products. A Marketing Board consisting of the Director of Agriculture, Registrar of Co-operative Societies and the Director of Industries and two non-officials acquainted with trade was also established to advise and guide the work of the marketing staff of which the Provincial Marketing Officer is the *ex-officio* Secretary. The Board has been functioning since August 1934 and has made many important recommendations on marketing matters. Later in February 1935, three Assistant Marketing Officers were appointed under the marketing scheme sanctioned by the Imperial Council of Agricultural Research and since then marketing surveys which are referred to in paragraph 71 above were carried out. The necessary staff having thus been provided for marketing surveys of agricultural products which provide a sound basis for the formation of marketing organization, the Provincial Government strengthened the staff further during 1937 by the appointment of a fourth Assistant Marketing Officer for undertaking the development side of the marketing work. The following are the important items of work done by and under the auspices of the staff :—

Standard grades were fixed for tobacco, groundnut and eggs. Thirteen grades were adopted in tobacco five for flue-cured virginia, three for sun-cured virginia and five for 'Natu'. In groundnut, three standard types, Khandesh, Coromandel and Bold were tentatively adopted and tentative contract forms were drawn up. Four grades on the basis of weight were adopted for eggs. Proposals are under consideration for the opening of grading stations for ghee in Guntur and Coimbatore districts. A merchants' association for tobacco in Guntur and a number of special co-operative marketing societies of producers of commodities like fruits, eggs, etc., were formed. The Indian Tobacco Association, Guntur, marketed 87,500 pounds of tobacco worth Rs. 50,000 under the new standard grades fixed. The association has also commenced publishing a monthly bulletin on trade aspects and also leaflets on agricultural and marketing aspects of tobacco for propaganda work. A co-operative marketing society of fruit-growers was started at Koduru (Cuddapah district) and Puthur (Chittoor district) for marketing oranges and other fruits. The Provincial Marketing Society in Madras assists these societies in marketing fruits. A similar society was started in Vizianagaram for marketing mangoes in North India. A society at Michalpaliyam in Madura district for marketing grapes and another for marketing limes in Palacole in the West Godavari district were also started. Societies for growers of pine-apple and potatoes have been started in the Malabar and the Nilgiri districts respectively. The Egg Marketing Society at Chinnaganjam (Guntur district) is marketing graded eggs in Madras. During the year the Nilgiri Potato Growers' Association commenced extended sale of potatoes in Madras at better prices than what they used to get at Mettupalaiyam from commission agents. As a result of concessions obtained in railway freight an increasing movement is noticed in the traffic of bananas to North India and Hyderabad. The Provincial Marketing Board took up the question of reduction of railway freights in the case of commodities like pine-apples, betel leaves, bananas, coconuts, etc., and addressed the railways in the matter. The Madras and Southern Mahratta Railway were addressed to reduce the freight in pine-apples from Tellicherry and Malabar to important marketing centres in South India.

Weekly prices of over 30 commodities are published in the *Fort St. George Gazette*. These reports are published regularly in English and vernacular dailies from Madras and

they are also posted in the offices of Assistant Directors of Agriculture, and Tahsildars and are also distributed in the form of pamphlets in important market centres by agricultural demonstrators and panchayat officers. Enquiries from the public and others on marketing problems of various commodities are on the increase and all these are promptly attended to. The Provincial Marketing Society also furnishes weekly prices of fruits and other commodities in the City to all co-operative loan and sale societies in the Presidency.

Orissa.—Please see remarks under item 71 above.

Punjab.—Please see remarks under item 71 above.

Sind.—There are three marketing officers in Sind financed by the Imperial Council of Agricultural Research, *viz.*, one for cereals, one for special crops and one for live-stock.

United Provinces.—There is a Marketing Officer for the province, with a number of assistants.

CHAPTER XII.—The Finance of Agriculture.

73. Limitation on period of usufructuary mortgages (paragraph 353).

Assam.—The Goalpara Tenancy Act, I of 1929 and Sylhet Tenancy Act of 1936, forbid an occupancy tenant to enter into any form of usufructuary mortgages except a complete usufructuary mortgage, which may be for any period not exceeding nine years, and may be redeemed before the expiry of the period. The Assam Banking Enquiry Committee, 1930, reviewed the position and, while observing that the bulk of indebtedness is secured otherwise than on the land, recommended that this limitation should be applied in any future tenancy legislation.

Bihar.—The Government of Bihar do not consider that legislation to limit the period of usufructuary mortgages is suitable for all parts of this Province. The policy which the Provincial Government have followed in Bihar is to make transfers of land easier and safer by reducing the amount of the transfer fee payable to a landlord, by enabling the transferee to get a secure title on payment of the transfer fee, and by measures to protect both transferor and transferee from the harassment to which they were liable under the old system. This new legislation is clearly incompatible with any proposal to limit the period for which an usufructuary mortgage can be given and the Provincial Government do not consider that such legislation will serve any useful purpose in Bihar.

In the more backward tracts of the Province the position is different and the Chota Nagpur Tenancy Act already provides that no usufructuary mortgage shall be for a period exceeding five years while in the greater part of the Santal Parganas the tenants have no right to mortgage their land at all. In the year 1935 the local Government introduced a Bill to deal with the special case of the Santals in certain parts of the Bhagalpur division lying outside the Santal Parganas. It was recognised that restrictions on alienation of land by the aboriginals in this area were necessary and the Bill which was passed into law the same year, prohibits all forms of alienation of land of aboriginal tenants, except an usufructuary mortgage for a period not exceeding 7 years by an aboriginal to another aboriginal. Subletting is permitted, but only to another aboriginal and for a period not exceeding five years.

Delhi.—The Punjab Alienation of Land Act, 1900, limits the period of usufructuary mortgages by agriculturists in favour of non-agriculturists to twenty years.

Orissa.—The Governments of the Central Provinces and Madras and Orissa did not consider any steps necessary for legislation in this direction. On the other hand the Government of Bihar and Orissa followed a policy of unrestricted alienation and transfer, though such a policy had no application to the backward tracts which were protected. The policy of the Orissa Government as foreshadowed in recent tenancy legislation is to make transfer of lands easier and to remove all restrictions on alienations, whether mortgage or sublease. The new legislation is incompatible with any proposal to limit the period for which usufructuary mortgage can be given. The Provincial Government, however, recognise that it is essential to protect aboriginal cultivators, and restrictions on alienations are still a normal feature of administration in the partially-excluded areas.

United Provinces.—The United Provinces Agriculturists' Relief Act and Encumbered Estates Act deal with the limitation of the period of usufructuary mortgages of agricultural and grove land. No usufructuary mortgages were granted under the Act as the liquidation proceedings under the United Provinces Encumbered Estates Act were held in abeyance pending the consideration of the question of rural indebtedness by a committee appointed by the Provincial Government.

Applications for ejectment of mortgages under the United Provinces Agriculturists' Relief Act were almost negligible.

74. Removal of restriction on operation of Punjab Redemption of Mortgages Act (paragraph 354).

Delhi.—This Act is in force in the Delhi Province. By section 33 of the Punjab Relief of Indebtedness Act, 1934, which was extended to Delhi in 1937 relief is made possible in respect of mortgages for sums not exceeding Rs. 5,000.

(No remarks have been received from the Punjab Government.)

75. Enactment of Legislation in regard to redemption of mortgages in provinces other than the Punjab (paragraph 354).

Assam.—Please see remarks under item 73 above.

Bihar.—Please see under item 73.

United Provinces.—The total number of applications filed for the redemption of mortgages under the United Provinces Agriculturists' Relief Act was 442, out of which 332 applications were disposed of. The number decided in favour of agriculturists was 237 or 71 per cent. of the applications disposed of.

76. Desirability of extension of principle of Statutory Restriction on Alienation of Land (paragraph 355).

Assam.—Although there is no Land Alienation Act in Assam, the Local Government have realised the necessity of preventing unfettered transfer of land by agriculturists to non-Agriculturists in areas where there is danger of the people being victimized. Generally speaking the problem is not very serious in the province. For instance, at the resettlement of the Sibsagar district, where figures were collected for the whole area, it was found that less than one per cent. of the land was in the hands of Marwaries and other traders so that their grip on the land could not be said to be great. A clause has been inserted in all periodic *pattas* issued since the year 1919 providing that land shall not be transferred by an agriculturist to a non-agriculturist without the permission of the Deputy Commissioner. As this forms one of the conditions of the lease, its breach renders the lease liable to cancellation. The position was, however, reviewed in 1928 and after the receipt of opinions it was decided that as there had been no marked increase in the areas held by traders, even where the clause had not been enforced in practice, the clause should not be enforced in future without the consent of Government, which would only be given in respect of particular areas or particular classes of lease holders, if Government were satisfied that special danger existed of the land passing on a large scale into the hands of non-cultivating classes. The policy of Government was endorsed by the majority of the Assam Banking Enquiry Committee, 1930. The clause thus remains as a useful reserve power to be enforced if occasion arises.

The above remarks cover the implications of the recommendation so far as Assam is concerned and the progress made or contemplated. As regards the estimate of cost, no expenditure has been incurred by Government in pursuance of the policy described above.

Bihar.—Remarks under item No. 73 may be seen.

Delhi.—The Punjab Alienation of Land Act, 1900, is already in force in Delhi.

Orissa.—Government are unable to agree to the recommendation in regard to the principle of statutory restriction on alienation of land. Statutory restriction is applied partly in the interest of the landlord and partly in that of the tenant. If the limitation of right of transfer becomes a source of profit to the landlord it defeats its own purpose. In cases where transfer is prohibited in the interest of the tenants the problems become more difficult. As far as the plains area of the province is concerned no imposition of restriction on alienation of land seems desirable as it would immediately lead to a fall in the value of land. Government, however, recognise that it is absolutely necessary to protect the aboriginal cultivators who are in contact with more advanced people and such a protection is already there in law.

United Provinces.—The question has not yet been decided.

77. Enquiry into expropriation of hereditary class (paragraph 353).

Assam.—The matter was considered by the Assam Banking Enquiry Committee, 1930. Admitting that the extent to which non-agriculturists are obtaining possession of the land is comparatively small, they considered the process represents a danger for the future, but were unable to make any proposal as to how it might be checked save by growing education.

Bihar.—On further examination the Provincial Government have decided that a general enquiry to ascertain the extent to which actual cultivating classes are being expropriated by non-cultivators is not feasible. It is only by dealing with the facts of

every holding in a village that the extent and character of transfers can be ascertained. Such an investigation can only be made during settlement operations, when a complete record of transfers by sale or mortgage is prepared. If and when further revision settlements are carried out in this Province, Government will be prepared to make the enquiry. The only alternative would be to make a limited enquiry in selected areas. Under the revenue system of this Province, the Provincial Government have no staff for the purpose and they do not think that the limited results to be obtained from the special enquiry would be sufficiently reliable or sufficiently typical to warrant the expenditure necessary for a special staff. They have decided, therefore, not to make such an enquiry until revisional settlements are undertaken.

Orissa.—In the backward tracts expropriation of the hereditary class is already guarded against by law. The question arises only in connection with the plains. The Madras Government did not appear to have taken action in the area transferred to this Province. The Government of the Central Provinces and the Government of Bihar and Orissa considered that an enquiry in the ordinary way, save at the time of settlement operations, was not feasible except at an enormous cost. Therefore, they decided to postpone their enquiry into the matter till the next revisional settlement operations. This Government do not propose to undertake a general enquiry at present into the extent to which the hereditary cultivating class is being expropriated by those who do not themselves cultivate the land. This matter will be looked into, in those areas where settlement operations on a large scale may be undertaken in future.

United Provinces.—It was not found possible to undertake an inquiry on the subject.

78. Removal of difficulties in the way of landlords investing capital in their lands (paragraph 358).

Assam.—The problem does not apply to the temporarily-settled districts of the province, where large landlords are practically unknown, nor to most of the Sylhet district where the proprietors are in the main small cultivators. In the Goalpara district there have until recently been large areas of waste land and no question has yet arisen of introducing special measures to enable landlords to acquire home farms, nor has it been represented that the existing systems of tenure of tenancy laws deter landlords from investing capital in the improvement of their land. In the Goalpara Tenancy Act I of 1929, Assam Temporarily settled District Tenancy Act, 1935, and the Sylhet Tenancy Act, 1936, provision has been made to establish the rights of the landlord, as well as the tenant, to make improvements and to ensure the proper registration of the same.

Bihar.—The recommendations made in paragraph 358 are not, in the opinion of the Provincial Government, suitable to the conditions of Bihar. Owing to the extreme subdivision of proprietary rights, the majority of landlords are petty proprietors, in many cases, little bigger than ordinary raiyats and could not in any case afford to take up scientific farming. If more facilities for acquiring raiyati lands were given, there is a grave danger that the rights would be used for the expropriation of the cultivators without any real improvement in the standard of cultivation. As a general rule, only the big landlords could undertake scientific farming but very few of them do so and it would be unwise to legislate for this small minority.

Delhi.—No difficulties exist in the Delhi Province.

Madras.—The Estates Land (Amendment) Act (Act VIII of 1934) provides for the landholder entering into a contract with the ryot as follows:—

“Before executing any improvement, the landholder may, with the previous sanction of the Collector enter into a contract with the ryot for the payment of an additional rent in consideration of such improvement. On the improvement being effected, the landholder shall apply to the Collector for registration of the same, and the Collector after satisfying himself that the sanctioned improvement has been executed, shall register the same. On or after such registration and on the application of the landholder to enforce such contract, the Collector may pass an order granting such enhancement, not exceeding the additional rent mentioned in the contract, as is found by him to be reasonable”.

Orissa.—The tenancy laws of Central Provinces and Madras Governments, which are still in force in the transferred areas provide for the removal of the difficulties of landlords in the way of investing capital. But the Government of Bihar and Orissa to the view that if facilities were given to landlords for acquiring raiyati lands there was grave danger of the cultivators being expropriated. At the present time the condition of the landlords is so precarious that any landlord who invested large sums in his land would be regarded as a very imprudent man. It is, therefore, unprofitable to discuss this question at the moment.

United Provinces.—There are no particular difficulties in the way of landlords investing capital in their lands.

79. Working of Land Improvement Loans Act and Agriculturists' Loans Act (paragraphs 359 and 362).

Assam.—Experience shows that the Acts have worked satisfactorily in Assam. As regards land improvement, irrigation is not an important matter in Assam, which enjoys the benefit of copious rainfall, and there is no reason to think that landlords are not sufficiently acquainted with the facilities afforded by the Act. In fact loans under the Act are not extensive. The suggestion that part of the allotment under the Land Improvement Loans Act should be placed at the disposal of land mortgage banks was not supported for the time being by the Banking Enquiry Committee. There are now five such banks in the province. Government have not yet considered it necessary or advisable to make an allotment to them under the Land Improvement Loans Act, although certain Government loans have been given to strengthen their general position. Loans under the Agriculturists' Loans Act are issued freely when circumstances require them and are much appreciated. No serious defects have been experienced or reported in the working of the rules either under the Land Improvement Loans Act, or the Agriculturists' Loans Act, which were last revised in the years 1927 and 1929 respectively.

Bihar.—The recommendation that steps should be taken to make landlords better acquainted with the facilities offered by the Land Improvement Loans Act does not call for any action as the Provincial Government think that the facilities under the Act are already well known to landlords in Bihar.

Consideration of the recommendation that part of the allotment under the Land Improvement Loans Act should be placed at the disposal of land mortgage banks where these are firmly established, provided that steps are taken to ensure its utilisation on objects which fall within the scope of the Act, has been postponed until the policy with regard to the establishment of land mortgage banks has been settled. The Provincial Government do not consider that the co-operative societies in this province are at present suitable agencies for the general distribution of Government loans. But they agree that where loans given under the Agriculturists' Loans Act are remitted, similar clemency ought to be shown in the case of agriculturists' loans distributed through co-operative societies.

Bombay.—In the matter of remissions under the Agriculturists' Loans Act the same concessions which are extended to cultivators who are granted loans direct by Government are extended to co-operative societies and their members.

Coorg.—A statement showing loans granted, recovered or pending for recovery under L. I. L.* and A. L.† Acts during the years 1936-1937 is given below :—

				Loan granted.	Recovered.	Pending.
				Rs.	Rs.	Rs.
L. I. L.* ..	1936	..	..	31,613	5,424	26,189
	1937	..	..	40,145	5,604	34,541
	Total	..	..	71,758	11,028	60,730
A. L.† ..	1936	..	..	42,105	7,056	35,049
	1937	..	..	50,039	7,858	42,181
	Total	..	..	92,144	14,914	77,230

Delhi.—Both Acts are freely used, and their working is satisfactory.

Madras.—The Agriculturists' Loans Act has been amended by the Madras Act XVI of 1935 with a view to relieve the indebtedness of ryots in rural parts. The amended provision of the Act has been extended to selected areas in the following districts, viz., Chingleput, East Godavari, Kistna, Guntur, Kurnool, Anantapur, Salem, South Arcot, Coimbatore, Trichinopoly, Malabar and South Kanara. The Madras Debt Conciliation Act (Act XI of 1936) has been passed to facilitate the quick settlement and scaling down of debts under a simple procedure and in 1937 the Madras Debt Relief Act was passed to afford further relief to indebted agriculturists. These provisions are referred to further in the succeeding paragraphs.

The advances made under the Land Improvement Loans and Agriculturists Loans Acts during fasli 1345 (1935-36) and fasli 1346 amounted to Rs. 9,83,260 and Rs. 12,14,288 respectively.

Loans are also granted by the Industries department under the Land Improvement Loans Act on favourable terms to ryots for the installation of pumping plants where

*Land Improvement Loans Act.

†Agriculturists' Loans Act.

there are reasonable prospects of increased cultivation and for a return on the capital expenditure incurred. Fifty-eight loans to the value of Rs. 2,05,200 were sanctioned during 1936-37.

The suggestion that a portion of the allotment under the Land Improvement Loans Act should be placed at the disposal of Land Mortgage Banks was considered by Government but it was decided that the agency of these banks should not be used for distributing takkavi loans.

North-West Frontier Province.—The total demand including arrears on account of Taccavi advances under the two Acts, XIX of 1883 and XII of 1884, stood at Rs. 11,96,974 during the period under review. Of this Rs. 2,19,561 were realized, leaving a balance of Rs. 9,77,413 at the end of 1937.

The Districts showing the largest arrears are :—

	Rs.
Peshawar	5,35,400
Bannu	1,34,307
Dera Ismail Khan	2,01,493

The working of both the Acts in all Districts except Peshawar, is reported to have been satisfactory. In these Districts taccavi loans are greatly appreciated by cultivators, who utilize the same for the specific purposes for which they are granted. But in the Peshawar District the cultivators are still inclined to spend taccavi advances for purposes other than the real objects for which they have been intended. The result is that there are still heavy arrears which are partly due to the inappropriate expenditure and partly to the continued economic depression.

To remedy this evil in the Peshawar District precautions are being taken by adopting a scheme to ensure that fresh loans under Act XIX of 1883 are granted in two instalments instead of one. The second instalment is usually not granted until the first one is utilized for the declared purpose. Advances under Act XII of 1884 with respect to the purchase of seed and agricultural implements, etc., are granted to deserving individuals recommended by the Agricultural Department. This enables Government to control expenditure on specified objects.

Orissa.—The benefits of the loans advanced under the two Acts are well known to the tenants and landlords. Few people, however, come forward to take advantage of the land improvement loans. With regard to recommendation that a part of the allotment under the Land Improvement Loans Act should be placed at the disposal of Land Mortgage Banks no steps have yet been taken by this Government as Land Mortgage Banks are only just being founded in this province.

United Provinces.—The total amount paid out as takavi under the Agriculturists Loans Act, XII of 1884, during the years 1936 and 1937 was about Rs. 40 lakhs.

The advances for tube-wells and for the purchase of seed, bullocks, implements and machinery amounted to Rs. 4 lakhs. Advances were also given for purchasing bulls, cows and fertilizers.

80. Working of Usurious Loans Act (paragraphs 364-365).

Assam.—Hitherto it has not been considered necessary in Assam to undertake special legislation to deal with the question of rural indebtedness, as the grip of money-lender is believed to be not unduly severe. It was found in a district recently resettled that less than 1 per cent. of the total area of village land was held by traders or money-lenders, and that the practice of taking advances of money was considerably less common than it was 20 years before, a fact which indicates the improved position of the present farmer following directly upon a large increase in the sale prices of home-grown produce. Indebtedness undoubtedly exists and not infrequently means real distress, but it is held that the proper solution lies in the extension of co-operative credit societies, whose activities are being constantly extended. The Banking Enquiry Committee made certain local enquiries and found that the Act was sufficiently known and applied in practice in Assam. They did not recommend any amendment.

Bihar.—In view of the general impression that the Usurious Loans Act is a good and useful measure which has not had a fair trial, steps have been taken by the Patna High Court to have it enforced. The Provincial Government, therefore, deem it wiser to await results of this action taken by the High Court before concluding that it is necessary to embark on fresh legislation. The Patna High Court has accepted the proposal to include a special report on the working of the Usurious Loans Act in its annual reports on the administration of civil justice.

Bombay.—This Act has been little used chiefly for the following reasons, viz., (1) various means devised by money-lenders to evade it and (2) the existence of the Deccan Agriculturists' Relief Act. Another reason may be that it is not sufficiently known in certain areas. No action is proposed.

Central Provinces.—The working of the Usurious Loans Act has been very considerably affected by the Usurious Loans' Central Provinces (Amendment) Act (XI of 1934), the Central Provinces Reduction of Interest Act (XXXII of 1936) and the spreading of a network of Debt Conciliation Boards over the province. The number of cases in which the Act was applied appears to have fallen though complete statistics are not available. All District Judges, however, certify that the courts are fully alive to the provisions of the Act and apply its provision in all suitable cases. It is interesting to note that in four cases in the Nagpur district interest was reduced by Rs. 4,597, Rs. 2,593, Rs. 5,445 and Rs. 18,530. In the Jubbulpore division (Jubbulpore, Saugor and Mandla revenue districts) the provisions of the Act were applied in 1,129 cases and the interest claimed was reduced from Rs. 83,222 to Rs. 23,492. In Nimar the Court of the Second Subordinate Judge, 2nd Class, Burhanpur, reduced interest from Rs. 12,218-1-5 to Rs. 5,378.

The scope for the application of the Act has been considerably reduced by the Central Provinces Reduction of Interest Act. One District Judge considers that legislation for the relief of debtors has gone as far as possible and fears that shrewd moneylenders will resort to devices to circumvent the legislation. Difficulty is still reported in re-opening transactions when accounts are not forthcoming, but this is likely to disappear with the effect of the operation of the Central Provinces Moneylenders Act (XIII of 1934), as subsequently amended. Some District Judges report that the benefit of the Act cannot be measured by statistics since creditors reduce inordinate interest to a reasonable level before coming to court.

The period under report has been noticeable for the interest taken on the question of indebtedness and the steps, legislative and otherwise, taken to remedy this have brought the question into prominence. The more the question is brought to the notice of the public the greater is the benefit to the debtor class who in the past have not always been aware of the protection afforded them. The Provincial Government has no doubt that the courts are fully aware of the legislative efforts to protect the debtor class against extortionate interest and are applying the remedies supplied by the Debt Conciliation Act and other legislation on all suitable occasions.

Madras.—The High Court has issued a circular directing all civil courts to apply the Usurious Loans Act with greater regularity and precision in all proper cases including those in which the defendant is ex-parte. It has been made clear in the Madras Debtors' Protection (Amendment) Act, 1935 (Madras Act IV of 1936), that the provisions in the Act should not in any way fetter the discretion of the courts to enquire into the fairness of transactions under sections 3 and 4 of the Usurious Loans Act. By the Usurious Loans (Madras Amendment) Act, 1936 (Madras Act VIII of 1937), since passed, it has been made obligatory on courts to exercise the powers conferred by section 3 when circumstances justifying such exercise exist. The Act also makes it clear that relief shall be afforded if the transaction as between the parties was substantially unfair and that such unfairness shall be presumed if the rate of interest charged is found excessive, unless special circumstances justifying the high rate of interest are proved. Having regard to the fact that agriculturists in this Presidency are, as a class, unable to bear the burden of loans at compound interest, provision has been made in the Act that if compound interest is charged on loans advanced to agriculturists, such interest shall be presumed to be excessive.

Orissa.—During 1937 the Provincial Government contemplated the enactment of legislation on money-lending and the relief of agricultural indebtedness.

United Provinces.—The Usurious Loans (Amendment) Act has afforded some relief to debtors of all classes. Its provisions were often applied to claims before complaints were filed and as a result of this litigation was reduced. Relief under the Act was given in *ex parte* cases also and consequently it had some effect in checking usury.

81. Examination of case of Money Lenders' Act (paragraph 366).

Assam.—The old Assam Legislative Council passed the Assam Money Lenders' Act which became Assam Act no. IV of 1934. The Act was brought into force with effect from the 1st April 1935 and the people are taking full advantage of it. An amending Bill has been introduced in the Provincial Legislature by a private member to reduce further the rate of interest and to give relief to usufructuary mortgages.

Bihar.—For the reason stated in paragraph 80 above it has been decided to postpone the consideration of action on the lines of the Punjab Money-lenders' Bill and the British Money-lenders' Act of 1927.

Bombay.—The introduction of legislation on the lines of the Punjab Regulation of Accounts Act has been postponed till some experience has been gained of the working of the Act in the Punjab.

The question whether any action should be taken by Government to combat the Pathan money-lenders' menace has been considered by Government and a circular has been issued to all District Magistrates containing instructions for preventing oppression by Pathan money-lenders.

Madras.—The Madras Debtors' Protection Act, 1934 (Madras Act VII of 1935), which came into force from 15th January 1936 provides for the protection of small debtors who have borrowed loans below Rs. 500 and for the maintenance of proper accounts by creditors for that purpose. The Act has been amended by Madras Act IV of 1936 which provides for a maximum rate of simple interest of 9 per cent. per annum in the case of secured loans and of 15 per cent. per annum in the case of unsecured loans. The Act also provides that if in any suit or proceeding relating to a loan advanced after its commencement, it is found that the interest charged exceeds these rates, the court shall, until the contrary is proved, presume for the purposes of sections 3 and 4 of the Usurious Loans Act, 1918, that the interest charged is excessive and that the transaction was, as between the parties thereto, substantially unfair. Legislation for the regulation of money-lending and the business of pawn-brokers and for the licensing of money-lenders and pawn-brokers is at present under consideration.

United Provinces.—The Agriculturists' Relief Act, 1934, empowers the local Government to fix limits to the rate of interest chargeable to loans taken by agriculturists. It makes it incumbent on a creditor to maintain regular and correct accounts and to supply a copy thereof to each agriculturist debtor.

2. Examination of case for Rural Insolvency Act (paragraph 367).

Assam.—The Assam Debt Conciliation Act, 1936 (Act X of 1936) and Rules thereunder are now in operation in Assam.

Bihar.—The Provincial Government, after careful consideration of the opinions of the High Court, selected District Judges, Commissioners of Divisions and District Officers, who have been consulted, have decided not to introduce a Rural Insolvency Act.

Bombay.—The recommendation made by the Provincial Banking Enquiry Committee in paragraph 244 of its report regarding the enactment of a simple Rural Insolvency Act has been considered by Government in consultation with the High Court and other Judicial Officers. A majority of the Judicial Officers consulted do not support the recommendation, their main objections being :—

- (1) The Deccan Agriculturists' Relief Act gives sufficient protection to agriculturists against imprisonment and attachment or sale of their land; Chapter IV of the Act also provides for recourse to insolvency;
- (2) The agriculturists are generally averse to having recourse to insolvency proceedings;
- (3) The easy resort to insolvency proceedings might deprive the agriculturist of his land, which would pass into the hands of the money-lender and reduce him to the status of a daily labourer;
- (4) The credit of the agriculturists which is at present very low would be ruined altogether.

In spite of these objections, Government will support the proposal for such legislation should it be favoured by other provinces, if it is possible to devise an Act which would give the agriculturist the benefit of insolvency and yet preserve to him the possession of unencumbered land sufficient for his maintenance.

Delhi.—The Punjab Relief of Indebtedness Act, 1934, which was extended to Delhi in 1937 contains a provision (section 4) which assists the rural insolvent. This section is not yet in force in Delhi.

Madras.—In 1935 a Special Officer, W. R. S. Sathianathan, Esq., I.C.S., was appointed by Government to submit a report on the indebtedness of the agriculturists in this Presidency and he made recommendations similar to the provisions contained in clauses 21—26 of the Bengal Relief of Indebtedness Act, 1934, and in sections 3 and 4 of the Punjab Relief of Indebtedness Act, 1934. It was finally decided to undertake legislation on the lines of sections 3 and 4 of the Punjab Relief of Indebtedness Act, 1934. But as there was no time to introduce the Bill in the last Council, it was left over

for the Reformed Government to undertake legislation. This question was however held over pending decision on the more general question of rural debts. An Act has been since passed called the Madras Agriculturists' Relief Act, 1938—vide paragraph 67 above. The question whether legislation should be undertaken in regard to the amendment of the Provincial Insolvency Act on the lines of the Punjab Act will now be considered.

Orissa.—Please see remarks under item 80 above.

United Provinces.—A Rural Insolvency Act is not at present considered necessary in view of the Agriculturists' Relief Act.

83. Conciliation Bodies (paragraph 367)

Assam.—Please see remarks under item 82 above.

Bihar.—The Provincial Government have decided not to appoint any such Boards, as (i) they would have no authority, (ii) their influence might in some cases be diminished by the fact of their being Government nominees, and (iii) the villages can be trusted to choose the best available persons as *panches* or arbitrators. Government have, however, commended to all executive officers in the Province the encouragement of the settlement of claims by the intervention of persons who are influential and trusted.

Central Provinces.—The Debt Conciliation Boards at Mehkar, Kelapur, Yeotmal, Balaghat, Ramtek-Umrer, Patan-Sihora, Mandla, Saugor-Banda and Narsinghpur-Gadarwara have completed their work during the year under report. These boards conciliated debts aggregating Rs. 26.27 lakhs for Rs. 14.09 lakhs resulting in a remission of 46 per cent. of the demand. 3,025 certificates under section 15 (1) of the Act were issued for debts aggregating Rs. 28.69 lakhs. Twenty more boards were established during the period under report. Five of these have been financed out of the grant received from the Government of India for rural development and the rest from Provincial Revenues. There are now forty-three boards working at the end of 1937 and up to the end of that month these boards conciliated the debts for Rs. 760.28 lakhs for Rs. 390.28 lakhs resulting in a remission of 49 per cent. of the demand. Nine thousand, one hundred and fifty-seven certificates were issued for debts aggregating Rs. 89.83 lakhs.

Delhi.—The Punjab Relief of Indebtedness Act, 1934, was extended to Delhi in 1937. This Act gives power to appoint Debt Conciliation Boards and the power has been used (1938).

Madras.—The Madras Debt Conciliation Act, 1936, was brought into force on 1st January 1937. The Act applies to agriculturists whose debt exceeds Rs. 100 and provides for the establishment of a Debt Conciliation Board for any district or part of a district. The duty of the Debt Conciliation Boards is to reduce to writing the amicable settlement which may be arrived at between creditors and debtors who apply to them and if, in the opinion of a Board, any creditor refuses to accept a fair offer made by a debtor, it shall issue a certificate to that effect. Such a certificate debars a creditor from getting costs and more than 6 per cent. per annum simple interest from the date of such certificate on his loan. Under the Act, no creditor can be allowed, in full settlement of his claims, more than twice the amount of the original principal, and if the debt was incurred before 1st June 1933, then twice the amount due on such date. Debt Conciliation Boards have been established in six districts. The Madras Agriculturists' Relief Act, 1938 (Madras Act IV of 1938), was passed and brought into force from 22nd March 1938, to give relief to indebted agriculturists by (1) compulsorily scaling down their existing debts through ordinary civil courts, (2) reducing the rate of interest on their future debts and (3) writing-off arrears of rent due to zemindars, janmis and other landholders. This Act is also intended to ensure more satisfactory working of the Madras Debt Conciliation Act. For the purpose of scaling down, debts are classified into two categories, viz. :—

- (a) those incurred before 1st October 1932 ; and
- (b) those incurred on or after that date.

In the case of the former, all interest outstanding on 1st October 1937, is wiped out and only the principal or the unpaid portion of the principal will be due from the agriculturist. Where the agriculturist has paid twice the amount of the principal to his creditor by way of interest or principal or both, the entire debt (principal and interest) is wiped out. Where the repayments made exceed the principal but are less than twice the principal, only such amount as would be necessary to bring up the amounts repaid to twice the principal or such portion of the principal as is outstanding, whichever is less, need be paid. Where a debt has been renewed and a fresh document has been executed, only the principal originally advanced together with the sums subsequently advanced as *principal* will be regarded as principal for the purpose of these provisions. As regards debts incurred on or after 1st

October 1932, the principal or such portion thereof as may be outstanding is not affected by the Act and will have to be repaid. Relief is given only in respect of interest. Interest is calculated at 5 per cent. per annum simple interest. All payments made by the agriculturist towards interest are deducted from the interest as so calculated and only the balance, if any, will be due from the agriculturist.

United Provinces.—The question is under consideration.

84. Appointment of Official Receivers (paragraph 367).

Assam.—There is yet considerable difficulty in securing the assistance of suitable non-officials, and the official staffs are already short handed and fully occupied.

Bihar.—The Provincial Government agree with the High Court that official receivers will not pay their way at present and that if anything is to be done at the expense of the State the money could be better spent in other directions.

Bombay.—The proposal was considered but no action was deemed to be necessary.

United Provinces.—No particular difficulty is experienced in connexion with the appointment of receivers.

CHAPTER XIII.—Co-operation.

85. Enquiry into working of Co-operative Movement in Provinces other than the Central Provinces, the United Provinces and Madras (paragraph 373).

Enquiries are now under the consideration of Government.

Government are about to introduce a Bill to amend the Co-operative Societies Act, 1930, the provisions of which are designed to facilitate enforcement of the Act as laid down by the Committee.

In connection to the enquiry made by Mr. M. L. Darling, C.I.E., I.C.S., no such enquiry is made into the working of the co-operative movement by any Committee. The department, however, has recently completed an investigation into the financial position of the Central Banks and into the position of loans outstanding with debtor-members of Credit Societies, and has suggested measures of relief with a view to improving the position of the Credit movement.

Bihar.—A committee on co-operation was appointed in 1931-32. Its recommendations are being given effect to as funds and circumstances permit.

Bombay.—The Registrar of Co-operative Societies and Mr. V. L. Mehta, Managing Director of the Bombay Provincial Co-operative Bank were asked to hold an enquiry into the present position of the Co-operative movement and suggest lines for its future development. The suggestions made by them are under the consideration of the local Government.

Coorg.—The Co-operative Societies Act, 1936 (II of 1936), was passed and received the assent of the Governor General in Council.

North-West Frontier Province.—The number of societies which stood at 529 on the 31st July 1935 had risen to 692 by the 31st July 1937, the membership from 19,659 to 25,078 and the working capital from Rs. 21,05,622 to Rs. 23,98,671. 163 new societies were registered during the period under report.

Orissa.—The recommendations of the Committee on Co-operation appointed by the late Government of Bihar and Orissa were given effect to in this province as far as funds and circumstances permitted. Another comprehensive enquiry into the co-operative movement of this province is now being conducted under orders of the Provincial Government.

86. Building up of efficient co-operative staff (paragraph 374).

Assam.—Please see remarks under item 85 above.

Bengal.—Education upon the lines indicated is just commencing consequent upon the training of the departmental staff which is now in progress.

The staff has recently been strengthened by a substantial increase in the cadres of Assistant Registrars, Divisional Auditors, Inspectors and Auditors. The scheme for training every officer of the department was inaugurated in April 1937 ; all Inspectors have been trained in three courses of four months each, and the last of these has been completed ; the training of Auditors is about to commence.

Bihar.—A scheme of reorganisation of the Department came into effect from the 1st April 1936. The main feature of the scheme was the appointment of a subordinate

inspecting staff, consisting of 28 inspectors, to help the Assistant Registrars in inspection and test audit of primary societies. The creation of a close co-operative service and a common bank service is under examination.

Bombay.—Owing to financial stringency in the past, the staff had to be curtailed instead of being increased or properly trained. However, there have been some additions recently with the creation of two special posts of Assistant Registrars, one for the Land Mortgage Banks and the other for the scheme for Co-operative Training and Education subsidised from the Government of India grant. The Assistant Registrar for land mortgage banks is also doing duty as Personal Assistant to the Registrar. The post of the Special Assistant Registrar, Co-operative Education and Training, which was sanctioned only for a period of 18 months was abolished on the termination of the period. In addition, the superior staff of the department was increased by the appointment of one Deputy Registrar in April 1937, and one Special Auditor in May 1936.

The School for Co-operative Education and Training was conducted by the Special Assistant Registrar with the assistance of two Inspectors and four Assistant Inspectors. Four temporary posts of Agricultural Organisers were also sanctioned in connection with the scheme for organisation of co-operative societies for sugar manufacture subsidised from the Sugar Excise Fund from the Government of India.

Central Provinces.—The work of training the officials received an impetus from the scheme of education and training of the staff of the department and the co-operative institutions in the province. The scheme was financed out of the Government of India grant of Rs. 49,450 available for five and a half years. According to this scheme, Circle Auditors below seven years' standing and the whole of the field staff of co-operative organizations are being trained in their duties. Sixty-two classes for different grades of employees were conducted by the Educational Institute for Co-operative Societies at Bhopal. At these classes three hundred and fifty candidates were trained and a staff examination was held at the end. No person is employed in a co-operative institution unless he has obtained an efficiency certificate from the Central Board of the Divisional Institute.

Goorg.—The posts of three Inspectors and two non-official supervisors were created.

Delhi.—The staff employed in Delhi is supplied by the Punjab.

Madras.—Training classes for panchayatdars of societies were held by the Madras Provincial Co-operative Union and the District Federations (then in existence) till the beginning of the year 1937. From 1937 onwards, the classes are held under the auspices of the Provincial Co-operative Union in accordance with a scheme of training for panchayatdars and members of primary societies out of the subsidy given by the Government of India.

There were six training institutes in the mufassal for training of officials and non-officials. The training institutes continued to hold classes till June 1934, when the Government sanctioned the creation of the Central Co-operative Institute at Madras and the running of the peripatetic classes at two mufassal centres. The Central Co-operative Institute at Madras completed its second session in 1936 and the third session in May 1937. In all 148 candidates underwent the course.

Peripatetic institutes under the new scheme were started in 1937 at Anantapur for the northern districts and at Coimbatore for the southern districts. The candidates for training were selected in consultation with the central banks in the area of the institutes after they had undergone a preliminary training of two months. Forty candidates underwent training at each of these institutes for five months. The schools were in charge of Sub-Deputy Registrars deputed by the Government for the purpose, assisted by two instructors appointed by the Madras Provincial Co-operative Union.

Co-operative education received a great stimulus with the comprehensive scheme of training of officials and non-officials brought into force with the help of the Government of India grant. The scheme was put into operation in November 1936. Side by side with the regular classes in the institute, two courses of training classes for secretaries and managers of central and urban banks and for select Sub-Deputy Registrars were held during the period. The theoretical course was supplemented by visits to typical co-operative institutions in the city. Twenty-nine non-officials and seventeen officials so far underwent training.

A course of training in non-credit activities was also given by the Central Co-operative Institute. Two such courses were held during 1936 and 1937 at which twenty departmental inspectors and forty non-officials deputed by several co-operative institutions underwent training. These classes, each of which lasted for two months, were in the charge of a Deputy Registrar.

The refresher course for departmental inspectors was revived and conducted for a week in all districts in the months of January and July 1937. At these courses, many of the problems and difficulties that the inspectors meet within their daily work were discussed and lectures were delivered by leading co-operators.

The Government entrusted to the Provincial Co-operative Union the conduct of the classes for panchayatdars and members of co-operative societies outlined in the new scheme of co-operative training and education. The union prepared an exhaustive syllabus and under its aegis the training classes in all the districts in the Presidency were conducted in 1937. The classes were held at 523 centres and 21,436 panchayatdars and members of co-operative societies attended them.

Under the new scheme of training, candidates for the posts of junior inspectors are elected by the Madras Public Service Commission and their training commences after the selection and not before as heretofore.

North-West Frontier Province.—This province being, for co-operative purposes, under the guidance of the Registrar of the Punjab, its co-operative staff receives the same training as that of the Punjab. In addition an Educational Inspector has been appointed for the province out of the funds allotted by the Government of India for the purpose. The Educational Assistant Registrar appointed from the same funds for the Punjab is devoting part of his attention to the North-West Frontier Province. For this the Local Government pay Rs. 500 as cost of the share of the Educational Assistant Registrar annually. The staff's main objective is the improvement of the standard of co-operative education of the office-holders and members of Societies. During the period under report 48 Secretaries' classes attended by 723 persons and 41 office-holders' classes attended by 969 were held.

On the recommendation of the Co-operative Department in North-West Frontier Province, a scheme was sanctioned to form a link between Assistant Registrars and the Provincial Government in June 1937. The appointment of the staff has, however, been kept in abeyance pending report of the Co-operative Enquiry being conducted now.

Punjab.—The staff as a whole is well trained as the result of the systematic training given during the 22 years. The teaching of members is being systematically undertaken with the help of a special grant made by the Government of India in 1935. The grant which is to be spread over five years, has enabled the Punjab Government to appoint additional staff and this has led to a considerable extension of classes for Secretaries, Committee members and other members of primary societies. In order to stimulate interest and gauge the actual results attained, a system of attendance certificates and efficiency certificates was introduced. Two classes were also held for women at which subjects of domestic economy were taught.

Sind.—One Chief Propaganda Officer, with three District Propaganda Officers under him, has been appointed to give screen shows on the subject of co-operation. Government have recently sanctioned four additional posts of Sub-Auditors and one post of Office Superintendent.

United Provinces.—The co-operative staff is given adequate training and short refresher classes for supervisors and inspectors are held every year. In 1936 a special education inspector was appointed who gives special attention to the training of panches and secretaries of village societies.

87. Supervising Unions (paragraph 375).

Assam.—The Banking Enquiry Committee did not endorse the recommendation that supervision should be taken out of the hands of the central financing bank. The supervisors are, however, enabled to get the necessary training.

Bengal.—Federation of primary societies into supervising unions has not yet been tried in Bengal.

Government make an annual grant to the Provincial Co-operative Organisation Society, and the question of increasing this grant is under consideration.

Bihar.—The recommendation of the Bihar and Orissa Committee on Co-operation for separating the functions of banking and supervision or development, has not been given effect to for want of funds.

Bombay.—In this Province the system of supervising unions was introduced in 1924. For some years past, it was noticed that the condition of societies in their charge was deteriorating. A committee was appointed in 1933 to examine the system of supervision over societies in detail and to make recommendations for its improvement. The Committee found that the unsatisfactory working of the unions was due to the defects

in their constitution and working. On the recommendations of the committee, Government have issued orders for improving the constitution of the unions and the employment of a better qualified and better paid staff. The unions have been given wider powers to enforce their suggestions and recommendations on the societies. Under the orders now issued, the unions control the appointment of the secretaries of affiliated societies and can suspend, with the approval of the district boards of supervising unions, a committee of management of a society or a member of such a committee for a maximum period of 12 months. Improved scales of pay have been fixed for the supervisors under the unions and provision has been made for their leave salary and contributory provident fund. To ensure proper working and management of supervising unions, the creation of district boards of supervising unions in each district has been sanctioned. The district boards are to have definite constitution and powers. The entire control in the matter of recruitment, promotion and dismissal of the supervisors is vested in the district boards. The boards have been given powers of suspending with the approval of the Registrar the managing committees of supervising unions for a period of six months in the first instance and for a maximum period of one year in cases in which their orders are disregarded by such committees in spite of clear warnings.

The entire cost of supervising unions is financed from the following sources :—

- (a) Supervision fee paid by affiliated societies.
- (b) Contributions by central banks on their loan operations with societies.
- (c) Grants from Government out of the audit fee receipts.

District boards of supervising unions have been registered in almost all the districts. Separate supervising unions in place of the Banking Union and Taluka Development Associations have also been registered. The central financing agencies within their means have agreed to contribute to the supervision scheme. The success of the scheme will depend in a large measure upon the efficient and regular supervision and the diligent watch by the district board over the affairs of the societies affiliated to them.

Central Provinces.—The Institutes continued to control the field staff working in their areas.

Coorg.—The Supervision Board and the thirteen Unions have been functioning.

Madras.—In 1929 there were 448 supervising unions working in the Province. Owing to the continued economic depression and the consequent contraction of loan business in societies, some of the unions could not be self-supporting and a policy of liquidating wasteful unions was adopted and as a result there were 262 unions working in this Province on 30th June 1937. With very few exceptions, the unions had ceased to be autonomous bodies, their work being controlled and regulated by the central banks. The central bank in nearly all cases pools the supervision fund of the societies affiliated to it and exercises control over the expenditure and also over the supervisory staff.

There were 25 district federations in 1929. The supervision fund pooled by the federations was too small in a number of districts to meet the cost of supervision. The Government provided a sum of Rs. 15,000 in the budget for 1930-31 for granting subsidy to weaker federations. But the federations did not do much active work and there was a general feeling among co-operators that these institutions failed to justify their existence. The central banks have gradually taken over the functions of supervision of societies and the federations were liquidated gradually.

Orissa.—The Central Co-operative Banks in North Orissa continued to supervise the primary societies. In South Orissa (ex-Madras area) the local supervising unions do this work. But their activities are co-ordinated and controlled by Central Co-operative Banks. A uniform system of supervision of primary societies will be introduced as soon as the present Co-operative Enquiry is concluded.

Sind.—45 Supervising Unions and 7 District Boards of Supervising Unions have so far been registered. Their duties are to attend to the work of recoveries in addition to the routine duty of supervising the Society and training the members.

United Provinces.—The United Provinces Co-operative Union, which has been in existence for over nine years, has 59 out of 71 central co-operative banks affiliated to it. The Government contribution during each of the two years under report was about Rs. 72,000.

88. *Policy to be followed in selecting Registrars of Co-operative Societies (paragraph 376).*

Assam.—The recommendation has been fulfilled. The officer is, however, also Director of Industries.

Bengal.—The importance of this recommendation is recognised.

Effect is now being given to this recommendation to train selected junior officers to fit them for the post of Registrar.

The desirability of deputation to Europe is recognised, and it is proposed to give effect to it in due course.

Bihar.—The Registrar of Co-operative Societies visited the United Provinces and the Punjab during the year for the purpose of studying the working of the movement in these Provinces.

Bombay.—The question of training a junior civilian in the work of the Co-operative Department was considered by Government. No action was considered necessary as the lack of such training did not appear to have handicapped the officers who have held the post of Registrar so far. The proposal for the deputation of officers of the Co-operative Department to Europe to study the co-operative movement will be considered when the financial situation improves.

Madras.—Arrangement is in force in this Presidency for training of officers preliminary to their appointment as Registrar. They are attached to the department for about a year to study the working of the movement and its problems.

The Registrar was deputed to the Punjab in 1937 with a view to enable him to acquaint himself with the progress of the movement in that Province. The Government have also sanctioned in 1938 the deputation of four Deputy Registrars two to the Punjab and two to Bombay for acquainting themselves with the progress of the movement in those Provinces.

Orissa.—Since the creation of the province, the Registrar of Co-operative Societies, Bihar, continues to be the Ex-officio Registrar of North Orissa (ex-Bihar and Orissa area). The Registrar of Co-operative Societies, Madras, continued to be the Ex-officio Registrar of South Orissa (Ex-Madras area) till November 1937. The Director of Development has now been appointed Registrar of South Orissa. But the Registrar of Bihar continues to be the Registrar for North Orissa.

A Deputy Registrar has been appointed for the whole province and his tenure of office has been fixed at three years.

Sind.—The Registrar's post which was held by a Provincial Officer on the separation of the Province has from January 1938 been transferred to the I. C. S. cadre for one year in the first instance.

United Provinces.—An Indian Civil Service officer continued as full-time Registrar throughout the period with the exception of the last two months when he was on deputation as Cane Commissioner and the Deputy Registrar took over his duties in addition to his own. The present arrangement is that this officer is Cane Commissioner in addition to his duties as Registrar, and an additional Deputy Registrar is being provided who will be an Indian Civil Service officer of about nine years' service.

89. *Appointment of a whole-time Registrar in the Central Provinces (paragraph 376).*

No remarks have been received from the Provincial Government.

90. *Training of Co-operative Staff (paragraph 377).*

Assam.—Of the four Co-operative Inspectors who were deputed to the Punjab for training in 1935, two returned to Assam in March 1936 and the remaining two in 1937. They are now giving training to other Co-operative Inspectors, office bearers and members of societies.

Bengal.—In the winter of 1936-37, 12 officers of the department were deputed for a four months' course of training in the Punjab and Government have selected from among them the instructors to train the remainder of the staff in Bengal.

This recommendation is followed, but the supervisors deputed by financing banks are in many cases poorly qualified for their duties. It is, however, intended to take up their training after the training of the departmental staff has been completed.

Bihar.—With the funds available out of the Government of India's allotment for co-operative training and education, including the grant from the Provincial Revenues, a scheme for co-operative training and education was sanctioned by Government in 1935. According to the scheme a training institute for Assistant Registrars, Inspectors, Welfare Officers, etc., and for refresher classes for bank employees, has been established. The scheme also provides for two education inspectors, and 17 instructors for educating the office bearers and members of rural societies. The Institute trained 28 Inspectors, 4 Rural Welfare Officers, 4 Village Guides, 2 Education Inspectors, 17 Instructors 2 Managers, 5 Bank Clerks and 3 Inspecting Clerks. Besides 6 Assistant Registrars received short training and 17 auditors and 77 bank employees attended refresher courses. Fifty-four honorary workers were also given short training lasting for a week in three batches separately. The training institute is now located in a Government building at Pusa. The whole scheme of training is proposed to be revised.

Bombay.—A Board for conducting examination in co-operation and accountancy as a substitute for the G. D. C. A. examination consisting of the Registrar, as chairman, and five other members was created. The first examination under the revised regulation was held in April 1937.

The scheme for co-operative education and training which is subsidised by a grant from the Government of India has been devised to be worked in three stages as under :—

- (1) Training of Educational Inspectors and Assistant Inspectors.
- (2) Training of departmental staff, honorary organisers and officers of the central and urban banks and educational supervisors and
- (3) Training of union supervisors, secretaries and members of co-operative societies.

The training of Educational Inspectors and Assistant Inspectors was carried on by the Special Assistant Registrar with the assistance of some non-official experts and officials of other departments. The training of this staff was completed on 21st August 1936.

The second period of the training scheme which is expected to cover a period of about three years commenced from 22nd August 1936. Apart from regular lectures delivered in the classes, exchange of views and experience on the aspects of the movement amongst the staff under training and holding of weekly tests are noteworthy features of the scheme. The number of members of the departmental staff who were trained consisted of 13 auditors, 14 sub-auditors, 21 clerks and 3 agricultural organisers. The number of employees of central banks who received training was 14 and the number of managers and secretaries of urban banks who got training was 10. So far ten honorary organisers have availed themselves of the training provided in the class.

Central Provinces.—The educational staff of the department consisting of one Educational Inspector and three Assistant Educational Inspectors returned in March 1936 after receiving four months' training at Gurdaspur and for one month in other important places in the Punjab. They held training classes for (1) Circle Auditors, (2) Managers, (3) Society Auditors, (4) Group Officers, (5) Assistant Group Officers and (6) Accountants, in 1936 and 1937 for periods varying from one to three months. Instructions to the Circle Auditors were imparted in Rural Economics, Theory of Co-operation, Co-operative Law and Accounts, while to others they were confined to the last three subjects mainly. Out of the 350 candidates who underwent training at these classes 254 came out successful.

Coorg.—The first batch consisting of the head clerk of the office of the Registrar of Co-operative Societies and six subordinates of the Coorg Central Co-operative Bank underwent training in 1936 for one year at the Central Co-operative Institute, Madras. In 1937 two of the senior clerks of the Coorg Central Co-operative Bank were given practical training for two months at Coimbatore (Madras) in the routine working of co-operative banks. In addition to this, a course of training for three weeks at the end of 1937 was given in Coorg to Secretaries and employers of credit and store societies. These courses were well attended. The cost of all these courses of training was met out of a grant of Rs. 20,000 from the Government of India for co-operative training.

Delhi.—Delhi joins in the Punjab arrangements for the training, both of departmental staff and of members of societies.

Madras.—Co-operative inspectors most of whom are employed on audit duty are required to pass a test in Accountancy and Auditing in addition to possession of other qualifications. Instruction in auditing is one of the items of training given now at the Madras Central Co-operative Institute for junior inspectors before actual appointment.

North-West Frontier Province.—One Inspector and 6 Inspector candidates joined the Gurdaspur Inspector's class in the year 1936 and 3 Inspector candidates joined the said class in 1937. Nine Sub-Inspector candidates were sent to the Sub-Inspectors' class at Lalamusa and two consolidation Sub-Inspectors were sent to Swabi Tahsil for 3 months' training in practical work during the year under report. The consolidation staff also attended the Consolidation Refresher Course at Amritsar and both the Assistant Registrars attended the Assistant Registrars' Conference held at Lahore. Joint Refresher Courses were held at Kohat and Peshawar. In addition to the lectures given by the Assistant Registrars and Inspectors, lectures were also delivered by officials of other departments of Government. All the staff attending the course also had an opportunity to visit the Agricultural Farm at Tarnab. One Inspector studies Urban Co-operation in the Punjab for one month only.

Orissa.—A sum of Rs. 42,847 has been allotted by the Government of India for education of the Co-operative staff and members of co-operative societies in this province. A scheme of co-operative education and training has been drawn up which is under consideration of the Provincial Government.

Punjab.—Please see remarks under item 86 above.

Sind.—Extensive training of the departmental staff and Bank Inspectors has been given under the Co-operative Training and Education Scheme sanctioned and financed by the Government of India, and it is now being given to Union Supervisors and District Union Inspectors.

United Provinces.—Inspectors, auditors and supervisors receive training in practice and theory for a year and have to pass an examination before appointment.

91. *Government aid to specialised forms of co-operative activity (paragraph 378).*

Assam.—The recommendations are being followed. The two co-operative organization societies, which undertook propaganda for the dissemination of co-operative ideas and the encouragement of special societies, particularly for public health purposes, are continuing their activities. A grant of Rs. 1,000 to each of these societies has been given on several occasions.

Bengal.—An annual grant of Rs. 2,000 to Rs. 3,000 is made by Government to provide efficient clerical help to societies amongst backward classes.

A staff of 10 Inspectors and 10 Supervisors is maintained by Government for organisation and supervision of Co-operative Irrigation Societies. This class of societies has, however, experienced serious practical difficulties, and their progress has not been up to expectations. The reasons for this failure are under investigation and measures will be taken to revive them on a more practical and utilitarian basis.

Bihar.—A grant of Rs. 6,000 to Rs. 8,000 remained at the disposal of the Co-operative Department for organization and improvement of Weavers' Co-operative Societies. Supervisors were appointed during the years under report and there are one organiser and 6 supervisors. The supervisors have proved very useful for supervising the work of members of weavers' societies for the manufacture and supply of handloom cloths to the Bihar Cottage Industries, Gulzarbagh.

With the inauguration of the scheme for the organization and operation of cane-growers' co-operative societies, the cost of which is being met by the Government of India out of the Sugar Excise Duty, cane-growers' societies are becoming very popular and there is an ever increasing demand for fresh organization particularly in North Bihar where two Special Officers with a field staff of 8 organisers, continued to be in charge of the work. Thirteen supervisors were also temporarily appointed. In 1936, the number of cane-growers' societies was 123 which has increased to 214 in 1937. A more comprehensive scheme providing for the creation of three additional circles, each in charge of a Special Officer, is expected to be shortly sanctioned by Government.

Due attention is being paid to the organization of special types of societies and they are started where there is real need for them.

Bombay.—Grants are made to sale societies in their early stages to enable them to carry on propaganda. Grants are also made to cattle insurance societies and backward class societies.

In 1935, a scheme for the development of the handloom weaving industry to be financed out of the grant-in-aid given by the Government of India was sanctioned in accordance with which four District Industrial Associations were organised and registered under the Co-operative Societies Act with the object of obtaining improved appliances and raw materials to handloom weavers and also to advise weavers and others in regard to the production of improved and easily marketable patterns and designs, to undertake preparatory and finishing processes and dyeing and printing in connection with handloom industry.

Central Provinces.—There is only one society, viz., Central Provinces and Berar Weavers' Society, which is receiving Government aid in its activity to revive the handloom weaving industry.

Coorg.—The Government of India allotted a sum of Rs. 20,000 for advances to Crop, Loan, Sale and Supply Co-operative Societies in Coorg for the provision of storage accommodation and the usual allotment of the Coorg administration was increased from Rs. 7,000 in 1936 to Rs. 10,000 in 1937.

Delhi.—There is nothing special to report; the Delhi Administration contributes about Rs. 2,500 annually to the Delhi Audit Fund for the staff employed for supervision and audit.

Madras.—The Madras Government have willingly sanctioned staff and subsidy to develop specialized forms of co-operative activity wherever needed. To the Madras Provincial Marketing Society which started work in 1936, Government have sanctioned the services of Sub-Deputy Registrar, a senior inspector and a routine clerk free of cost.

and a cash subsidy of Rs. 2,800 per annum for a period of three years. To encourage sale societies to construct godowns, Government have been giving a free grant of 25 per cent. of the estimated cost of the godown. A sum of Rs. 49,149 has been given under this head to sale societies so far. They also sanction Government inspectors and subsidy to sale societies on the following basis :—

For bigger societies which have done a business of Rs. 75,000 and over, one inspector, provided his cost is paid by the society as follows :—

Twenty-five per cent. during the first two years,

Fifty per cent. during the next two years,

Seventy-five per cent. during the fifth and sixth year and full cost thereafter.

In the case of smaller societies which have done business of less than Rs. 75,000 a subsidy to meet the full cost of the non-official staff during the first year, 75 per cent. during the second year, 50 per cent. during the third year, 25 per cent. during the fourth year after which it will be withdrawn.

There is at present a special staff of 10 junior inspectors for supervision and development of loan and sale societies and these inspectors are employed to improve the business of select societies so that in course of time the societies may afford to have their own well-paid non-official staff.

The need for separate women organizers has been keenly felt in order to develop the co-operative movement among women as under the prevailing social conditions only women can freely and effectively do the propaganda. Two honorary organizers in the West Coast have been working for the past two years. A woman organizer for the Madras City has also been appointed in August 1937.

A portion of the excise duty levied on sugar which has for the last four years, been set apart by the Government of India for distribution among Provinces where white sugar is produced is made available to this Presidency for the purpose of assisting the organization and operation of co-operative societies among sugarcane growers to help them in securing fair prices and for other purposes directed towards the same end. A total sum of Rs. 1,31,000 has so far been allotted to Madras and the Madras Government sanctioned a scheme for utilizing the grant to help sugarcane growers. The scheme covers a period of five years and is intended to help unions and societies of sugarcane growers to do their work efficiently with the help of agricultural demonstrators and co-operative inspectors. Eight agricultural demonstrators, 16 maistries, 4 senior inspectors, 2 junior inspectors and 4 clerks have been sanctioned for the purpose. A sum of Rs. 17,495 has been set apart for payment of cash subsidies for purchase of implements.

So far Rs. 6,234 has been disbursed as cash subsidy.

Orissa.—A grant of Rs. 5,825 has been placed at the disposal of the Co-operative Department for organising Weavers' Co-operative Production Societies. One Organizer and two Supervisors have been appointed under the scheme and three societies are already working. More societies will be started as soon as the Provincial marketing organisation is set up.

Punjab.—The Punjab Co-operative Union receives a grant-in-aid from the Government every year. The Government have also sanctioned a loan of Rs. 40,000 for a house building society in Gurdaspur. The Mortgage Banks are now financed by the Provincial Bank.

United Provinces.—The following grants were given for special activities during the years 1936 and 1937 :—

	Rs.
(a) Ghee sale	4,692
(b) Rural reconstruction	7,853
(c) Adult schools	7,500
(d) Consolidation of holdings	2,099
Total	22,144

92. Government expenditure on education and audit (paragraph 378).

Assam.—In order to relieve the Inspectors for educative work, a proposal for a separate audit staff is now under the consideration of Government.

Bengal.—Statutory audit is paid for by societies, but up-to-date Government have not incurred any expenditure on the co-operative education of members of societies ; a scheme for this purpose is under consideration.

The concessions recommended are in force in Bengal.

Bihar.—Government have considered the question in the light of the recommendations made by the Bihar and Orissa Committee on Co-operation and agree that conditions in this Province do not justify the transfer of control over auditors to district audit unions of the type contemplated by the Indian Central Banking Enquiry Committee. They do not consider it necessary to alter the present audit arrangement. The question of transfer of the audit staff from the Co-operative Federation to Government is, however, under consideration.

Bombay.—The cost on account of audit of central banks, urban banks and urban societies with a working capital exceeding Rs. 50,000 and housing societies is met by recovery of audit fees levied from them. As regards the audit of other societies, an amount of Rs. 21,250 out of the audit fees recovered from agricultural credit societies every year is credited to Government to meet a part of the cost of audit staff provided for the audit of these societies and the balance is provided as subsidies to supervising unions. Grants are also made to the Provincial Co-operative Institute, other societies such as sale societies, backward class societies, supervising unions and insurance societies on account of education and propaganda.

Central Provinces.—In Berar, the audit of all co-operative societies continued to be carried out by the auditors of the department free of charge. The total cost to Government on the Co-operative Department aggregated Rs. 2,24,372 and Rs. 2,40,193 in the financial years 1935-36 and 1936-37, respectively. A grant of Rs. 24,000 was given to the institutes during each of these two years.

Coorg.—Owing to the limited resources of the Province the only assistance the administration could give was a subsidy of Rs. 3,400 in 1936-37 and a subsidy of Rs. 1,000 to the supervision Board attached to the Coorg Co-operative Central Bank for audit purposes. The annual audits are conducted free of cost.

Delhi.—See remarks against no. 91.

Orissa.—Since July 1937 the Provincial Government have taken over the Audit staff of the Bihar and Orissa Co-operative Federation who were hitherto doing the audit of Central Co-operative Banks and Societies in Orissa. The question of reduction of audit fees will be taken up after the report of present co-operative enquiry has been submitted to Government. The Provincial Government will of course bear the extra sum involved in the scheme of co-operative education and training besides the sum available from the Government of India's grant.

Punjab.—Please see remarks under item 86 above.

United Provinces.—As in previous years nearly half of the cost on both education and audit is met by Government. In 1936 a special education inspector was appointed for the training of office bearers and secretaries of co-operative societies.

93. Concessions to Co-operative Societies (paragraph 379).

Assam.—Remittance Transfer Receipts are already available at par for remittance between Societies.

Bengal.—Facilities for financial operations through District and Sub-divisional Treasuries are allowed.

Bihar.—An enquiry made from the Registrars of Co-operative Societies in other Provinces shows that Bihar enjoys all the concessions of importance which have been granted elsewhere.

Bombay.—The concession regarding the refund of 75 per cent. of the money-order commission paid on remittance between agricultural societies and their financing agencies is being extended from time to time.

Officers of the Land Mortgage Banks are allowed to inspect the documents in the sub-registry offices free of charge and the land valuation officers of the land mortgage banks are allowed to have free access to the registration records to collect statistics of sales and leases of lands within their areas.

The staff of the Special Recovery Officers which was recruited from the Revenue Department to give effective aid to co-operative societies in the matter of recovery of their dues, due under section 59 of the Bombay Co-operative Societies' Act (Act VII of 1925) was continued.

Central Provinces.—No further concessions have been given during the period under report.

Coorg.—Co-operative societies have been exempted from stamp duty and registration fees. Rule 211 of the Coorg Revenue Manual has been suitably amended.

Delhi.—All the concessions mentioned in paragraph 380 of the Commission's Report are enjoyed by the co-operative movement of this province.

Madras.—These concessions consist of not only certain facilities granted generally to all co-operative societies but also of certain special concessions provided for the working of special types of societies like land mortgage banks and societies now being formed for the consolidation of holdings.

Co-operative societies enjoy exemption of their profits from income-tax. It was not considered necessary to extend this exemption to the income from securities held by them. Till 1931 societies were exempt from payment of registration fees. As a measure of retrenchment this concession was curtailed in 1931 to payment of half the fees leviable under the law of registration and this exemption continues.

Another concession enjoyed by the societies for some time past is that for transfer of funds at par by means of remittance transfer receipts. The question of continuing this concession is under consideration.

Concession is also given in respect of payment of stamp duty payable by societies on sale certificates. This is now given by Government in the shape of a subsidy which is paid to small societies and is limited to the extent of loss sustained by them or the amount of stamp duty paid, whichever is less. In 1937 an allotment of Rs. 20,000 was sanctioned for payment of such subsidies to societies.

Land mortgage banks have, however, been allowed full concession in respect of registration fees till 1937. After this date the concession was reconsidered by Government and land mortgage banks are now eligible for the following concessions :—

Registration fees.—Same concessions as other societies.

Encumbrance certificates.—Loan applications of Rs. 2,000 and below are eligible for full exemption. Applications over this limit pay half fees, as ordinary societies, payable as on a single transaction irrespective of the number of owners revealed by the search provided the properties are situated in one district.

In order to facilitate the formation and working of consolidation societies, the Government have recently granted certain concessions to them as mentioned in paragraph 13 above extending to them free supply of village maps, settlement registers, etc. The question of the grant of exemption from registration fees is under consideration.

North-West Frontier Province.—The societies in this Province have been granted all the concessions mentioned in the Royal Commission's Report except that refund of Money Order Commission is given to the Societies at the rate of 50 per cent, instead of 75 per cent. and that the concession of free remittance by the Co-operative Societies through Government treasuries has been withdrawn. This withdrawal is most unfortunate as the movement in its infancy requires this particular concession not only as an encouragement but also as a safeguard against misuse or embezzlement of money, especially when post offices are only few in number and at very far off places.

Orissa.—The Provincial Government continues the concession of refunding to societies in North Orissa three-fourth of the commission on money orders when these are employed for remittances between societies. In South Orissa the Provincial Government have also allowed the concession of refunding to such societies as are working at a loss the amount spent by them for obtaining Sale Certificates.

Punjab.—The stamp duty payable in connection with mutation has been remitted on all mutations due to consolidation of holdings carried out by the Co-operative Department. This was done in July, 1930.

Sind.—The question of appointing a special Recovery Officer is under consideration.

United Provinces.—No fresh concessions were granted to co-operative societies during the two years under report. The facilities available at treasuries and sub-treasuries are availed of by co-operative societies in so far as they are required.

94. Attitude of officials to co-operative movement (paragraph 380).

Assam.—The recommendation is accepted and Government lose no opportunity to encourage district officers to interest themselves in the movement.

Bengal.—Officers of all departments co-operate fully with officers of the Co-operative Department.

Bihar.—Instructions have been issued by Government emphasising the need for co-ordination between the District Officers and the Co-operative Department and it is hoped that very fruitful results will be achieved with this co-operation and that the abuses which are known to exist will be eradicated.

Bombay.—Attitude of Government officials continues to be friendly.

Central Provinces.—Officers of the Agriculture and Veterinary Departments continue to take interest in the movement, but with a few exceptions, Revenue Officers do not take sufficient interest in the movement. Only seven societies were inspected by the Revenue Officers.

Coorg.—The attitude of the officials was one of hearty co-operation.

Delhi.—The attitude of Government officials continues to be sympathetic.

Orissa.—The officers of the Agricultural Department rendered such assistance to co-operative Societies as lay within their spheres of duty. Most of the Subdivisional Officers and District Officers in North Orissa continued to take active interest in the movement by associating themselves as Chairmen of the Central Co-operative Banks situated in their areas.

Punjab.—The Departments of Agriculture, Veterinary, Rural Reconstruction and Education have been of great help to the Co-operative movement. They give marked assistance in the supply of pure seeds to members of Credit and Better Farming Societies and in the selection of good animals for breeding societies. The programme of the activities of Better Living and Dehat Sudhar Societies has been carried on in close co-operation with the Commissioner, Rural Reconstruction. The Education Department helps in the formation and management of School Supply Societies.

United Provinces.—District officers and their staff help the co-operative movement. Officers of the Agriculture, Public Health, Education and Industries departments also co-operate and give help where necessary.

95. Land Mortgage Banks (paragraphs 381—384).

Assam.—The recommendations have been generally accepted, save that it is considered premature to issue improvement loans through these banks, two of which have received large loans. The banks have not yet reached the stage of issuing debentures.

Bengal.—In starting the five Land Mortgage Banks as an experimental measure, effect was given to the resolution of the Conference of Registrars in 1926.

These Land Mortgage Banks have been established under the provisions of the Co-operative Act.

Government have undertaken to guarantee the interest on debentures.

Government have not subscribed to any such debentures.

These Land Mortgage Banks have only been in existence for three years and they have not yet been used as an agency for the distribution of loans under the Land Improvement Loans Act.

The Collector is at present the Chairman of the Board of Directors of each Land Mortgage Bank.

Bihar.—Government sanctioned in 1936 the deputation of a Special Officer for a term of three months for making a special study of the working of the Land Mortgage Banks in the Provinces of Madras, Bombay, Bengal, United Provinces and the Punjab, and for reporting the possibilities of establishing such banks in this Province. The Special Officer completed his tours and work on the 8th October 1936 when he submitted his report to Government. The proposals contained in his report are under the consideration of Government. The creation of a Land Mortgage Bank will be considered after a scheme for the rehabilitation of the existing banks and unions is adopted.

Bombay.—Three land mortgage banks were started in 1928 and 1929 as an experiment and the services of a land valuer were lent to each of the three banks at Government expense; Government also purchased debentures worth Rs. 2 lakhs and sanctioned loans of Rs. 3 lakhs to the Bombay Provincial Co-operative Bank for financing land mortgage banks. As a result of the discussions at a Co-operative Round Table Conference held in 1933, a special committee was appointed to examine the question of extension of land mortgage banks and the Registrar was deputed to study the working of the banks in the Province of Madras in connection with the work of the Committee. As a result of the recommendations of the committee appointed, ten more land mortgage banks were registered at select places in 1935 and the Provincial Co-operative Land Mortgage Bank was also registered so as to serve as an apex bank for the primary land mortgage banks. The banks are assisted in the work of land valuation by land valuation officers who are lent hands of the department. The banks are subsidised annually for three years to the extent of Rs. 5,000 to meet a part of the cost of the land valuation officers and the leave and pension contribution on their account has also been foregone. An amount of Rs. 10,000 was sanctioned as subsidy to the Bombay Provincial Co-operative Land Mortgage Bank to meet the deficit in the cost of management of the Bank for the first year.

Government has agreed to guarantee principal and interest on the first issue of 20 lakhs of debentures floated by the Bombay Provincial Co-operative Land Mortgage Bank.

Central Provinces.—During the period under report five more land mortgage banks have been established in the province in addition to the 10 already mentioned in the last report. The Provincial Bank, Ltd., Nagpur, which acts as a Central Land Mortgage Bank for financing primary banks, floated the first series of debentures of the face value of rupees one lakh at 3½ per cent. in June 1936 and the second series at 3½ per cent. of the face value of rupees three lakhs in September 1937. Both the series were oversubscribed. The principal of, and interest on, these debentures have been guaranteed by the Provincial Government and these debentures have been recognized as Trustee Securities. The Central Provinces Land Mortgage Banks Act, I of 1937, was passed by the Provincial Legislative Council on the 29th July 1936 and brought into force from the 1st March 1937. The Act has also been brought into force in Berar with effect from the 15th March 1937. On the 31st December 1937 the balance of the loan of the Provincial Bank, Ltd., Nagpur, due from Primary land mortgage banks was Rs. 5,02,782, while the balance of the loan advanced to borrowers by primary land mortgage banks was Rs. 5,28,158. There is a separate Government establishment for looking after these land mortgage banks, consisting of one Assistant Registrar and ten Valuers, who are trained Circle Auditors and a small ministerial staff. The Provincial Government has sanctioned a grant of Rs. 3,532 during the financial year 1937-38 to enable the primary land mortgage banks to meet the deficit in the expenses that they had to incur in the first year of their working. Attempts are being made to develop the business of these banks, due regard being had to the safety of loans.

Coorg.—Necessary legislation is being considered.

Madras.—Land mortgage banks registered under the law of co-operative societies have been working in this Presidency since 1925 and have made a steady progress and now occupy a very important part in the scheme for redemption of agricultural indebtedness.

A Central Land Mortgage Bank was registered in Madras towards the end of 1929 for centralizing the issue of debentures for raising long-term money and financing the primary banks. A special enactment in the shape of the Madras Co-operative Land Mortgage Bank was passed in 1934 with a view to provide the necessary legal facilities for the working of land mortgage banks and the central bank in particular. The Provincial Government have guaranteed the principal and interest of the debentures of the Central Bank floated before and after the commencement of the Act. The Government guarantee of the debentures issued by the bank under the Act now runs up to a maximum face value of Rs. 150 lakhs. The debentures of the bank have also been included among trustee securities by amendment of the Indian Trusts Act in order to enable insurance companies and such other bodies as are interested in long-term investments to purchase the bank's debentures. These bonds are becoming increasingly popular so much so that there are now no debentures carrying more than 4 per cent. and loans are made available to the borrowing agriculturist at 6 per cent.

The Registrar of Co-operative Societies is an official member on the board of management of the Central Bank and is also a trustee on behalf of the debenture holders under the Act.

There are now 94 primary land mortgage banks and this type of credit bank is increasing in popularity and there is a growing demand for starting banks in new areas with the result that there is a steady expansion both in the number as well as in the activities of these banks. For work in connexion with these banks the Government have lent the services of 26 Sub-Deputy Registrars and 3 Deputy Registrars. The loan of the former staff continues to be free to the primary societies while the Central Land Mortgage Bank began to pay for the latter from 1934-35.

Orissa.—The Provincial Legislature has just passed the Land Mortgage Banks Bill and steps will now be taken to establish such a bank as soon as possible.

Punjab.—There are at present 11 Land Mortgage Banks. They are making very few new advances as they are merely concentrating on recovery. The question of their reorganization is receiving consideration.

Sind.—This is under consideration but it has hitherto been considered that the ordinary co-operative movement should first be put on sound foundations.

United Provinces.—The number of co-operative Land Mortgage Societies continued to be five without the addition of any new organization during the two years. The total working capital was Rs. 1,17,781 out of which Rs. 26,157 was owned. Loans advanced to individuals amounted to Rs. 27,420 during 1936 and 1937.

The societies worked at a profit and the overheads were small.

96. Single versus multiple purpose societies (paragraph 385).

Assam.—The conclusions are generally accepted.

Bengal.—Up-to-date the principle has been accepted that single purpose societies are preferable to multiple purpose societies.

Bihar.—Co-operative societies for a single purpose are given preference to multiple purpose societies.

Central Provinces.—At present no such societies have been organized. It has, however, been decided to establish ten such societies in the province, for which the Provincial Government has provisionally sanctioned a sum of Rs. 5,100 for the financial year 1938-39.

Coorg.—Attempts are being made to incorporate the bye-laws of non-credit societies in the bye-laws of credit societies.

Delhi.—Societies are generally established with a single purpose. Possible exceptions are the "Better Living" Societies, of which there are now five. These societies, if they are working properly, deal with a very large number of connected objects. They are, however, social rather than directly economic objects.

Madras.—The Royal Commission observed that single purpose societies have found general acceptance and that multi-purpose societies were nowhere advocated on grounds of policy. Of late, however, prominence has been given to the formation of multi-purpose societies as it is found that in order to promote thrift and repaying capacity and to secure an improvement in the general standard of living among members it is necessary to encourage in societies other activities than credit. The Reserve Bank, in one of its bulletins, has observed that the co-operative movement may give up dealing with members piecemeal and that with whatever apparent purpose a society is started, it must serve as a point of contact and gradually other purposes must be developed so that in due course it might serve all the needs of the members. It has accordingly been ordered that a few select societies should take up all activities conducive to better-farming, better-business and better-living. A multi-purpose society on a large scale has recently been started in Alamuru in East Godavari district. The society will function within a radius of 10 miles and cater to all the needs of the ryots besides mere supply of credit. The society arranges for the sale of members' produce and encourages the pursuit of subsidiary occupations by the members. It also has as its object the eradication of bad customs and wasteful expenditure, and the inculcation of the principles of thrift, mutual help and co-operative spirit among members. The possibilities of starting such societies elsewhere are under investigation and certain primary societies (on unlimited liability) which are working well have adopted bye-laws to facilitate multi-purpose activities. These societies differ from the Alamuru society in that the latter is a new society with limited liability and covers a large area.

Orissa.—The bye-laws of primary societies permit them to take up all sorts of activities with a view to all-round improvement of the members. Hitherto their activities were confined to credit only. As soon as the staff of Inspectors is appointed steps will be taken to induce the societies to take up other activities.

Punjab.—The Single Purpose Society is still the general rule.

Sind.—Efforts are being made to start a few societies of this type as an experimental measure.

United Provinces.—The recent tendency is to enforce provisions about better living and better farming tacked on to model bye-laws of credit primaries.

97. Encouragement of co-operative purchase and sale (paragraph 387).

Assam.—Sale societies have so far proved a failure. Until the organising staff has more training nothing can be hoped for in these times.

Bengal.—Sale and Purchase Societies are very few and small at present, but the value of the advice contained in recommendation 33 is fully recognized.

Bihar.—The Bihar and Orissa Committee on Co-operation recommended the starting of co-operative warehouses as a general scheme to improve marketing facilities. Government have endorsed the views of the Registrar that there is no prospect of success in this direction until a considerable advance has been made in educating the members of societies in co-operative principles and business methods.

Bombay.—There is a slow but steady increase in the number of purchase and sale societies. The availability of efficient staff and honorary workers continues to be the principal handicap in the development of agricultural non-credit societies especially societies for purchase and sale which require considerable initial propaganda.

Under the scheme subsidised by the Government of India from the Sugar Excise Fund societies for sugarcane growers on the canals have been organised during the last two years with the object of encouraging the cultivation of improved varieties of cane and for facilitating the supply of cane on collective basis to sugar factories and arrangements have been made to give subsidies to cane growers with a view to encourage cultivation of improved varieties of sugarcane.

Central Provinces.—Eight new agricultural associations which purchase implements and seeds for retail sale to members were registered.

Coorg.—Government is giving assistance to encourage co-operative purchase and sale.

Madras.—Loan and sale societies have been now in existence for many years. While there were 63 societies on 30th June 1929 and 51 on 30th June 1933, there were 111 on 30th June 1937. A provincial Marketing Society was also formed in October 1936 with the object of co-ordinating the activities not only of the various sale societies in the Presidency but also of co-operative stores by putting them in touch with the several centres of production and marketing. As stated in para. 91, the Government sanctioned free to the society the services of a Sub-Deputy Registrar, a senior inspector and a clerk besides a cash subsidy of Rs. 2,800 per year for three years. The Provincial Bank also sanctioned a subsidy of Rs. 3,000. The society deals in ghee, butter, potatoes, oranges, hand-pounded rice, tamarind and jaggery. A weekly bulletin is issued by the society showing the prices at which the chief primary products of the Presidency are sold in Madras and copies of it are communicated to departmental officers and sale societies.

The Government have also agreed to grant loans to sale societies at low rates of interest for the construction of godowns. Twenty-five per cent. of the estimated cost of the godowns constructed by such societies is treated as a free grant; provided the balance, viz., 75 per cent. is contributed by the society out of its funds or by way of loan taken from Government. The loans are repayable in 30 years. Simple interest at 3½ per cent. is payable during the first five years and thereafter the loan is repayable in 25 equated annual instalments. Government have so far sanctioned loans amounting to Rs. 40,000 in 1936-37 and Rs. 1,34,551 in 1937-38 to 18 sale societies. The free grant sanctioned up to date amounts to Rs. 49,149.

The main object of the sale societies is to eliminate the middlemen and to secure better prices for producers. This can be achieved only if the sale societies get a control over the produce. A scheme of controlled credit has accordingly been introduced to finance members under which the requirements are classified into three distinct heads:—

- (1) Loans for cultivation expenses.
- (2) Loans on standing crops.
- (3) Loans on the pledge of produce.

Loans for cultivation expenses are given by the village credit societies on condition that the borrower agrees to sell the produce through the panchayat of the loan and sale society to which the society is affiliated. Out of the sale-proceeds the loan amount is recovered. In the second stage the loan is given by the village society for payment of kist and for other similar urgent expenses. The loan is advanced on the security of standing crops. All loans given for cultivation expenses and on the pledge of standing crops are recovered at the following harvest. As far as possible these self-liquidating loans are advanced according to a forecast system prepared well in advance based on the number of acres proposed to be cultivated. Loans on the pledge of produce are also advanced when it is advantageous to hold up the produce for a better market.

This system of controlled credit has been tried in South Arcot, Salem and Coimbatore with success. The scheme is being extended to other districts such as Tanjore, Tinnevely and Chittoor.

In the Coimbatore district the Tiruppur Trading Society worked a scheme with the help of a grant from the Indian Central Cotton Committee and of staff from the Agricultural department over a period of five years from 1932—1937 for distribution of improved quality of cambodia seed (Co.2 strain). The society has now made its own arrangements for supplying good seeds to ryots for cultivation purposes and to get good kappas. The question of recruiting agricultural graduates as co-operative inspectors with a view to provide the necessary technical assistance to these societies is under consideration.

North-West Frontier Province.—In addition to the already registered sale society (Sheikh Mohammadi) the Frontier Egg Grading and Sale Association, Ltd., Peshawar, was started at Pabbi on the 1st January 1937 and worked on trial for about 6 months. As it proved a success and showed good results, it was registered on the 27th September 1937. The Association despatched 1,879,518 graded eggs costing Rs. 76,291 during the

period of 6 months from the 1st January 1937 to the 31st July 1937. In the preliminary stage, the Association was held by the Agricultural Marketing Department of the Government of India, which provided it with a sum of nearly Rs. 2,000. They supplied a Grading machine, a candling machine and cleaning machine to the Association free of cost. The Association approached the Railway Authorities through the Agricultural Marketing Department and got a concession of 1/3rd in railway freight.

Orissa.—Enquiries were made with a view to starting a Co-operative Turmeric Sale Society. It is also proposed to start paddy sale societies as soon as circumstances permit.

Sind.—The progress made has been somewhat discouraging but as it is realised that it is very necessary to develop this aspect of the movement specially after the Barrage, efforts are being made to select a few suitable centres for organisation of seed and sale societies.

United Provinces.—Co-operative marketing of cane, ghee and cotton has been dealt with against items 31 and 68.

98. *Expert advice to Co-operative Societies (paragraph 388).*

Assam.—This is being done in the case of milk societies, which are being organised under the supervision of the Live-stock section of the Agricultural Department.

Bengal.—No such proposal has yet been considered in Bengal.

Bihar.—The Co-operative Department gets all possible help from the Agricultural and the Civil Veterinary Departments. The Irrigation Department is always ready to examine irrigation projects and advise thereon, though at present it is not in a position to lend the services of an Irrigation Officer to irrigation societies.

Central Provinces.—No necessity of a special appointment for this purpose has been felt so far.

Delhi.—Expert advice is given when necessary by the Departments concerned. For instance, a Cattle Breeding Society can always secure the advice and help of a Veterinary Officer.

Punjab.—The help of the Agricultural, Public Health, Veterinary, Industries, Education and Rural Reconstruction Departments is always very readily put at the disposal of the Co-operative Department.

United Provinces.—The Director of the Imperial Institute for Sugar Technology and his staff have been helping co-operative societies with their advice when necessary.

99. *Appointment of agricultural officers to work under Registrars of Co-operative Societies (paragraph 388).*

Assam.—Such steps as are necessary to ensure co-ordination are being taken.

Bihar.—There is sufficient co-ordination between the Co-operative and Agricultural Departments and it is not necessary at present to appoint an officer of the Agricultural Department to serve under the Registrar of Co-operative Societies.

Bombay.—An agricultural organiser is working under each Assistant Registrar of Co-operative Societies for the organisation and supervision of non-credit societies.

Central Provinces.—Agricultural Assistants help to supervise Co-operative Agricultural Associations and Adat Shops and carry on general propaganda among the members of the societies.

Coorg.—The Agricultural Department is under the Deputy Director of Land Records and Agriculture, who is also the Registrar of Co-operative Societies. This department has been strengthened by the creation of a new post of an Agricultural Inspector and by raising the strength of the Agricultural Demonstrators to three. These officers instruct ryots in agricultural matters at the general body meetings and local conference of co-operative societies.

Delhi.—Nothing has been done. The connection between the Co-operative and Agricultural Departments is, however, very close.

Madras.—The services of a Deputy Director of Agriculture were placed at the disposal of the Registrar in 1931 in connexion with work in the cotton sale societies. This officer inspected all loan and sale societies and suggested ways and means for their improved working and also arranged for the distribution of improved cotton seed to the ryots. He had, however, to be withdrawn on 31st March 1932 as a measure of retrenchment. There is at present no agricultural officer attached to the Co-operative Department, but a Provincial Marketing Board has been formed in Madras of which the Registrar of Co-operative Societies is a member along with the Director of Agriculture and the Director of Industries. The Provincial Marketing Officer is Secretary.

to the Board and he helps the Provincial Marketing Society with technical information and advice.

Punjab.—The only Agricultural officers working under the Co-operative Department are the Mukaddams attached to the Better Farming Societies.

Sind.—This question has not yet been taken up.

United Provinces.—The cane control factory zone scheme which is financed from Sugar Excise Fund has brought the officers of the Agriculture Department in closer touch with those of the Co-operative Department. The factories participating in the scheme have been divided into two ranges each of which is under the control of a Cane Development Officer who is either a member of the United Provinces Agriculture Service or United Provinces Co-operative Service.

The work has recently been placed under the control of the Cane Commissioner, who is an Indian Civil Service officer and who was Registrar, Co-operative Societies. This officer will in future be both Registrar and Cane Commissioner.

100. *Encouragement of official and honorary workers to study co-operative developments in other Provinces (paragraph 389).*

Assam.—Conferences are occasionally held within the province and raise considerable interest.

Bengal.—Officials are occasionally deputed to study the movements in other provinces, but up-to-date Government have not given any assistance to non-officials for this purpose.

Bihar.—In 1936, the Registrar visited the United Provinces and the Punjab with a view to study the rural reconstruction programmes and the system of co-operative training and education in those Provinces. His visits were very brief but the information obtained by personal inspection and discussion with officers on the spot proved very valuable. The Registrar, Co-operative Societies, is hoping to undertake a similar tour when circumstances permit.

Bombay.—In the year 1935, the Registrar visited Madras to study the working of Land Mortgage Banks in that Province in connection with the work of the Committee appointed to consider the question of development of land mortgage banks. In December 1936, the Registrar attended the 12th Conference of Registrars held in Delhi and in February 1937, visited Punjab and Central Provinces where he was deputed as a member of the sub-committee on the Debt Conciliation Bill to study the working of the Debt Conciliation Boards in those Provinces.

Central Provinces.—No such visits were made during the period under report.

Coorg.—One of the Directors of the Co-operative Central Bank was permitted to attend the All-India Registrars' Conference held in Delhi in 1936 at Government cost. The Registrar of Co-operative Societies, Coorg, also attended.

The official and the non-official staff of the Co-operative Department are given facilities to study co-operative developments in the Madras Presidency and Mysore State with the aid of the grant of Rs. 20,000 made by the Government of India.

The Co-operative Central Bank permitted some of the Directors to attend the co-operative conferences held in Bangalore, Mysore and Madras.

Delhi.—Co-operative officials are naturally in direct touch with co-operative developments in the Punjab and during 1937, a party of 13 leading Delhi Co-operators was sent to study the work done by consolidation and cattle breeding societies in the Punjab.

Madras.—In the beginning of 1934, Government accorded permission to the Registrar to study the co-operative movement in the United Provinces and the Central Provinces. And again in 1937, the Registrar of Co-operative Societies was permitted by the Government to go on a study tour in the Punjab. As is stated in a previous paragraph the Government have recently sanctioned the deputation of some Deputy Registrars to Bombay and the Punjab during 1938-39 and succeeding years to study the working of the co-operative movement in those provinces. The expenditure will be met from the Government of India grant.

North-West Frontier Province.—See remarks under item No. 90.

Orissa.—The Deputy Registrar of Co-operative Societies attended the 12th Registrars' Conference held at New Delhi in December 1936. He also spent about three weeks in the Madras Presidency studying the co-operative movement there.

United Provinces.—The Registrar, Co-operative Societies, could not pay any visit to other provinces since 1935, but as Secretary to Registrars' Conference of 1936 he came in contact with leading co-operators of the country.

CHAPTER XIV.—The village.

101. *Medical Aid (paragraphs 401—404).*

Andamans.—(a) *Medical aid.*—Five dispensaries were maintained in outlying districts for the benefit of convict and "free" villagers and their families living in the vicinity.

(b) *Anti-malarial measures.*—Jungle undergrowth around convict stations near malarial areas was cleared.

Convicts at the various stations were examined before the monsoons set in, and those with enlarged spleens were given medical treatment.

In the malarial localities prophylactic quinine medication was continued.

Bamber oil or substitutes were issued free of cost as a mosquito repellant measure.

A Sub-Assistant Surgeon with a travelling dispensary visited all villages in rotation before and during the malarial season, distributing medicines and advising the villagers in the matter of prevention of sickness, water-borne and infectious diseases and village sanitation. Selected village Chaudhries and Chaukidars were given lectures in hygiene and sanitation and were provided with medicines for simple ailments among the villagers.

Sources of drinking water in the villages were periodically inspected and the water tested.

Vaccination.—All children and adults requiring it, were vaccinated with lymph vaccine. In 1936 and 1937, 542 and 485 vaccinations respectively were done.

Child Welfare and Maternity.—The majority of births took place in the Atalanta Point Female Hospital. In 1936 and 1937, 126 and 158 babies respectively were born there. The maternal mortality was 2 and nil respectively. In several cases the motor ambulance was used to bring expectant mothers to the hospital.

Assam.—A scheme for subsidizing medical practitioners in rural areas was introduced in December 1937. Provision has been made in this scheme for opening 27 subsidized dispensaries and if these prove successful it is hoped to extend the scheme if finances permit. The Public Health Department was strengthened during the period by the addition of two Epidemic Units.

Baluchistan.—Due to unusual Sanitary conditions which arose after the Earthquake, Quetta had two Medical Officers of health on deputation from the Punjab, instead of one Asstt. Health Officer prior to the Earthquake. One of them returned to the Punjab in August 1936 and the other continued to supervise the sanitation of Quetta city and the adjacent villages till the 30th September 1937.

Oriental sore broke out in severe epidemic form during the winter of 1935-36 due to the bites of sandflies after the Earthquake. An oriental sore investigation party was sent by the Government of India under Dr. Smith of the Pasteur Institute Kasauli in April 1936 for investigation and the party carried out research for four months. It was however impossible and impracticable to control sandfly breeding. The main consideration therefore was to try to reduce the number of human infections by successful treatment in various hospitals of as large a number of people as possible. A temporary dispensary was established for treating the infected population living in Nechari village, in the suburbs of Quetta. These operations proved useful to a large extent and at the close of the year 1937, the epidemic was reduced to a very appreciable degree.

Cholera broke out in Sind in the years 1936 and 1937. In order to keep off the disease from Baluchistan, an Inspection post was established at Mach and Quetta Railway Stations and new arrivals from the down countries as well as the residents of the Quetta city itself were inoculated. Compulsory vaccination was also carried out in and around Quetta and throughout the whole of the Province generally.

One more Sub-Assistant Surgeon was deputed to Karnal for special training in anti-malaria measures during April 1937.

Free Quinine was supplied to the Military authorities for distribution among the villages in the vicinity of the Quetta Cantonment.

Special supply of quinine was also distributed out of the Government of India's special supply, throughout the whole of the Province, through hospitals and dispensaries according to the needs of the various localities during the period under report.

Arrangements are being made to start very shortly 'visiting dispensaries' to afford medical aid to the inhabitants of rural areas who are living in the interior of villages away from the hospitals and dispensaries in the districts.

Bihar.—The district boards have been asked to adopt the scheme for subsidising medical practitioners in rural areas.

Bombay.—The question as to whether it should not be made obligatory on local bodies to provide an adequate sanitary staff in their areas and to place sufficient funds at the disposal of such staff is being considered in this Province.

The Government of Bombay has adopted the Scheme of giving monthly subsidy to qualified medical practitioners to induce them to settle in small towns or villages. Under this scheme each subsidised medical practitioner will ordinarily be in charge of three or four villages easily accessible by road or rail and he will be expected to visit them on definite days of the week. Four-fifths of the cost of maintaining a subsidised medical centre will be borne by Government and the rest will be met by the District Local Board concerned. Ayurvedic and Unani medical practitioners are also eligible for employment as subsidised medical practitioners, due regard being paid as far as possible to the wishes of the local population.

Central Provinces.—In the Medical Department there is no progress after the failure of the scheme for granting subsidies to provide medical practitioners for settling in important villages in the interior.

In 1936 there were thirty-seven travelling dispensaries and this number was raised to forty-three in 1937. The total number was as under :—

1936—Thirty-seven travelling dispensaries and seventeen leprosy dispensaries.

1937—Forty-three travelling dispensaries and eighteen leprosy dispensaries.

(1) The sub-assistant health officers in charge of the travelling dispensaries carried on health propaganda, afforded medical relief and inspected health condition, vaccination, school and the health of school children. They also checked the registration of vital statistics and generally looked after the sanitation of the villages they visited.

(2) The Leprosy Sub-Assistant Health Officers gave treatment for leprosy at twenty-one centres and forty-three sub-centres. They also treated other ailments in their circles and reported on their sanitation and vaccination. Special arrangements were also made to treat Yaws amongst aboriginal tribes.

Coorg.—The Public Health Unit formed in April 1937 has been doing a great deal of useful work in disseminating the principles of sanitary life in villages, by propaganda and lectures at Fairs, Cattle shows, school days, etc.

Delhi.—There are five dispensaries in the rural area and during 1937, the Government of India approved the addition of two to this number. The urban area is well-supplied with hospitals, which, as communications are improved will be increasingly used by village patients. A motor van equipped as a travelling dispensary and under the charge of a Sub-Assistant Surgeon has been purchased, and has done useful work.

On the Public Health side considerable progress has been made. During 1937, "Health Unit" was established at Najafgarh with the assistance of the Rockefeller Foundation. This Unit which is in the immediate charge of a qualified Medical Officer of Health, serves rather more than the Najafgarh Police Station Area, the population of the villages concerned being about 40,000. Under the Medical Officer of Health there are four "Centres" at each of which there are (a) a complete sanitary staff controlled by a Sanitary Inspector and (b) a Maternity and Child Welfare staff consisting of a Lady Health Visitor and two midwives. Outside the Health Unit area three small District Board Centres have been set up, and there are two other centres established and financed by a private Society. During 1937, the Government of India approved a complete scheme for the rural area which involves the employment of a much larger sanitary staff and on the welfare side a Lady Doctor, three Lady Health Visitors, and twelve midwives.

Madras.—With a view to bring medical relief within easy reach of the rural population in this Presidency, a scheme was inaugurated in 1924 for providing medical aid in rural areas by subsidizing private medical practitioners. The scheme has made appreciable progress and has increased in popularity. The total number of subsidized rural dispensaries was 419 and 394, respectively, during the calendar years 1936 and 1937 excluding dispensaries of Indian medicine which are run at the entire cost of local boards. The local bodies have taken a keen interest in the extension of medical relief in rural areas and there is still much scope for expansion.

North-West Frontier Province.—The fixed rural dispensary at Ghazi (Hazara District), mention of which was made in the last report, was formally opened for work on the 15th May 1936. One other fixed rural dispensary has also since been opened from the 1st December 1936 at village Amakhel (Dera Ismail Khan District) in a hired building. In addition to this the establishment of 3 more such dispensaries has been sanctioned by Government one each at Balakot and Sherwan (Hazara District), and Turangzai (Peshawar District). All these three dispensaries will shortly be opened in hired buildings.

As stated in last Report the scheme of subsidising private Medical Practitioners continues to work fairly satisfactorily and has since been extended to 8 more villages. It may be mentioned here that two out of the additional 2 subsidised dispensaries are self-supporting. The patients are charged a sum of one anna per prescription and the proceeds thus realized are utilized for obtaining necessary medicines and meeting the subsidy of the doctor in charge. In the case of another newly opened subsidised dispensary at village Toru (Mardan District) the Nawab of Toru meets the subsidy of the Doctors while Government supplies medicines worth Rs. 200 per annum.

The system whereby villages are placed in visiting medical charge of doctors attached to the nearest existing hospitals, has worked well.

The scheme of subsidising trained Dais in rural areas has been extended to 15 other selected villages. The scheme is working satisfactorily and it is hoped further extension will be made as funds permit.

An experiment has been made in extending the scheme of medical inspection of school children to rural areas which has so far been restricted to urban towns. Subsidised Medical Practitioners in seven selected villages have been given the medical charge of local schools on payment of a further subsidy of Rs. 10 per mensem each and work has since been started on the lines obtaining in town schools.

Apart from the free issue of quinine in rural areas as an anti-Malarial measure which is undertaken as usual, arrangements have also been made to issue quinine to the educational authorities for supply to the various schools in the Province both in urban and rural areas, for the use of school children.

An important step towards the check of the spread of tuberculosis in the province has been taken by establishing a provincial sanatorium at Dadar in the Hazara District, a site suitable for the purpose from all points of view. Building work has been started and it is hoped that the institution will be partially opened shortly.

The estimated cost of the scheme is—

Initial..... Rs. 2,10,000 (buildings Rs. 1,90,000 plus Rs. 20,000 for equipment).

Recurring..... Rs. 19,835 per annum.

The whole question of providing a cheaper form of medical aid in the rural areas where there are no medical facilities, is being considered.

Orissa.—In the ex-Madras area of the province the Madras district health scheme is in force. In the Agency areas of the districts of Ganjam and Koraput, the Civil Surgeons supervise the health organisation. All the subordinate public health staff belong to the Provincial cadre, except certain vaccinators in the Koraput Agency, who are paid from the local bodies fund. In the Ganjam plains there is a District Health Officer belonging to the Provincial Public Health cadre. The Health Inspectors under him are all Government servants but the vaccinators are District Board servants. In the North Orissa, the public health organisation scheme sanctioned by the late Government of Bihar and Orissa in 1924 is in force in the three important coastal districts of Cuttack, Puri and Balasore. The general scheme as outlined by Government is followed in each of the above three districts with certain modifications according to the local requirements and financial capability of the district. The Provincial Government contribute annually Rs. 10,000 to each District Board for these schemes. Each district board maintains a qualified Health Officer with the necessary subordinate public health staff, such as Assistant Health Officers, Health Inspectors, etc. In Sambalpur district there is no health organisation scheme, but there is a small nucleus of health staff appointed by the District Council, who work under the control of the Civil Surgeon of the district. The main duties of the district health staff are the investigation and control of communicable diseases in rural areas, supervision of vaccination, taking up preventive measures, education of the public through lectures, propaganda, etc., organisation of maternity and child welfare work, etc., etc.

It may be noted in this connection that the Madras health scheme which has been cited as model in the Report of the Royal Commission on Agriculture is in force in the Ganjam district. The public health rules and laws are complete under the Madras system and it is hoped that they will be gradually introduced in the rest of the province in course of time.

Village unions have been formed in several places in the province mainly through the local efforts of the villagers. The objects of such unions are to keep the villages clean, to enforce the public health bye-laws, and to look to the general welfare of the community.

The chief diseases which generally engage the attention of Government and the local bodies concerned are cholera, small-pox, malaria and leprosy. Cholera vaccine, and bacteriophage for cholera and vaccine lymph for small-pox were continued to be supplied

free to local bodies and all other institutions. It is under the consideration of Government to make vaccination compulsory throughout the whole province. A free supply of quinine out of the Government of India stock was made to all the district boards for distribution in the malaria affected areas. Small antimalarial schemes were called for from each district board for the consideration of Government and allotment of funds. An experiment on the effect of Paris green on rice cultivation was carried out at the Government Agricultural Farm, Khurda. The province had no separate officer for Malaria. In view of the large incidence of malaria cases in the province it was considered necessary to appoint a wholetime malaria officer for the province. Accordingly Government have accepted the proposal and arrangement is being made to appoint a malaria officer. Dr. Lowe of the British Empire Leprosy Relief Association visited the province during the latter part of the year 1936. He submitted a note embodying his suggestions for the treatment and prevention of leprosy in the province. During the close of the year a Provincial Branch of the British Empire Leprosy Relief Association was formed. A proposal for the appointment of a leprosy relief officer for the province has since been approved by Government and arrangement is being made for the appointment of the officer. An anti-leprosy scheme for the whole province was submitted to Government at the close of the year 1937.

At the close of the year 1937, Dr. I. Santra, the Propaganda Officer of the British Empire Leprosy Relief Association (Indian Council), visited the province and toured in all the districts for about two and half months, giving lectures, doing propaganda work by holding public meetings, inspecting leper clinics, carrying out leprosy survey in selected areas, holding classes of instructions for the medical officers of dispensaries, etc.

Provision of medical aid to school students.—Government maintain a staff consisting of one School Medical Officer of Assistant Surgeon class and one Assistant School Medical Officer of the L. M. P. grade for the medical inspection of all secondary schools as well as Middle English schools situated in close vicinity to the secondary schools. The medical inspection of Middle English and Middle Vernacular schools in rural areas is done by district board health staff and district board doctors.

Eight rural subsidised dispensaries were working in the Ganjam and Koraput districts during the years under report. Proposals submitted to Government during the same years for the establishment of similar dispensaries in North Orissa, have since been approved and orders have issued for the establishment of two allopathic dispensaries in each of the districts of Cuttack and Puri. It is also under the consideration of Government to subsidise Kaviraji practitioners.

In the coastal areas of the province, most of the villages which are subject to floods are cut off from the nearest dispensaries. To provide medical aid in such villages, the question of fitting up travelling dispensaries or floating dispensaries is under the consideration of Government. Moreover, the question of establishing dispensaries at several outlying places in the province was under the consideration of Government.

In 1937 a circular was issued by Director of Health and Prisons Services to all Civil Surgeons and Chairmen of district boards to instruct the medical officers in charge of rural dispensaries to take up the sanitation work of the villages situated within a radius of 2—3 miles of their dispensaries.

United Provinces.—The district health service was extended to four districts in 1936, making a total of 34 out of the 48 districts of the province. No extension was possible in 1937 owing to lack of funds.

The scheme of employing a resident public health official (vaccinator) for a group of villages was continued in the Gorakhpur District in an area of about 30 square miles.

The health unit scheme in Partabgarh continued during 1936 and 1937. The scheme was further re-organized during 1937 and brought into line with health unit principles as practised elsewhere. To judge the progress made, a survey was undertaken which showed that progress had been significant. The number of windows and ventilators increased by over 52 per cent. and that of parapet walls over drinking water-wells by over five times. The number of soakage pits, health societies and village dispensaries has similarly increased. Each village unit now has at least one improved type of well, a standard manure pit, an improved type of soakage pit, an improved cattle byre and some inexpensive windows and ventilators to serve as model.

The nine "modified" health units of which mention was made in the last report were abolished in 1936, in view of the Government of India's decision to apply the rural development grant (from which it was financed) on other types of work.

During 1936 and 1937, 69 new maternity centres were opened. In the Partabgarh Health Unit 67 per cent. of the total births were attended to by qualified midwives and all of these cases received visits from qualified health visitors before and after confinement.

Attention is paid to the training of indigenous *dais* but expansion in rural areas is slow for want of qualified workers. This situation is expected to be relieved to some extent by the opening of the Silver Jubilee Health School for which a sum of Rs. 1,00,000 has been provided out of the Silver Jubilee Fund. A further sum of Rs. 66,500 has been provided from the same fund for the establishment of local maternity and child welfare centres in certain towns.

Portable medicine chests were in great demand. These contain simple indigenous drugs of known therapeutic value most of which are easily available or can be prepared for use according to printed instructions supplied with each chest. School teachers or other literate officials available in villages are placed in charge of such chests.

Arrangements have also been made with St. John Ambulance Association, Public Health and Veterinary Departments for the delivery of lectures to patwari school candidates in "First Aid", hygiene and cattle diseases. Rules have also been incorporated in the Land Records Manual requiring patwaris to maintain prescribed quantities of permanganate of potash and of kaolin for use in the event of an outbreak of cholera and to give wide publicity to preventive measures through the distribution of pamphlets issued by the Public Health Department.

The number of societies in which village aid scheme was in force was 619, of trained village aiders was 2,426 and of *dais* working on approved lines was 1,467. The number of the medicine chests kept in societies was 1,467. Nearly 455,700 persons were supplied with medicines during 1936 and 1937. The number of members and their dependants vaccinated during the two years was nearly 106,000.

The operations of the Government Quinine Manufacturing Factory continued to expand. Efforts were made to extend the use of quinine in rural tracts and to make it available in as many villages as possible.

At the end of 1937 there were nearly 2,500 rural post offices which were selling quinine. Arrangements were also made for village postmen to sell the drug on their beats.

Owing to unprecedented flood in 1936, a portion of the 6,000 lbs. of quinine supplied by the Government of India in that year was released for free distribution in villages.

102. Improvement of water supply (paragraph 406).

Andamans.—The water level of the Diltaman Tank in Aberdeem which is the main source of water supply for the notified area including the bazaar, military police lines, the Cellular Jail and officials living in Aberdeem, was raised approximately three feet by the construction of a concrete wall on the existing bund. The storage capacity of this tank was thus increased by several million gallons.

The bund at Bamboo Flat tank was raised three feet by means of a concrete wall and extensive concreting was carried out on the inner facing of the bund in order to increase the capacity of the tank. The adjoining masonry settling tanks were provided with sand filter beds.

Natural springs near the villages of Port Mouat and Mithakhari were walled in with cement concrete.

Assam.—A considerable amount of work was done in the matter of improving the water-supply in the rural areas from the grant received from the Government of India for rural re-construction.

Bengal.—(a) Prior to the year 1937 the Government of Bengal made an annual grant of Rs. 2 to 2½ lakhs for the improvement of rural water-supply.

The grant for 1937 was increased to 3½ lakhs. The grant was equally distributed in the districts according to need.

(b) In 1929 Government introduced a rural water-supply loan scheme under which the district boards were invited to take loans for the improvement of water-supply at a concessional rate of interest. Loans to the extent of Rs. 2,60,000 were granted up to 1937.

(c) The number of union boards constituted under the Bengal Village Self-Government Act, 1919, rose to nearly 5,000 in 1937. Union boards have powers to undertake sanitary measures, including measures for the improvement of local water-supply.

Bihar.—Government have been making small annual grants to district boards for improvement of water-supply.

Bombay.—Prior to 1937 about a lakh of rupees every year was spent on giving grants-in-aid to local boards for village water-supply. In each of the years 1937-38 and 1938-39 a provision of Rs. 10 lakhs was made for providing wells, etc., in villages. A provision of Rs. 8.55 lakhs is similarly made in the budget estimates for 1939-40.

Prior to 1937-38 the local boards and villagers were required to find one-third of the cost of a well, the remaining two-thirds being provided by Government. Since 1937-38 however the entire expenditure is being borne by Government.

Central Provinces.—Liberal grants were made to district councils for improvement of water supply in rural areas out of the Government of India's grant for rural development.

Coorg.—With an increase in the number of public wells constructed out of Rural Development funds, there has been a tendency among villagers to sink more wells to provide themselves with better drinking water.

Delhi.—Waterworks have been constructed at Shahdra, a small town which is now almost a suburb of Delhi. In the villages extensive repairs to the superstructures of wells have been carried out from the rural development fund. The installation of tube wells as a possible substitute for open wells has also been undertaken experimentally in some villages. In all wells for the supply of drinking water regular periodical disinfection is carried out.

North-West Frontier Province.—Grants amounting to Rs. 51,219 from the Central Government's grants were given to certain district boards for this purpose and proposals for further grants to various district boards are being considered by Government.

Orissa.—The province of Orissa was created with effect from 1st April 1936. The report of progress covers the period from 1st April 1936 to 31st December 1937.

Cuttack district.—Tanks were excavated and wells sunk in suitable places. During melas temporary tube-wells were provided for and in important bazars tube-wells have been sunk.

A special water-supply scheme at a cost of Rs. 30,000 was drawn up by the Board. Rs. 10,000 was contributed by Government and Rs. 10,000 was promised by Tikayat Sailendra Narayan Bhanj Deo of Wanika. Several works in different police-stations of the district have been completed and it is expected that the whole scheme will be completed during the current financial year (1937-38). Over and above this, the District Board from its ordinary allotment also constructed some wells and tanks in addition to repairing the existing ones.

Rs. 5,435 and Rs. 8,766 respectively have been spent during the years 1936-37 and the first half year ending 30th September 1937. The total provision made for the improvement of water-supply in the Budget for 1937-38 is Rs. 32,006 for both special and ordinary schemes.

Puri.—Minor water-supply works in the shape of providing wells were done by the two local boards of the district and the major works, viz., excavation and re-excavation of tanks and sinking stone masonry wells were done by the District Board for the supply of drinking water in rural areas.

A sum of Rs. 12,081 was spent by the District Board over water-supply during the years under report. This sum includes the Government grant of Rs. 7,635 made during 1934-35.

A sum of Rs. 5,506 has been provided in the sanctioned Budget for the year 1937-38 for water-supply.

Balasore.—The chief sources of water-supply in the district are tanks, masonry wells and tube-wells. Tube-wells are being supplied in greater number by taking a nominal contribution from the villagers who are benefited thereby and excavation of tanks and shallow wells is discouraged. The total amount spent for the improvement of water-supply was Rs. 14,162 during 1936-37 and a provision of Rs. 5,500 has been made for the year 1937-38.

Sambalpur.—The District Council, Sambalpur, renovated and excavated 92 tanks and excavated 181 wells in the rural areas of the district for the supply of drinking water up to first April 1936. A sum of Rs. 3,000 was provided in the Budget for 1936-37 for the improvement of water-supply in the district and a sum of Rs. 2,168 was actually spent during that year. A sum of Rs. 6,887 has been provided in the Budget of 1937-38, for the improvement of water-supply which includes the unspent balance of the previous year.

Ganjam.—Prior to 1st April 1936, wells were dug in rural areas with the grants received from Government of Madras supplemented by funds from the District Board. The District Board has spent an amount of Rs. 4,128 during 1936-37 for the improvement of water-supply and a provision of Rs. 4,430 has been made for 1937-38.

Koraput.—The sources of water-supply in the district are hill streams, rivers, springs and wells. During the years under report 20 new wells were dug, 2 springs, 17 wells

and one tank were repaired and an approach road to the local *gedda* (spring) at Raya-gada was constructed all at a cost of Rs. 15,620. The above amount included grants from Government sanctioned in the previous financial year.

In the coastal areas of the province which are liable to inundation, the question of supply of good drinking water is somewhat difficult to solve. Tube-wells have been a failure in many places especially in Balasore district, as they yield brackish and saline water not suitable for drinking purposes. The district boards have been advised to excavate tanks in these areas only—which should be protected by proper fencing and by high embankments to prevent animals and the flood water entering them.

United Provinces.—No special societies for the improvement of water supply were formed. Masonry wells for drinking and household purposes were however constructed in a number of villages out of surplus balances of liquidated societies. Two thousand eight hundred wells were provided by co-operative societies with sanitary parapets and nearly 26,000 were disinfected or cleaned.

Under the rural development scheme 2,149 wells were bored, of these 1,960 proved successful; the percentage of success was 91.2.

103. Addition of fish to cultivators' diet (paragraph 415).

Assam.—Fish is already a favourite article of diet with most of the people of the province. There is no separate departmental staff, the fisheries being administered by the Revenue and Agricultural Departments. Special enquiries have from time to time been made and an officer was once trained for the purpose of development, but subsequently found other employment. The only important need in regard to the fisheries is a method of keeping them clear of water hyacinth economically, and no practicable method has yet been evolved.

Bihar.—Continued efforts were made to spread pisciculture in the Province. Before the separation of Orissa there were three centres for the distribution of carp fry, viz., one in Bihar at Patna and two in Orissa. In 1936-37 after the separation, a second centre on an experimental basis has been started at Ranchi. The distribution of fry from these two centres during the calendar years 1936 and 1937 was 272,100 and 161,000, respectively. The fall in distribution in 1937 was mainly due to abnormal rainfall at the Ranchi centre which damaged the rearing tanks and interfered with the fry distribution work.

To encourage the spread of pisciculture in rural areas, the Department gave a short course of training to a few inspecting clerks and kamdars of Central Co-operative Banks. It has undertaken further to give such training in future to the employees of the Co-operative Banks and youngmen who propose to take up pisciculture as a profession.

The Department also made some attempts to organise marketing of fish in those areas where there is a scarcity of fish.

Bombay.—The Government of Bombay has established a fisheries section under the Department of Industries since 1933 with a view to organise on a sound and systematic basis the fishing industry so as to augment the supply of fish, to increase the finances of the Province from its fisheries and to improve the economic position of the fishing community generally. A scheme for research into the food values of different varieties of edible fish found in Bombay waters is under the consideration of this Government.

Coorg.—The majority of the population of the Province are fish eating and during monsoon they get fish from their paddy fields, and during the rest of the year from streams, rivers and tanks. With the availability of quick bus services from the west coast, fresh sea-fish is now available in the principal towns.

Madras.—A scheme for propaganda in this direction in rural areas was formulated and sanctioned towards the close of 1929-30. The scheme had the following objects:—

- (1) To survey ponds, irrigation wells, etc., in the villages to determine their suitability for fish culture and to devise methods for improving their fisheries, and
- (2) to propound piscicultural methods and induce villagers to improve the fisheries of village ponds individually in the case of private wells or tanks, and on a co-operative basis in the case of communal ponds.

Sixty-three villages in Chingleput district were visited by the staff in 1930 and a total of 75 tanks, 38 ponds and 617 wells were surveyed. Of them two private wells and a pond belonging to the Chingleput Municipality were stocked before the end of 1930-31.

Owing to financial stringency, however, the staff had to be disbanded in 1931. The year's work, though only a few wells were stocked, was successful inasmuch as it awakened considerable interest in pisciculture among private individuals and public bodies. The work also revealed many gaps in our knowledge of the kinds of fish and methods of culture suitable for village ponds and wells. But a scheme for special investigations for propagating fish culture in rural areas has been drawn up and sent to the Imperial Council of Agricultural Research for a grant. The scheme was sanctioned by the Council in 1933 and is awaiting allotment of funds by the Council.

Orissa.—The distribution of carp fry was continued from two centres, namely, Cuttack and Sambalpur. The supply was 164,000 fry in 1936 and 187,500 in 1937.

To develop fish culture in tanks two fish culture demonstration parties, each consisting of one Fishery Assistant and four Rearingers were created as an experimental measure early in 1938.

Punjab.—Hitherto research work on fish in the Province has not yielded results of much economic value. Facilities available for research work are being increased and it is hoped that during the next few years the Agricultural Department will be in a position to improve matters in this respect.

United Provinces.—No special action was taken to induce cultivators to eat fish.

104. Research into problems of human nutrition (paragraph 417).

Assam.—The Government of Assam have neither the men nor the money to engage in an enquiry into nutrition.

Bihar.—A medical officer of the Public Health Department has been specially trained at Coonoor in nutrition work and a scheme for nutrition work in this Province has been drawn up and is under the consideration of Government.

Bombay.—Action will be taken when funds are available.

Central Provinces.—Owing to financial reasons it was not possible for the Public Health Department to provide funds for expanding the activities of the Public Health Institute. In 1937, a grant of Rs. 500 was paid to Dr. C. Wilson for carrying out Nutritional Survey in the Chhattisgarh division.

Coorg.—There has not been any research in the fields of human nutrition during the years under review. Steps, however, are being taken in the current year.

Delhi.—In 1936, a dietary survey was made. In addition a nutritional survey has been carried out among school children in the Najafgarh Health Unit area, by a field worker trained at the Coonoor Institute.

Orissa.—The question of the problem of human nutrition in the province has not been taken up yet, in any appreciable form. Although a proposal to appoint a Nutrition Officer has been submitted to Government, this has not been taken up mainly for want of funds. Leaflets, etc., on food and diet were distributed through the Public Health staff. An officer of the Public Health Department has, however, been trained in nutrition survey at the Nutrition Research Laboratory, Coonoor, and another officer, the Health Officer of Cuttack District Board, is at the present moment undergoing a similar nutrition training at Coonoor, and it is hoped that with the improvement of the finances of the province the Provincial Government will be able to take up this question in greater detail.

Early in January 1938, a nutrition survey was carried out by Dr. Wilson of the Royal Society, Nutrition Research, London, and her assistant Dr. Narindra Singh, in certain rural areas of the districts of Cuttack and Puri and also in the municipalities of Cuttack and Puri. The provincial Government contributed a sum of Rs. 500 for the incidental expenses connected with the investigation.

United Provinces.—The Public Health Department issued a large number of pamphlets on "our food in villages".

An officer of the Public Health Department was deputed to Coonoor for three months for studying questions connected with human nutrition, in order to enable him to undertake a survey on the nutritional habits of the people, but for lack of funds no survey could be undertaken.

105. Co-operative effort to improve amenities of village life with special reference to uplift campaigns and rural community movements (paragraphs 421—424 and 429).

Assam.—The problem of Rural Reconstruction has received a very close attention of Government and a scheme is now under consideration.

Bengal.—The importance of adopting co-operative measures to improve the amenities of village life is being realised by the people. Uplift campaigns and rural community movements were set on foot in some villages. Rural uplift associations were formed to improve sanitation, to destroy water-hyacinth, to prevent malaria and to take other measures to make village life healthier and more attractive. In some districts, the substantial grants available from the rural uplift fund were utilised in providing village libraries, playing fields for rural schools and facilities for practical training in Agriculture. Encouragement was also given to physical culture societies which revealed a better record of work than in former years.

Bihar.—The Bihar Village Welfare scheme was put into operation from 2nd November 1936, in four selected centres, one in each division. The sanctioned staff at each centre consists of one Rural Welfare Officer, one Village Guide, one Agricultural Kamdar and one Dai. The Rural Welfare Officers and the Village Guides had to be previously trained at the Co-operative Training Institute for about six months before the work at the centres could be started while the Department was able to get 4 trained Kamdars for the centres. Difficulty has been experienced in getting suitable persons for appointment as Dais for maternity work with the result that the post of Dai at one centre is still vacant. The scheme contemplates an intensive programme of rural reconstruction at selected centres by setting up a few village organisations on co-operative lines capable of developing in course of time. The programme of work includes, among other things, the introduction of improved methods of agriculture, encouragement of cottage industries, betterment of village sanitation, provision for good drinking water, expansion of primary education and introduction of social amenities like village sports, reading rooms, etc.

Bombay.—In the South Central Division, the Deccan Agricultural Association, Poona, has taken up the question of rural uplift at Khed-Shivapur, a village 16 miles from Poona on the Poona-Satara road. The work has been concentrated in a group of 14 villages. The Agricultural Department is giving its full co-operation in the scheme of rural uplift. During the last four years, however, there is a special movement of rural uplift throughout the province of Bombay. Substantial progress has been made in organizing village uplift centres in all the districts. The staff of the department and the Taluka Development Associations are taking advantage of the village uplift organisations and seed and implement supply, land development and crop protection work is being done.

Central Provinces.—The rural uplift scheme at Piparia in the Sohagpur tahsil of the Hoshangabad district has been extended up to the 28th February 1938. Uplift activities have been undertaken in all the districts of the province.

Coorg.—Two better living societies have been started at Koodige and Napoklu and have been doing useful work in improving the amenities of village life and social reforms with the object of reducing the expenditure incurred on ceremonial occasions.

Delhi.—Some improvements have been effected through a "Central Village Welfare Board" which has performed some of the functions of a Rural Community Council. At present, however, little spontaneous effort by the villages can be observed. With the strengthening of the Public Health Department (see No. 101 above) more rapid progress may be expected. Consolidation, coupled with agricultural and health improvements, must be the foundation of any programme.

Madras.—There are no rural reconstruction societies as such in this Presidency but efforts are made by the department through the auspices of co-operators to do such work. Recently better-living societies are being started by the Co-operative department to improve rural life, a few of which first came into existence in 1935. The main objects of these societies are to reform bad customs prevalent among members, to prevent extravagant expenditure on ceremonial and festive occasions, to inculcate habits of thrift, to provide educational assistance to members' children, to improve rural sanitation, etc. At the end of the co-operative year 1936-37, there were 32 societies of which some did useful work. One society in East Godavari conducted a night school for its adult members and a day school for the children of members. A society in Tinnevely deputed one of its directors to every religious ceremony performed by its members to see that they did not spend more than the amount fixed by the general body for the occasion. In Chingleput, the settlement of a civil dispute was effected by a society. One society in Madras City assigned house-sites to its members on condition that they conformed to the rules and regulations laid down by the society for better living. These societies are new to this Province and are slowly establishing themselves.

The officers of the Co-operative department were also of assistance to District Economic Councils, which were in existence till October 1937, in promoting rural recon-

struction activities in the districts. Several of the model villages chosen for reconstruction work were those where co-operative societies had already been working with some success and the members of these societies were ready to co-operate in all schemes of rural uplift.

The Agricultural department has also lent its part in this work. In the scheme of intensified rural development work at Tiruvellore initiated in 1933 under the general control of the Director of Public Health, two agricultural demonstrators assisted in agricultural propaganda and economic survey. Similarly in the general activities of Rural Reconstruction organized by the Young Men's Christian Association and other bodies, the Agricultural department played its fullest part. Rural reconstruction was also taken up in Velacheri village in the Chingleput district and the department contributed its share to improve the condition of that village.

North-West Frontier Province.—Special attention was paid to the uplift of villages. Every official of the Department advocated the use of good seed, the digging of pits for manures and spread of sanitation, education and new scientific implements. Success has also been achieved in sending girls to the boys' schools for education. Quinine was also distributed through the staff to members of societies whenever need arose, and nets have been supplied to Sub-Inspectors for demonstration as safeguard against Malaria.

Two drama parties gave shows during the year under report. The Punjab Co-operative Players gave shows at 5 places and the Mardan Rovers Scout party gave shows at 6 places. These shows were well received and had good effect. The expenses were met by this Department from the propaganda fund. Three Agricultural shows were also held in the Southern Circle and were found very useful.

Orissa.—An experimental village welfare centre has been opened in village Dersardeuli in district Cuttack. There are four villages under the centre where welfare work is being carried on. The staff consists of a Welfare Officer in charge of the centre, a guide (Teacher), a Kamdar and a midwife who is paid a retaining fee. The scheme is being financed from an allotment of the Government of India grant for rural reconstruction.

Sind.—Three trained District Propaganda Officers and one Chief Propaganda Officer have been appointed by the Sind Provincial Co-operative Institute.

United Provinces.—Progress towards increasing the amenities of village life was maintained. The number of primary societies working exclusively for village welfare increased to 482. In addition to this a large number of credit societies carried on propaganda among its members for healthier living, for less litigation, and for the curtailment of expenditure on ceremonials. Two thousand eight hundred societies had physical culture clubs and 4,000 members were trained as scouts. The number of schools which are mainly attended by members or their children was 255.

Two thousand five hundred and twenty-three dispensaries were opened in villages and 1,467 *dais* were trained. The number of villages in which manure was stored in pits outside the *abadi* was 2,653. The number of Meston ploughs in use was 5,000 and three roller sugar mills 10,678. Chemical manure was used in 16,622 acres.

The Forest Department co-operated in the uplift campaign of the Rural Development Department. The Forest Development Officer gave lectures at the camps of village organizers and prepared and issued a small vernacular pamphlet for the use of village organizers.

The number of Junior Red Cross groups rose from 3,057 in 1935 to 5,025 in 1937 and the membership from 83,391 to over 110,000. Over 94 per cent. of these groups are in rural schools. Members of these groups undertook elementary anti-epidemic measures like disinfection, minor anti-malarial measures like oiling of pools, and distribution of quinine, and persuaded people to submit to vaccination or inoculation against plague or cholera.

A scheme for rural development has been brought into force in all the districts of the province with the object of improving the health, wealth and happiness of rural population. The rural health staff actively co-operated with the rural development organizations, the programme of health work in these areas consisted of the supply of the medicine chests, the construction of manure pits, soakage pits, bathing platforms or sheds, latrines, improvement of cattle sheds, opening of ventilators in houses, training of indigenous *dais*, recording of vital statistics and formation of village sanitary committees. Funds were also placed at the disposal of district officers for the improvement of seed supply, village communications and water-supply, with active assistance of villagers. The work was in the first instance confined to six centres in each district, each centre comprising 12 villages. There was one organizer for each centre and one inspector for one district.

106. Assistance from universities in work of rural development (paragraph 426).

Assam.—There is no University in the province.

Bombay.—There is an increasing number of theses being offered on agricultural and rural subjects by the students of the Bombay University School of Economics and Sociology. The optional subject of agricultural economics attracts a fairly large number of men in the final year of their course in the Poona College of Agriculture.

Delhi.—University students are generally more interested in politics than in social work, and have done no social work to speak of in the Delhi villages.

United Provinces.—University students do not appear to find the time required for continuous work in connexion with rural development. Occasional visits leave behind no lasting impression.

107. Establishment of Bureaux of Rural Economic Research (paragraph 427).

Assam.—The question of agricultural survey has now been taken up by the Government.

Bihar.—Establishment of such a Bureau will involve substantial expenditure and a serious start cannot be made with less than Rs. 25,000 a year. Desirable as it is to get accurate information as to the economic condition of the people of the Province, it is more urgent to take those measures which will help to raise their economic condition. The recommendation has, therefore, been reserved for future consideration.

Bombay.—No action has as yet been taken.

Punjab.—The Board of Economic Enquiry continues its valuable enquiries and publications.

United Provinces.—There is a bureau of Statistics attached to the Board of Economic Inquiry which can undertake the investigation of problems relating to rural economic research also.

108. Settlement of village disputes by local arbitrators (paragraph 431).

Assam.—The intention of the Rural Self-Government Act, 1926, is that, when the Village Authorities are established, village courts and benches,—not necessarily composed of members of the Village Authority—should be set up wherever local conditions permit. The courts and benches set up hitherto under the Bengal Village Self-Government Act have evoked considerable enthusiasm and in many cases have done useful work. Government have, therefore, not considered alternative methods such as the promotion of arbitration societies. Sporadic efforts in this direction have been made by the Congress.

Bihar.—A Village Administration Act under which panchayats can be appointed with powers to decide minor criminal and civil cases is already in force in Bihar and experiments under it are being tried. It will probably be more widely extended as the education of the village in Local Self-Government advances. Some revenue officers are under special training for supervising this measure.

A proposal for the establishment of panchayat courts in larger numbers in the Province is at present under the consideration of Government.

Central Provinces.—The post of the Village Panchayat Officer is still being continued and a provision of Rs. 6,000 in 1936 and Rs. 4,000 in 1937 was made in the budgets of these years for making contributions to village panchayats for initial expenditure.

Orissa.—During 1936 there were 18 village munsiffs and 40 village panchayat courts in the district of Ganjam. The number of cases pending with the panchayat courts of taluks Berhampur, Parlakimedi and Ghumsur was heavy. The Panchayat Courts of Konnaipur, Purusottapur and Konchuru of Chutrapur Division are reported to have been not functioning properly due to party feeling and lack of interest in the members. The work of the village courts was, however, generally satisfactory.

In 1937 the Panchayat Court at Konchuru in Chatrapur taluk was abolished, thus bringing down the number of Panchayat Courts in the district from 40 to 39. The number of cases pending with the Village courts of Berhampur, Parlakimedi and Ghumsur taluks was heavy. There was a fall in the number of cases received and disposed of by the Panchayat Courts during the year which may be in some measure due to the economic depression among the people. There have been fewer disposals during the year and in the majority of cases, the disposal has been greatly delayed generally due to the apathy and indifference of the members. The Panchayat Courts at Polsora in Kndala taluk and at LszehL

Kaviti Kaspā and Haddubhangi in Parlakimedi Taluk were reported to have worked satisfactorily. There is considerable scope for improvement in the work of the remaining Panchayat Courts. The work of the village courts on the whole cannot be regarded with satisfaction.

United Provinces.—No separate societies were formed for this purpose but the panchayats of many co-operative credit societies helped in the settlement of village disputes through formal or informal arbitration.

At the end of 1937, the total number of village panchayats was 4,853 as against 5,043 in 1928-29. In 1936, 84 panchayats were granted enhanced powers and in 1937 such powers were conferred on 87 panchayats.

The law relating to local bodies including village panchayats is under revision at present.

CHAPTER XV.—Education.

108-A. Primary Education and the attainment of literacy by the general masses of the Agricultural population (paragraph 441).

Bombay.—The attainment of literacy continues to be the goal kept in view by the local authorities. These local authorities are doing their best with limited resources at their disposal to spread literacy among the agricultural population. During the years 1935-37 there was an increase of over 44,000 pupils under instruction in primary schools in the rural areas as compared with the increase of over 21,000 during the years 1933-35.

Sind.—The District Local Boards and Local Authority Municipalities, with whom the question of Primary Education now mostly rests under the Bombay Primary Education Act, 1923, are doing their best to promote education among the rural classes, by opening new schools, where needed, so far as the funds at their disposal permit. Owing to financial stringency, the activities of the local authorities in respect of expansion of Primary Education were naturally restricted, and there was little progress in the years under report.

Mulla Schools are doing very useful work in spreading literacy amongst the Muslim masses, who are mostly agriculturists.

109. Female education (paragraph 444).

Assam.—In this province prejudice against female education is not strong, and there are clear indications of growing emancipation. The main obstacle is one of finance, and very rapid progress could be made if funds admitted.

Baluchistan.—During the period under report the number of schools in the Province was 9. The number of girl students in Government and private Institutions on the 31st December 1937, was 1,169 out of which 153 were locals.

Bengal.—People of different sects and communities have now realised the need for the education of women and girls. Progress was made and it can be predicted that the rate of progress will be accelerated in the years to come, both in regard to primary and secondary education.

Bihar.—The progress is very slow. There is a growing demand for more girls' schools in villages but the paucity of funds at the disposal of the local bodies and dearth of qualified trained mistresses is militating against the spread of female education. Co-education however is gradually gaining popularity as the number of girls at boys' schools is increasing steadily. Both middle and upper primary scholarships are now won by deserving girls. The guardians are beginning to realise the necessity of educating their girls and are sending them to schools in greater numbers. Guardians who, some years back, were opposed to the secondary education of girls are now willing to educate them up to that stage. The quality of the work done in girls' schools has also somewhat improved. Play, games, drill, handwork and a little bit of gardening are now the normal features of every girls' school.

Bombay.—As in the case of boys efforts are made by local authorities to enroll more girls in schools. The inspecting staff, the local school committees and other members interested in the education of girls held conferences in villages to promote the cause of the education of girls and it is gratifying to note that the number of girls' schools and of pupils attending them is steadily increasing. The number of girls under instruction in primary schools increased by over 29,700 during the years 1935-37. The main difficulty in the expansion of girls' education is the lack of suitable women teachers. A sufficient number of qualified women teachers is not available for our village schools. The number of women teachers employed in municipal areas is, however, gradually increasing.

Central Provinces.—The Central College for Women, Nagpur, embodies a unique effort in the cause of higher education of girls in the Central Provinces and Berar owing to its affiliation to the Nagpur University in the year 1935-36. In the same year the Government Anglo-Vernacular Middle School for girls at Akola was raised to the High School status which is noteworthy. The opening of English medium sections in the Government Girls' High School, Amraoti, provided facilities for high school education for Muslim girls, and this venture has proved very satisfactory. In the High School at Akola, there was a society for the encouragement of Marathi literature and the Simla milk scheme was successfully carried out. In the Burgess Memorial Girls' High School, Bilaspur, instruction was given in dairying, typing, and care of trees, animals and poultry, and there was also a village uplift programme among senior pupils of the school.

During the two years, 1935-36 and 1936-37, the local bodies opened seventeen new primary schools which received grants from Government for their maintenance.

The percentage of girls under instruction in recognized and unrecognized institutions in relation to the total female population of the province increased from 1.02 in 1934-35 to 1.07 in 1936-37 while the percentage of school-going children in general to the total population of the province decreased from 3.23 to 3.22 during the period. Primary education however in the interior makes little headway and there is little co-operation on the part of parents. The policy of placing girls' primary education in charge of local bodies does not promise to be successful as most of them maintain an attitude of passive resistance.

Coorg.—The progress of girls' education in Coorg has been very rapid, particularly during the last decade. In 1927 the strength in the elementary classes was 777 and in 1937 it was 3,314. Women in general are not labouring under social disabilities such as early marriage and purdha systems. Satisfactory facilities do exist now in Coorg for the education of girls as in addition to co-educational schools there are separate elementary schools for girls, one higher elementary school and one high school. The wastage in Coorg is very favourable compared to other parts of India as it is less than 50 per cent. The wastage is due to the girls being taken away early from schools.

Delhi.—There are 12 girls' schools in the rural area. The total number of children in these schools at the end of 1937 was 695. In addition 45 girls are reading in schools intended primarily for boys. There is a Government Normal School for the training of women teachers in Delhi City.

Madras.—The importance of the education of girls is fully realized and in schemes for the introduction of compulsory primary education steps are taken to see that girls are included equally with boys.

Orissa.—There has been considerable extension of co-education at the primary stage. 43,085 girls were reading in institutions for boys of whom 8 were in colleges, 186 in high schools, 706 in middle schools and 39,993 in primary schools. One girl was trained in the Secondary Training School at Berhampur. Proposals were made for raising two girls' middle vernacular schools to Middle English status and one upper primary school to middle vernacular status but these are still under the consideration of the Provincial Government.

The female inspecting staff of the new province consists of one Inspectress, one District Inspectress and one Sub-Assistant Inspectress of Schools and no arrangements have yet been made for medical supervision of girls' schools.

Sind.—The Province is very backward in the education of girls—especially in the rural areas. Government have sanctioned 150 scholarships for girls to induce them to receive education and eventually to serve as teachers. In order to give an additional impetus to the cause of female education, Government are providing a sum of Rs. 27,000 for the year 1939-40, on account of grants to Local Bodies for the opening of 61 additional girls' schools, one in each taluka in the Province.

Slow but steady progress is being made in the education of girls. The Local Authorities' efforts to increase the number of schools have been greatly handicapped by lack of funds and the dearth of suitable women teachers. The poverty, general apathy and ignorance of the parents are also serious obstacles to the spread of literacy among women.

No local authority has so far introduced compulsion for girls.

United Provinces.—The number of girls reading in schools and colleges has increased by 19,770 since March 1935.

The number of registered and unregistered societies for women rose from 69 to 95. They carry on propaganda in favour of literacy in addition to propagating ideas of thrift.

care of children, curtailment of ceremonial expenditure, recitation of *khatus*. The recitation of *khatus* has undoubtedly extended the scope of their knowledge.

The number of girls' institutions for the last three years is given below :—

Up to 31st March 1937.			Remarks.
1. Colleges, Arts and Science ..	2		No new colleges were established in 1936 and 1937.
2. Intermediate colleges ..	7		One new college was established in 1937.
3. High Schools ..	34		Two new schools were established in 1936 and one in 1937.
4. English Middle Schools ..	73		Four new schools were established in 1936 and three in 1937.
5. Vernacular Middle Schools ..	249		Sixteen new schools were established in 1936 and six in 1937.
6. Primary Schools ..	1,794		Three new schools were established in 1936 and fifty-two in 1937.
7. Special Schools ..	60		Two schools were closed down in 1936.

N.B.—Extended facilities are now given to female candidates for admission to training colleges. One State scholarship for study in the United Kingdom has been, for the last few years, awarded to women candidates each year. Co-education in primary schools is increasing. As regards the question relating to the influence of female education in preventing a relapse into illiteracy, a general letter was issued in 1929 to the persons and bodies interested in female education. Replies received indicate that where such families exist the mothers' influence is important but the number of literate women though increasing is so far infinitesimal in villages.

110. Introduction of compulsory primary education (paragraph 445).

Assam.—It became evident during examination of the schemes under the Primary Education Act, 1926, that a great deal of labour on the minutiae of rural schools must be undertaken if mass education is to be introduced in a form adapted to the resources both of Government, which must find two-thirds of the cost of administration, and of rural economics. Only when schemes have been put into practice will experience be gained as to the suitability of the compulsory principle of securing an adequate benefit from the primary course. The annual cost of this course has hitherto been about Rs. 5 or 6 per pupil. Under the compulsory schemes, as framed by the local bodies, it comes to very much more, varying from Rs. 12 or 13 to Rs. 28 or even as much as Rs. 68 as the ultimate commitment per additional pupil. No provision has been made for financing the two-thirds share of the cost falling on Government.

Baluchistan.—Due to the conservatism of locals, it has not yet been found possible to introduce compulsory education in the Province. Primary schools, scattered here and there in the Province, have been established in various villages to bring, as far as possible, education within reach of the people. Quetta and other District Headquarters have flourishing High and Middle Schools.

Bengal.—In accordance with the Optional Scheme framed by Government under the Bengal Rural Primary Education Act of 1930, District School Boards were constituted in twelve districts of the province with a view to bring into operation, by subsequent imposition of the education cess, the scheme of free and compulsory primary education contemplated by the Act. Cess was imposed in one district and steps were begun for its imposition in eleven other districts.

Bihar.—Excepting the area under the Jamhore union board in Gaya district, nothing practical has yet been done for the introduction of compulsory primary education, though some schemes to start it in selected areas are being discussed. The compulsory education scheme introduced in Jamhore union board has been re-organised on proper lines. The staff has been strengthened and an attendance officer has been appointed. Schemes are contemplated to be introduced in some municipal areas of the Tirhut Division in future years. The compulsory primary education scheme in the Ranchi municipality has been working fairly well. Schemes have been prepared for introducing compulsory primary education in the municipalities and union committees in the district of Manbhum. The district board of Singhbhum has also decided to introduce a scheme of compulsory primary education in the Baharagora thana of the Dhalbhum sub-division and the Chaibassa municipality has also a similar scheme. Government have sanctioned the continuance of the scheme of free and compulsory education in Jamhore village lying within the jurisdiction of the Jamhore union board in the district of Gaya until further orders.

Bombay.—No new scheme of compulsion was sanctioned during the period (1935–37) under report. The number of local authorities which have introduced compulsion to a limited extent is ten (nine Municipalities and one District Local Board). The

figures of attendance in the areas in which compulsion has been introduced show, however, that compulsion is not rigidly enforced and the School Boards are reluctant to take coercive measures.

Central Provinces.—The Betul District Council introduced compulsory education in twenty-nine centres from 1st April 1934 and the Municipal Committee, Malkapur, from 1st July 1935. It was found necessary to suspend the operation of the Act in nine villages in Bhandara district owing to the distance of the villages from the Central school. The Act also ceased to operate in four villages attached to the Mungeli centre in the Bilaspur district. For the Betul scheme, Government was unable to give a grant owing to financial stringency. It cannot be said that the results of the working of the Act have been satisfactory. The defects in the administration of primary education were emphasized in the reports. The conferment of real political power upon the masses involves the absolute obligation on the part of the State to make adequate provision for the education of the electorate and this provision can be made only if control is transferred to the Provincial Government. At present, administration is in the hands of regional bodies with an ever-changing personnel with the inevitable result that continuity of policy is conspicuous by its absence. The management of schools is left to clerks. Indeed the general impression of those competent to judge is that neither Government nor the public is getting a suitable return for the money spent on primary education.

Coorg.—There is no compulsory education in Coorg, and, desirable though it is, it cannot be introduced as the finances of the Province cannot afford the additional expenditure.

Delhi.—The Punjab Primary Education Act, 1919, has been applied to 9 rural areas comprising 17 villages. Except in one area there has been fair success. It must, however, be admitted that the Act is ordinarily not very effective.

Madras.—Under the Madras Elementary Education Act, 1920, as it stood before 1935, it was optional on the part of local bodies to introduce compulsion. In order to enforce compulsion the Act was amended in 1935. The Amendment Act empowers the Provincial Government to compel local bodies to submit schemes for the introduction of compulsory education. The Act also contemplates the introduction of a modified form of compulsion by which pupils of school-age once admitted to schools will be retained in them till they complete the school course. No local body has so far introduced this form of compulsion. It has been recognized that an essential preliminary to the introduction of compulsory education is the establishment of complete five standard fully-equipped schools. Local bodies are being exhorted to develop incomplete elementary schools into complete schools wherever possible.

Orissa.—The experiment in the Union area of Banki in Cuttack district was continued but Government withdrew its financial aid and it is now being carried on at the sole expense of the District Board, which has doubts about the justification of continuing the additional expenditure entailed for a small area. The results obtained are not striking. In the Madras area of the province compulsion is very successfully carried out by the Parlakimedi municipality and the organisation here will be of service as a model for other areas. The proposal to have universal compulsion has been much discussed here in common with other parts of India and details of the cost of introducing it in all municipalities are being worked out. New views as to the duration of the period of compulsion have been expressed and these require that previously prepared financial estimates should be revised.

Sind.—Compulsory education had been introduced only in the taluka of Larkana. No new scheme of compulsion was sanctioned during the period under review.

The progressive introduction of the compulsory system is the only means to overcome the unwillingness of parents in rural areas to send their children to schools and to keep them there till literacy is attained; and with this end in view, Government have decided to introduce compulsion in one taluka of each district. During the year 1938–39, primary education on a compulsory basis, has been sanctioned for the Sukkur taluka, and the case of the Dadu taluka is under the consideration of Government. It is proposed to introduce compulsion in three more talukas in the next financial year, i.e., 1939–40. But it is largely a question of finance and both Government and Local authorities find it difficult, in the present state of their finances, to meet their share of expenditure towards the introduction of schemes of compulsory education.

United Provinces.—Compulsory primary education for boys is in force in 36 municipalities and 25 district boards and is being extended to Dharamnagri school area of the Bijnor District.

During the years 1936 and 1937, compulsory primary education for girls was introduced in selected areas of the Mirzapur, Muttra, Etawah and Lucknow districts. The

question of introducing it in certain selected areas of the Partabgarh District and Lucknow Municipality is under consideration.

The result of compulsion wherever it has been applied does not show much improvement over what was reported previously.

111. Formation of co-operative education societies (paragraph 446).

Assam.—Co-operation has as yet made but small advance in Assam. The general compulsory system has yet to be put on trial, and the elaboration of alternative schemes will be due if and when it is shown to fail of its purpose.

Bihar.—There are no such societies in the Patna, Bhagalpur and Chota Nagpur Divisions. Co-operative education societies have come into existence at the district headquarters of Muzaffarpur.

Bengal.—No co-operative society has so far been formed with the object of promoting adult education among the masses. A few additional night schools were, however, opened at some places during the years under report out of the Government of India grant for village uplift. During the latter part of the year 1937 some adult education classes were started in different parts of the Province with the help of grants-in-aid from Government. The chief aim of these classes so far has been the attainment of literacy by adults.

Central Provinces.—No new societies have been registered during the period under report. Attempts are, however, being made in this direction.

Coorg.—Co-operative education societies have not been formed in this Province.

Madras.—The Madras Government agreed with the Agricultural Advisory Committee which considered that there was no need for co-operative societies for the purpose of securing the attendance of pupils in this Presidency. A few parents' societies on the model of the Punjab have, however, been started in some municipalities which have introduced compulsion.

Punjab.—Adult schools which once numbered several hundred, have dwindled to one and are a definite failure. Compulsory Education Societies, too, have declined in number and members. This is more or less due to the spread of compulsory education by Government agency.

Sind.—No Co-operative Societies have been formed so far with the object of promoting adult education.

Of the adult population, 87 per cent. of the males and 98 per cent. of females are illiterate. Local Authorities and private bodies maintain a certain number of schools—most of which are night schools; but, owing to the ephemeral character of these schools and the want of popular support, there has been a gradual reduction in the number of these schools. Spontaneous efforts, in consequence of an awakening among the villagers, are essential for any real progress in this direction.

United Provinces.—No separate societies for education were organized. The ordinary societies however carry on propaganda for the education of village boys.

112. Improvement of primary education (paragraphs 447-448).

Assam.—Primary School Teachers are being trained in two Normal Schools, as usual, at Government expense. Great endeavours have been made to introduce gardening in village schools in a systematic way.

Baluchistan.—Baluchistan is a hilly country. It has a sparse population, scattered over a very wide area, some parts of which are difficult of access. But in spite of all this as well as the barrier of local customs, Village primary schools have been established in a fairly large number in rural and urban areas. A village primary school in the province is generally in the charge of one teacher and has four classes with an average attendance of 20 to 25 boys. Sometimes a fifth class is added to it. The curriculum of these schools consists of reading, writing, arithmetic and geography. Four stipends of Rs. 2 each per mensem are awarded in each of these schools to the local boys to induce their parents to keep them in the school up to the 4th class standard. The Normal school, the only institution of this kind in the Province, was destroyed in the Earthquake of 1935 and has not been revived.

As the villages are generally far apart, it has not been found possible to establish any central schools and owing to the distance between the villages the system of branch schools cannot be introduced.

Bengal.—Finance is the greatest difficulty, but it is expected that with the proceeds from the education cess and the existing Government grants for primary education, supplemented by proposed additional grants, a fairly satisfactory system of primary education will ultimately be possible in the province.

Bihar.—Since the introduction of the revised syllabus for primary schools there has been an appreciable improvement in teaching in them. Besides the teaching of the 3 R's instruction is being given in handwork, clay modelling and manual work. The holding of guru-gatherings and refresher courses for primary school teachers is doing immense good to all concerned. The demand for more primary schools is increasing and the raising of the status from lower primary to upper primary and from upper primary to middle English has become a feature of the day. The villagers in fact are trying hard to comply with the requirements of the Department for the recognition of the schools; some ultimately collapse for want of grants from local bodies. The appointment of trained teachers has contributed much to qualitative progress in primary education. The appointment of graduates trained in the primary course as sub-inspectors and in a few places as head teachers of elementary training schools and the holding of conferences by the sub-inspectors in central places to be attended by primary school teachers in batches at which demonstration lessons and talks to teachers are given, have proved very beneficial for primary education. Special attention is paid to the lower classes in the endeavour to maintain a steady flow of progress of children from the bottom to the top classes. Instruction is given to guardians by the inspecting officers to secure better attendance of pupils. The number of trained teachers employed under local bodies is increasing.

Bombay.—With a view to securing a large supply of trained teachers with higher training certificates a scheme for the training of 240 additional men and 120 additional women teachers was introduced in June 1935. The third year classes which were discontinued in 1923, were re-opened in 1935. The curriculum of studies for primary training institutions was thoroughly revised to bring it into line with the present day requirements of primary schools. These measures have gone a long way to improve the standard of training of primary teachers and their qualifications. The number of trained teachers has been increasing every year. During the years 1935-37 the percentage of trained teachers has also increased.

Some of the local bodies have appointed a few women teachers in boys' schools. Wider scope cannot, however, be given to this recommendation for want of women teachers. The number of girls passing the vernacular final examination every year is increasing and it is hoped that more women teachers will be appointed for small children in future, particularly in municipal areas.

The proposal to appoint at least two teachers in primary schools cannot be put into action at present for want of funds. Efforts are, however, made by the District Local Boards to staff the schools adequately as far as possible and it is recognised that one-teacher schools are to some extent responsible for wastage. If the one-teacher schools that are at present in charge of vernacular final men, or young inexperienced first year trained men, etc., are placed in charge of experienced trained teachers who can handle efficiently four or five classes of about 30 pupils, the wastage is likely to be minimised.

Teachers who are residents of villages and brought up in villages are generally selected for training. Of the total number of candidates deputed for training every year nearly 75 per cent. belong to the intermediate and backward communities. A special training school is maintained at Loni (district Poona) which gives a definite rural bias to the training given.

During the year 1935-36 a tentative revised curriculum for primary schools was drawn up and was introduced as an experimental measure in some selected Government and aided schools all of which are practising schools attached to primary training institutions. In the new curriculum the treatment of each individual subject has been made as practical as possible with a view to educating the child through the medium of his immediate environment. The Educational Department continues to give encouragement to enterprising publishers publishing suitable text-books.

Central Provinces.—The Revised Syllabus for Primary Schools, which lays emphasis on Handwork relating to the rural and urban environment, has been extended to about 300 schools. Minor operations in agriculture and the care of "pets" are also features of this syllabus.

Coorg.—Coorg has a good supply of trained teachers and there are only 32 untrained teachers in schools under the control of the Education Department and their number is fairly decreasing. Their efficiency and pay is satisfactory compared to other provinces. Women teachers have not been employed in boys' schools so far. The girls' schools as a whole are not sufficient as the boys' schools.

A village school serves its purpose if it adds to the literacy of the population whether it is manned by one teacher or more than one teacher. These village schools serve as feeders to the elementary and model schools and so they serve a definite purpose in the system of education and are not entirely an economic waste though many of them are

understaffed. Here again the financial position of the Province comes in the way of appointing additional teachers.

Delhi.—The Government Normal School, Najafgarh, trains male teachers and there is a normal school for women in Delhi City. Of 183 male teachers employed in District Board Schools in the rural area 178 are trained. Schools are managed on the same lines as in the Punjab. The following table shows the number of schools (District Board and Aided) in the rural area (including small towns), and the number of pupils—

	High.		Middle.		Lower Middle.		Primary.	
	No. of schools.	No. of pupils.	No. of schools.	No. of pupils.	No. of schools.	No. of pupils.	No. of schools.	No. of pupils.
Boys ..	1	244	3	712	29	2,789	56	2,090
Girls ..	..	..	..	..	..	..	31	1,443
Total ..	1	244	3	712	29	2,789	87	3,533

As the population of the rural area is not far short of 2,00,000 there is room for improvement.

Madras.—The training school syllabuses are under revision. The importance of providing for practical training and pre-vocational work is kept in view in the revision of the syllabuses. As pointed out above, the establishment of complete schools is encouraged ; where this is not possible, schools having only two or three standards are allowed to continue as feeder schools.

Men of rural origin and upbringing are recruited for admission to training schools as far as possible.

Proposals are under consideration for the preparation by the Educational department of suitable text-books for use in primary schools, particularly in languages. The constitution of a separate text-book committee for scrutinizing books prepared for use in elementary schools is also engaging attention.

Orissa.—Popular dissatisfaction at the results of the expenditure on primary education has found increasing expression during 1936-37 with the advent of responsible provincial Governments but necessary adjustments are still in the stage of discussion.

Meanwhile the main effort in Orissa has been directed to secure more skilled and more regular attention to the beginners and where this has been secured some decline in wastage and stagnation is visible. Individual sitting arrangements have been introduced in the effort to promote individuality and self-reliance and the importance of manual work has been constantly stressed. Many schools now make their own mats for the individual sitting arrangements already referred to and their own counting materials and the teachers are trained in the elementary training schools to devise and make various interesting teaching devices. The importance, too, of doing things progressively better is emphasised. New methods of asking questions, designed to combat purely verbal memory work, have been encouraged. Regular gatherings of teachers for the inculcation of these and other improvements are held in all districts.

The response obtained from poorly and irregularly paid teachers reflects the greatest credit on many of them but all controlling authorities are still greatly handicapped by shortage of funds. No additional grants have been forthcoming and many teachers cannot be paid even the minimum salaries to which they are entitled. Aided school teachers in South Orissa are subjected to a cut of no less than annas 4½ in the rupee. The great discrepancy between the grants paid to the boards formerly under the Madras Government and those formerly under the Government of Bihar and Orissa make the question of finding funds for improvement very difficult of solution.

Sind.—Government fully realize the importance of giving initial training to every teacher of the right age, working under a local authority. The Local Authorities are doing their best to maintain the proportion of trained teachers, as laid down in Primary Education Rule 58. At present, the Educational Department is training as many teachers as will be necessary to make up for wastage and other normal requirements. There is a general demand for the raising of the percentage of trained teachers laid down in Primary Education Rules ; but, owing to financial stringency, it does not seem possible to meet this demand. With a view to securing a larger supply of trained teachers, Government propose to make arrangements for the training of 80 additional teachers in the first year class at the Training College for Men, Hyderabad.

An institution like the one contemplated in this paragraph is a desideratum for this Province ; but this is not feasible, at present, owing to the fact that even the girls' schools themselves are not manned by women teachers. The main difficulty is the dearth of qualified women teachers, and it is not possible to provide teachers for small children till the requirements of girls' schools proper are satisfactorily met.

It is fully realised that one-teacher schools are to a considerable extent responsible for wastage ; but financial considerations militate against the provision of a second teacher for small schools. Government, however, hope that with the expansion of primary education, the number of one-teacher schools will decrease.

United Provinces.—There was no material change from the position reported before.

113. Adult education (paragraph 449).

Assam.—Sixty-six co-operative societies have started 66 adult night schools and about 830 uneducated adults have been receiving education in these schools.

Bengal.—Night schools were not found to be either attractive or efficient. This was mainly due to poverty and poor organisation. It did not appear that those who attended, took their work very seriously. The Government of Bengal outlined a scheme for adult education and a central committee was formed with the Inspector-General of Registration, Bengal, as Secretary. Adult Education centres were organised in the mufassal.

Bihar.—Adult education is being imparted through the organisation of night schools. The total number of schools organised at different places comes to 36 which includes the girls' schools. The total number of students at these schools at the end of the year 1937 was 919. Some of these schools are maintained partly by local contributions and partly by local bodies. In several of these schools the teachers are literate persons of the villages who work without any remuneration.

Bombay.—Please see remarks against item No. 112.

Central Provinces.—The scheme drawn up for the establishment of fifty schools for adults was postponed owing to financial stringency. In the year 1934-35 there were thirty-six night schools with 834 pupils in them, and in 1936-37 there were thirty-seven schools with 766 pupils. In the Saugor district two night schools for adults received a Government grant of Rs. 209. Owing to lack of sufficient interest among the labouring classes, these schools did not work efficiently. The night school at Khandwa has not proved successful for want of funds and proper organization. The night classes for adults started by the Municipal Committee, Dhamtari, in the year 1935, are held for two hours with three teachers at a remuneration of Rs. 5 per mensem. The Balaghat District Village Uplift Committee maintained five night schools but they were not very successful.

During the period under report no new societies have been registered. One society in the Jubbulpore district has, however, been revived and is working satisfactorily.

Coorg.—The Education Department has at present one night school at Hulse which is attended by the adults as well as children who cannot afford to attend a day school.

Delhi.—There are at present ten schools in which instruction is given to adults. They have not proved very effective.

Madras.—The Government are giving grants to private agencies that conduct adult education classes.

Orissa.—There have been no developments during the period under report. Small classes are conducted at Parlakimedi and Kukudakhandy in South Orissa. The shortage of funds at the disposal of local bodies and the paucity of private effort combine to prevent extension of the movement. Optical lanterns provided do not appear to be adequately used and an enquiry into this aspect of the adult education movement leads to the belief that the only way of getting satisfactory use of these is the appointment of a special lecturer and propagandist. If lanterns are provided and handed about from officer to officer they easily become damaged and unserviceable. Proposals are in course of preparation for the reorganisation of this branch of the work on lines which will secure more regular work.

United Provinces.—The number of central education societies increased from 1 to 3, while the number of registered and unregistered adult schools was 20 and 235 respectively. The total enrolment of adults receiving education rose from 5,000 to 5,470.

The members are also trained as scouts and their number is now over 4,000.

114. Agricultural Middle Schools (paragraphs 456—458).

Assam.—The Assam Government do not feel themselves yet in a position to experiment with any type of agricultural middle school, nor has any demand for such schools yet arisen. The recognised course does all that is possible to give the middle vernacular school a friendly and intelligent outlook on country life, and the introduction of agriculture as an option is permitted.

Baluchistan.—The secondary schools at Sibi and Pishin have agricultural classes and experimental farms. The teachers and the taught take much interest in the

technique and practice of the subject. The local Zamindars are invited to see the western implements and methods of cultivation. Both the schools teach English side by side with the other subjects.

Bengal.—The schools in which the scheme for agricultural education had been introduced, with few exceptions, worked well, but there was room for improvement. In January 1937, a batch of three teachers was deputed for training in the Dacca Agricultural Training School and two more Middle English Schools were allowed to open continuation classes. The schools participating in the scheme for agricultural education are allowed by Government a monthly grant of Rs. 10 each for payment of "agricultural allowance" to the teachers of agriculture. The schools which have continuation classes are allowed the usual grant of Rs. 720 each per annum.

Bihar.—The agricultural middle school at Pirauta in Shahabad is making fair progress. Gardening has been introduced in many middle schools where there is sufficient land available for the purpose. There is one middle school at Bellaur in the district of Darbhanga which offers a course in agriculture to its pupils. A recurring grant of Rs. 414 is given by Government through the district board to meet the expenditure. The Assistant Director of Agriculture occasionally visits this school and offers necessary advice and instructions to the staff. The Santal pupils in the Kairabani Mission middle English school in the Santal Parganas grow paddy in the fields attached to the school. An experiment in agriculture which was tried in Gorgawan middle English school in the Bhagalpur district failed owing to the apathy of the local public. A special agricultural class has been opened in R. C. Mission girls' middle English school at Noatoli in Ranchi.

Bombay.—Vocational agricultural schools in vernacular of the type at Loni have been reduced in number. There are now only two such institutions—one at Devihosur in the Karnatak and the other at Dhulia in Khandesh, which have radically changed the course and have curtailed the expenditure to a great extent.

Central Provinces.—There is an Agricultural Anglo-Vernacular School at Powarkheda in the Hoshangabad district which is under the control of Director of Agriculture, Central Provinces and Berar. It is a residential institution which, in addition to the ordinary subjects, gives instruction in practical agriculture and surveying. For agricultural practice, a plot of seven acres has been entrusted to the boys and on this they grow different kinds of vegetables and dry crops.

The Buldana Peace Memorial School, which was opened in 1929 for instruction in agriculture for the sons of agriculturists in the Buldana district, provides a two years' course for 25 pupils, most of whom reside in the hostel. Stipends of Rs. 6 and Rs. 7 per mensem are awarded to them. The Department of Agriculture has placed the services of a special assistant at the disposal of the school; the staff of the Government farm also helps. A better class of pupil is now joining the school but the main attraction seems to be the stipends offered and the hope of Government service at the end of the course.

The Agricultural Anglo-Vernacular Middle School, Betul Bazar, which started as a District Council Vernacular Middle School, developed gradually into an Anglo-Vernacular Middle School teaching agriculture and was last year taken over by the Department of Agriculture.

There were seven vernacular middle schools in which agriculture was taught, three of them are in Chhindwara, one in Raipur, one in Bilaspur and two in Amraoti districts. Maintenance grants to district councils to cover the cost of equipment and allowances to teachers teaching Agriculture in these schools were given in 1936-37.

Coorg.—All the higher elementary schools in Coorg have a course of instruction in rudimentary agriculture, and poultry and bee-keeping are encouraged in some of them.

Delhi.—The theory and practice of agriculture are taught at only one middle school out of nine in the rural area. The school concerned has an extensive farm and the agricultural teacher was trained at Lyallpur. Curiously enough the school is not popular, the "advanced" non-agriculturists in the village having persuaded many of the Jats that practical education is a mistake.

Rural Science is now a compulsory subject in the Vernacular Final Examination.

Since 1935, Agriculture has been a compulsory subject for the Senior Vernacular course at the Najafgarh Normal School. The school has a small farm.

Madras.—The Government opened two schools of the "Loni" type one at nakapalle and the other at Taliparamba. The former was closed in 1928 and the latter in 1932, as there was not sufficient demand for such kind of education from the public. A school was opened at Usilampatti in 1929 by the District Board, Madras, for the benefit of the boys of the Kallar community. It continued to be under the board's management but has since been closed as the district board found it difficult

to continue it. A proposal for amalgamating it with the Board High School at Usilampatti is under consideration. The vocational school at Muthanandal run by the Ramnad District Board was closed and was formally converted into an industrial school in 1935 and elements of agriculture, bee-keeping and poultry rearing are taught in this school.

North-West Frontier Province.—In certain Middle Schools the teaching of elementary agriculture and gardening has been taken in hand and school gardens are being encouraged where water is available.

Orissa.—A scheme is under consideration for giving training in agriculture to teachers of Middle Vernacular and Middle English Schools and for the introduction of simple lessons on agriculture with practical demonstrations in the schools.

Punjab.—A new scheme of rural science was introduced as a compulsory subject in the curriculum of Vernacular Middle Schools and Agriculture as a separate subject of study was discontinued. Rural Science is now taught by properly qualified teachers in some hundreds of elementary and secondary schools throughout the Province. Farms and gardens are attached to these schools. All the work is being done by the students.

Sind.—There are no Agricultural Middle Schools in Sind, but there are Agricultural Bias classes attached to Primary Schools.

United Provinces.—The Agricultural Schools at Bulandshahr and Gorakhpur are working satisfactorily and impart vocational training to the sons of agriculturists.

A course in estate management has been instituted at the Agricultural School, Bulandshahr, since September last.

One hundred and thirty-seven students passed out of these schools in 2 years and 159 were admitted.

The number of vernacular middle schools at which agriculture is taught has been increased from 36 to 45 owing to conversion of 9 rural knowledge classes into agricultural ones. Further 10 district board teachers are being trained with effect from October 1937, at the Agricultural School, Bulandshahr, in the subject of Agriculture. They will finish their course in October 1938, when 9 new agricultural classes would be added with the aid of grant from provincial revenues.

Rural knowledge classes have been opened in Government Normal and Central Training Schools and also in district board, vernacular middle schools for boys with the aid of Government grant. Certain boards have opened further rural knowledge classes with the aid of teachers available in the district. The number of rural knowledge classes in the province aided by Government was 125 on 31st December 1937.

There is nothing to add to the note given against this item in the report for the calendar years 1934 and 1935 except that the number of English classes in vernacular middle schools in various districts and municipalities has risen from 228 to 251, thus showing an increase of 23 English classes in the number of schools maintained by local bodies only.

115. *Addition of course in agriculture to curriculum of High Schools in rural areas (paragraph 461).*

Assam.—The provision of practical and theoretical instruction in Agriculture in high schools must necessarily offer difficulties in Assam since there is no Agricultural College in the province and teachers would not be available to impart such instruction even were it deemed desirable. Until such time as the regulations of the University of Calcutta require the provision of an agricultural or technical course in the high schools it is not to be supposed that pupils will be diverted from the Matriculation examination, which is regarded as the avenue to employment and the purpose of high school life, to agriculture. The Government of Assam feel that more evidence will be required that a demand exists for such training and more assurance that the pupils who avail of it will emerge equipped in other respects for a useful and profitable livelihood before they can venture on a decision to change the curriculum in this way.

Baluchistan.—There is no High School in the Rural area of Baluchistan.

Bengal.—See under item 114.

Bihar.—The only schools that have provided for the teaching of agriculture are (1) the Parvati High School at Bikram in the Patna district, and (2) the Dumraon Raj High School in Shahabad district. The latter has introduced the teaching of agricultural botany as an optional subject. The Parvati High School at Bikram receives a grant from Government for the purpose. Results achieved so far are highly promising.

Bombay.—There are only three secondary schools in which a course in agriculture is taught. In the S. P. Hakimji High School, Bordi, an elementary course in agriculture

is compulsory for the first three standards. A graded course in agriculture and nature study is taught in standards I to V of the Rajapur High School, while in the D. S. High School, Bhusawal, agricultural science is taught in standards I and II in place of nature study.

The experience in this direction at Rajapur and Bordi High Schools shows that boys take much interest in garden and other hand work and that general education has not been interfered with. Many other High Schools run privately, especially those in Chandesh and Karnatak, are keen on introducing agriculture in their high schools. But the introduction of such a course necessitates some land and equipment and a special teacher. Unless the Department is liberal in giving grant-in-aid on such additional items much headway cannot be made in this direction.

Central Provinces.—There are no high schools in rural areas in the provinces. Agriculture has, however, been introduced as a subject of study in the high school classes at the Government High Schools at Basim and Betul for the benefit of students from the Marathi and Hindi speaking rural areas respectively.

Coorg.—Agriculture has been introduced as one of the optional subjects for the S.S.L.C. examination in the Virajpet High School and the boys cultivate a paddy field near the school.

Delhi.—There are four high schools in the rural area, one District Board and three aided. In the Jat High School, Kheragarhi, agriculture is taught to the high classes. There is a very small canal irrigated farm attached to the school. The Hailey Rifahi High School, Narela, has also introduced agriculture as a subject in the higher classes but there is no real farm for practical work. The Anand Parbat Ramjas High School in the suburbs of Delhi has a small farm which has been improved.

Madras.—The question of revision of the syllabuses of higher elementary schools and of the re-organization of secondary education is under consideration. The feasibility of including Agriculture as an optional subject in these schools will be considered in due connexion.

Agriculture is taught as an optional subject in the Secondary School-Leaving Certificate curriculum in a dozen high schools in the Presidency.

United Provinces.—The number of high schools recognized for the teaching of agriculture rose from 15 to 18.

116. Technical education (paragraph 462).

Assam.—The Government of Assam agree in principle. They are not financially in position to undertake the management of a technological institute. The State Technological scholarship and sundry stipends are, however, granted with a view to the prospect of employment in the province. Technical education is at present confined to cottage industries, and is given in the Weaving Institute, Gauhati, and the Weaving Section of the Sylhet Technical School and by peripatetic weaving parties. The two plains and the hill technical schools are at present giving a training in ordinary handicrafts. Weaving is being taught, and lac demonstrations have also been given in two districts. The teachers having been given a training at the Lac Research Institute, Nankum, and elsewhere.

Baluchistan.—No technical education is provided in any of the schools in the province.

Bihar.—Besides the Bihar College of Engineering which offers higher education in civil engineering, there are two technical schools under Government management at Muzaffarpur and Ranchi. Each of these has got a five year industrial Diploma course and a two year course in leathercraft. The Industrial Diploma course offers training in engineering trades such as carpentry, pattern making, moulding, smithy, fitting, machine shop, garage, electrical engineering and painting. The lowest admission qualification is middle vernacular. It was started in 1930 and is growing and more popular among the rural population every year. There is also arrangement for the training of artisans in carpentry, fitting, turning, etc., in Dehri Canal Workshop at Dehri, and of compositors, book-binders and letter press printers at the Technical class attached to the Government Press at Gulzarbagh. Seats for Biharis are also reserved in the Apprentice Mechanics course of the East Indian Railway Technical School at Jamalpur for which Government pays a grant-in-aid to the school at Rs. 30 per student per month.

There are four industrial schools under Government management, namely, the Cottage Industries Institute at Gulzarbagh, the Silk Institute at Bhagalpur, the Half-me Weaving School at Biharsharif and the Wool Weaving Institute at Gaya. Besides these, eight industrial schools receive grants-in-aid from Government. The industries taught in these schools are cotton-weaving on handlooms, cotton and wool dyeing, calico

printing, tailoring, pottery, basket making, knitting, carpet making, durrie making, newar and tape making, toy making, blanket weaving, eri-culture, seri-culture, silk weaving and dyeing, etc. The industrial schools admit boys who have passed the upper primary standard and preference is given to sons of artisans. The Benagaria Industrial School at Benagaria in the Santal Parganas and the Khunti Co-operative Weaving School at Khunti in Ranchi, each of which gets an aid from the Government, aim at popularising weaving and carpentry among the Santals of the Santal Parganas and the aborigines of Ranchi to provide a subsidiary occupation for them during their idle hours. Two new industrial institutions were recognised during 1936-37, of which the B. N. Surveying and Technical School at Digra in the district of Darbhanga offers training in surveying and map making, weaving, tailoring, carpentry and smithy; and the other, viz., the B. N. Malik Industrial School at Ryam in the district of Darbhanga, has been started for reforming the criminal tribes of that area by teaching them weaving and durrie making and helping them to market the goods produced by them by honest labour.

A number of scholarships and stipends are awarded each year to enable boys to get training in institutions and firms outside Bihar in those industrial subjects for which adequate facilities do not exist within the Province. Two scholarships for tanning are awarded at the Bengal Tanning Institute, Calcutta, and three scholarships for textile training are awarded at the Victoria Jubilee Technical Institute, Bombay. In addition to the scholarships paid to students, the Government of Bihar also pay contributions for the management of these two institutions. In addition to one scholarship for training in sugar technology, tenable at the Imperial Institute of Sugar Technology at Cawnpore, two more scholarships were sanctioned and awarded during 1936-37 for the Sugar Analyst course of the above institute. Besides the above, a sum of Rs. 4,000 is available each year for helping youngmen to undergo training in factories and industrial institutions outside the Province. These stipends are awarded on the recommendation of the Board of Industries. The subjects in which these stipends have been awarded so far are: fine arts, hosiery, knitting, tailoring, dyeing, aeroground engineering, marine engineering, ceramics, cinematography, linotype printing, pottery, brass and bellmetal work, practical weaving, radio and wireless telegraphy, leather craft, toilet manufacture, sericulture and silk weaving, celluloid work, hat making, motor mechanics, etc., etc.

Central Provinces.—The Committee appointed by Government to do exploratory work and to collect data for the consideration of experts on a scheme of Educational Reconstruction and Vocational Training in Central Provinces and Berar has submitted its report and it has been submitted to the Government of India for an examination by experts. The report will be considered on receipt of comments of these experts. The Vocational Syllabus Committee of the High School Board referred to in the report for 1934 and 1935 has not yet concluded its labours.

The following extracts from the reports of the High School Certificate Examinations of 1936 and 1937 show that the subjects—Commerce, Agriculture, Wood-work, Music, Painting and Art Needle-work introduced in the High School curriculum are gaining popularity among students. This is further evidenced by the number of institutions (High Schools) recognized so far in these subjects by the High School Board—nine in Wood-work, eight in Commerce, three in Music, three in Agriculture, three in Art Needle-work and one in Painting:—

	Commerce.	Wood-work.	Agriculture.	Painting	Art Needle-Work.	Music.
Number of candidates for High School Certificate Examination 1936	205	7	24	..	..	..
Number of candidates for High School Certificate Examination 1937	305	35	16	9	13	37

The question regarding the establishment of rural high schools is under consideration of the High School Board.

Coorg.—There are no technical institutions, and scholarships for technical studies are being given as and when occasion arises.

Madras.—Technical education in various industries is given in the Government School of Technology, the School of Arts and Crafts, the Leather Trades School and the Government Textile Institute, all of which are run by the Industries Department and are located in Madras. In the Government School of Technology, Madras, instruction in industrial trades as mechanical and electrical engineering leading to a diploma, L.M.E. is given. A printing course is also given. The courses of training given in the School of Arts and Crafts include those in wood-work, metal-work and pottery. Goldsmithing, engraving, enamelling, cotton painting and printing leather painting are also part of the

training. A leather goods manufacturing class is run at the Leather Trades Institute where students mostly of the shoe-making class are given a course of training in shoe-making and manufacture of simple leather goods. The Textile Institute provides two courses in the industry, *viz.*, the supervisor course and the artisan course in addition to special courses in certain subjects and part-time courses for mill apprentices. The supervisor course was bifurcated in 1937 into a course in power spinning and weaving and another in dyeing and finishing. A course for pupil teachers was also instituted in 1936-37.

In the Government Soap Factory at Calicut (Malabar district) a few apprentices are trained in improved methods of soap manufacture.

Government industrial schools.—In pursuance of the recommendation of the Committee on Technical and Industrial Education three new schools were established in 1929 at Bellary, Calicut and Mangalore to serve the needs of the West Coast and Ceded districts. These schools provide instruction in the wood-working and engineering trades, the length of each course extending to five years. With a view to meeting the demand for trained electricians consequent on the introduction of electrical schemes in the Presidency, a course of training in electrical wiring extending over two years was instituted in July 1936 at the Madura Industrial Institute.

There are also a number of aided industrial schools recognized by the department the number of which increased from 63 in 1928 to 75 in 1937. There are also three aided teachers' training centres, one at Tindivanam providing training for teacher-students in wood-work and two for girls at Madras and Palmaner (North Arcot) providing training in teaching, needle-work and dress-making.

Scholarships.—Besides industrial education in the schools run and aided by Government, encouragement to technical training is also given by means of State scholarships. Technical scholarships have been awarded for training outside India in various industries—three for Hydro-electrical Engineering, three for Sugar Industry, two for Electrical Engineering with special reference to Broadcasting, one each for Cement manufacture, Paper manufacture, Canning of fruit, Sanitary Engineering and Textile manufacture with special reference to hosiery, technology of oils and fats, glass technology, Oceanography and Aviation. During the same period 33 scholarships were awarded for research study at the Indian Institute of Science, Bangalore, in the departments of General and Organic Chemistry, Bio-Chemistry and Electrical Technology. The Government also instituted six scholarships tenable for a period not exceeding three years for the study of sugar technology at the Andhra University, Waltair. Fifteen scholarships for a period not exceeding four years tenable at the Victoria Jubilee Technical Institute, Bombay, were also awarded for training in various subjects, *viz.*, Textile Manufacture, Sanitary Engineering and Plumbing, and Technical Applied Chemistry. Between the years 1928 and 1930, five scholarships tenable for a period not exceeding five years were awarded for training in Electrical Engineering at the Benares Hindu University. Four scholarships tenable for a period of four years were also awarded between 1928-29 and 1930-31 for the study of Mining Engineering and Metallurgy at the Indian School of Mines, Dhanbad.

North-West Frontier Province.—An industrial class composed of carpentry and smithy sections has been attached to the Government training school for men, Peshawar, since 1935.

A carpentry class has been attached to the Government High School, Dera Ismail Khan, since 1935.

A class for teaching of deaf and dumb boys also exists in the Government High School, Dera Ismail Khan.

Nakhai making has been introduced at Ghaznikhel Vernacular Middle School and in the Anglo-Vernacular Middle School, Serai Naurang in Bannu District.

The making of useful articles which are required in schools, *e.g.*, matting, ink, etc., as well as book-binding is being taught in a number of schools in the Province.

Orissa.—There are two Government technical and industrial schools one at Cuttack and the other at Phulbani. The former provides subordinate Civil Engineering courses for matriculates and Industrial Diploma courses for non-matriculates. The latter provides courses of instruction in certain cottage industries to the aborigines.

Government grants are given to seven private industrial and technical schools wherein courses of instruction in cottage industries, *viz.*, weaving, basket-making, toy-making, etc., are given to students who are mostly artisans and agriculturists.

Scholarships and stipends were awarded to the students from Orissa tenable in the following institutions outside the province:—

1. Bihar College of Engineering, Patna.
2. College of Engineering, Guindy (Madras).

3. Cottage Industries Institute, Gulzarbagh.

4. Evening Mining Classes, Dhanbad.

5. Indian School of Mines, Dhanbad.

United Provinces.—Technical education continues to be imparted at Industrial and Technical Schools maintained or aided by Government. Almost all of them have got courses meant for artisans.

Tuitional classes also have been introduced for training artisans in improved methods at important centres and for demonstrating improved appliances. For the present training is given in the following subjects:

Cotton and silk weaving, Durrie weaving, wool weaving and spinning, wool dyeing and printing, cotton and silk dyeing and printing; carpentry; tanning and flaying; and handmade paper.

Tuition in improved methods of sugarcane crushing, clarification of juice, and its conversion into *gur* by improved methods is also given in a number of districts.

117. *Qualifications for admission to Agricultural Colleges (paragraph 471).*

Assam.—The Government of Assam agree that the I. Sc. should be made an essential qualification for admission to an Agricultural College.

Bihar.—This recommendation and the recommendation dealt with in item 118 cannot be considered until the Province is provided with its own agricultural college. The matter was taken up last year with a view to re-open the college at Sabour on a very small scale. The proposals were submitted to Government but the matter has been kept in abeyance for the present due to paucity of funds.

Bombay.—The qualification for admission to the course for degree in agriculture of the Bombay University is the examination held by arts colleges (F.Y.Sc.) one year after matriculation.

Central Provinces.—The qualification for admission to the Agricultural College is ordinarily Second Division pass at the High School Certificate examination.

Coorg.—There is no agricultural college in Coorg. The suggestion is paragraph 481 are being observed here. Men trained in agriculture are employed in the Agricultural, Co-operative and Revenue Departments.

Madras.—The Intermediate examination in Science of the University of Madras or of other Universities which are considered equivalent to it, is an essential qualification for admission into the Agricultural College, Coimbatore. The minimum age of the candidate is 17. The length of the college course is three years.

Punjab.—The qualification for admission to the Punjab Agricultural College, Lyallpur, is the Matriculation certificate or its equivalent.

Sind.—The minimum qualifications prescribed for admission to the Agricultural College at Poona is the first year Science Examination of the Bombay University.

United Provinces.—The qualification for admission to the intermediate course at the Agricultural College, Cawnpore, is the High School certificate, and for the degree course, the Intermediate Examination or its equivalent. The college is affiliated to the Agra University up to B.Sc. in Agriculture.

118. *Teaching of Agricultural Economics and Farm Management at Agricultural Colleges (paragraph 472).*

Assam.—The Government of Assam agree but are not closely concerned as there is no Agricultural College in the province.

Bihar.—See remarks under item 117.

Bombay.—The farm management research is continued under the Professor of Agricultural Economics in the Charotar tract of the Kaira district. This research proves to be very valuable in imparting practical training to the students in this subject.

Before 1936 students could specialise in advanced agricultural economics in addition to their training in it as compulsory subject. But from 1936 specialisation is discontinued and the compulsory part is only to be taught according to the new rules of the University.

In addition to M.Sc.Agr. in Agricultural Economics by thesis, a written examination for M.Sc.Agr. is being shortly introduced. For this purpose a special curriculum is being prepared.

A curriculum to give a special training for a short duration in farm management and rural social organisation is being prepared.

Central Provinces.—The staff of the Agricultural College has been strengthened for the purpose indicated and the instruction imparted is considered adequate.

Coorg.—Please see remarks under item 117 above.

Madras.—Under the syllabus and the University Regulations revised and brought into force with effect from July 1932 Agricultural Economics and Farm Management are taught at the Agricultural College, Coimbatore.

Punjab.—Agricultural Economics forms the subject of one out of the three written examination papers in the final B.Sc. (Agri.) Examination and Farm Management is taught as a part of the course.

United Provinces.—The teaching of agricultural economics and farm management at the college continued to be imparted at the Agricultural College, Cawnpore.

119. *Revision of Short Courses given at certain Agricultural Colleges (paragraphs 473-474).*

Assam.—The Government of Assam agree but are not closely concerned as there is no Agricultural College in the province.

Bombay.—The University of Bombay instituted in 1935 a diploma in farm management to be given after matriculation. No institutions have yet come forward to give this course. There is some demand for special courses in horticulture, dairying, agriculture and veterinary science at the Poona College of Agriculture which is being met as far as possible.

Central Provinces.—Short courses in dairying and agricultural machinery are provided and special classes are held when necessary.

Coorg.—Please see remarks under item 117 above.

Madras.—*Short courses at the College.*—The old 'short course' giving practical training in agriculture and teaching leading to the 'Certificate of Proficiency in Agriculture' was discontinued in 1925. The Government sanctioned in 1933 the institution of several short courses in practical Agriculture at the Agricultural College, Coimbatore, in order to meet the needs of young men who cannot undertake University courses in Agriculture. Young men who have attained the Secondary School-Leaving Certificate standard are eligible for this course. No tuition fee is charged. The course on "Farm Management", was started in 1933-34. Short courses of instruction in the following subjects have also since been instituted :—

- (1) Care of animals,
- (2) Dairying,
- (3) Insect pests and diseases,
- (4) Malt-making,
- (5) Jaggery-making,
- (6) Bee-keeping,
- (7) Horticulture, and
- (8) Manures.

The students attending the "Farm Management" course are permitted to take the other courses.

Institution of short courses at the agricultural farms.—A short course of Agriculture on "Farm Management" was also instituted at the Agricultural Stations at Nandyal and Taliparamba in Kurnool and Malabar districts, respectively, during 1936-37.

In order to afford to unemployed educated young men particularly those from land-owning agricultural families, an opportunity to take to farming their own lands, short courses of training in practical agriculture were instituted in 1936 at several agricultural stations in the Presidency. The courses were run for a period of four months. Young men possessing generally the Secondary School-Leaving Certificate standard of education were selected and the candidates were paid a stipend of Rs. 15 per mensem. Seventy-three students have undergone the course in 1936-37. The courses were improved and were continued in 1937-38 also and 34 students have undergone training in that year.

Punjab.—Various miscellaneous short courses ranging from a fortnight to one year are given at the Punjab Agricultural College, Lyallpur. As each year passes the need for adding to the existing courses or of remodelling them to provide for modern requirements continues to grow.

United Provinces.—Short courses of six months' duration were introduced at the Agricultural College, Cawnpore, to provide instruction in the handling of milk and milk products.

120. *Provision of facilities to enable passed students of Agricultural Colleges to obtain practical experience (paragraph 476).*

Assam.—It has already been decided that before going to a College a student selected for scholarship should be given six months' training at a farm and that after the College course he should again be given a six months' practical course with a stipend before being appointed to service.

Bombay.—The course in practical agricultural work given at the Agricultural College, Poona, aims at this object. There are no other special facilities.

Central Provinces.—Facilities on the lines recommended already exist.

Coorg.—Please see remarks under item 117 above.

Madras.—Passed students who are recruited for employment in the department are being allowed to work on agricultural stations before they are posted for district work. They are also trained by senior demonstrators before they are posted in sole charge of a taluk.

North-West Frontier Province.—Such facilities are provided at Tarnab Farm in practical problems of agriculture.

Punjab.—Arrangements have been made to institute a course of practical instruction in Farm Management on departmental farms for graduates in agriculture and men who have passed the leaving Certificate Course. It is proposed to admit 10 such candidates annually and to pay them a small subsistence allowance in return for their work. Whilst the demand for an agricultural education of the degree standard is still promoted to a large extent by the desire to use it as a means of entering Government Service a large number of agricultural graduates have returned to the land during the last two years. Many of them are now farming two squares (50 acres approximately) by direct cultivation under Government Scheme for placing graduates and men of lesser educational attainments on the land.

Sind.—All the graduates of the Agricultural College who passed out in 1936-37 have been taken up in the Agricultural Department and are obtaining initial practical experience at Government Farms. Those students who have passed during 1938 but have not been employed in the Agricultural Department can obtain the same facilities.

United Provinces.—Portions of the college instructional farm are leased to such graduates of the college as desire to obtain more practical experience before taking up farming.

Facilities are also afforded to selected graduates of the college to receive practical training on Government farms and gardens; some of the students have even been assisted with stipends.

121. *Organization of Agricultural Colleges (paragraphs 477-479).*

Assam.—The province of Assam is not concerned.

Bombay.—The question of the appointment of a full-time Principal of the Poona Agricultural College has been dropped for the present owing to financial stringency. The other recommendations are receiving attention and care is also being taken, in making direct appointments, to select distinguished graduates in science of Indian, American and British universities.

Central Provinces.—The Nagpur Agricultural College is affiliated to the Nagpur University and the staff employed is in accordance with the University requirements. In the quinquennial inspection held by the University the qualifications of the staff were scrutinized. All Heads of Research Sections take part in teaching work.

Coorg.—Please see remarks under item 117 above.

Punjab.—No change has been made in the organization of the Punjab Agricultural College, Lyallpur.

Sind.—There is no Agricultural College in Sind, but Government have under consideration a proposal to open an Agricultural Institution at Sakrand.

United Provinces.—The Agricultural College as re-organized in 1932 is working satisfactorily. The teaching and Research sides have been separated. The staff of the Agricultural Library has been increased and thus greater facilities now exist for students, research workers, and for the public, for making use of the library.

122. *Openings for passed students of Agricultural Colleges in other Departments (paragraph 481).*

Assam.—The eligibility of a holder of an agricultural degree from a recognised university for appointment to the Assam Junior Civil Service has been recognised by the Government.

Bombay.—An Agricultural Graduates' Board is organised under the Principal, College of Agriculture, Poona. The institution is found to be useful in helping the agricultural graduates in getting employment.

Agricultural graduates are also being steadily absorbed in the sugar industry.

Central Provinces.—B. Ags. of the Agricultural College are given the same facilities for admission to Revenue Department as other graduates.

Coorg.—Please see remarks under item 117 above.

Madras.—The Government sanctioned the institution of a course of instruction in Co-operation, Auditing, Book-keeping and Banking at the Agricultural College, Coimbatore, in 1934 to enable the students of Agriculture to qualify themselves for appointment as inspectors in the Co-operative department. This course was discontinued in 1936 as there was not sufficient response from the students of the College.

In this Presidency the B. Sc. (Ag.) degree is placed on the same level as a degree in Arts or Science for purposes of appointment in the Revenue and Education departments and, in the Co-operative department, preference is given to agricultural graduates for appointment as Sub-Deputy Registrars. The Education Department has employed a few agricultural graduates and local bodies also are encouraged to employ them in the schools maintained by them.

Punjab.—The Irrigation Department recruits two Zilladars annually from amongst passed students of the Punjab Agricultural College, Lyallpur. The need for preferential employment of agricultural graduates in departments of Government other than Agricultural, such as Revenue and Co-operative, is being continually emphasised.

Sind.—The B. Ag. degree is placed on the same level as the degree in Arts or Science in making appointments in other Departments.

United Provinces.—With the affiliation of the Agricultural College, Cawnpore, to the Agra University the Agricultural degree qualifies for admission to service in several departments of Government.

123. *Agricultural Colleges for Bengal and Bihar and Orissa (paragraph 482).*

No remarks have been received from the Provincial Governments concerned.

CHAPTER XVI.—Rural Industries and Labour.

124. *Government assistance in developing manufacture of agricultural implements and in training village artisans to manage and repair improved types of machinery (paragraphs 491 and 494).*

Assam.—The Director of Industries had already taken notice of the question as to how the technical school training could be best adapted to provision for encouraging the local manufacture and repair of approved implements. Loans are given to enable applicants, passed pupils and others to start small industrial enterprises.

Bihar.—Remarks under item no. 116 may be seen.

Bombay.—No action has yet been taken, but the Agricultural Engineer is in close touch with the Cooper Engineering Works, Satara. This firm is prepared to manufacture implements in accordance with designs certified by the Agricultural Engineer. Action is also being taken to encourage village artisans to manufacture simple articles like cotton uprooters and water-lifts.

Central Provinces.—The Agriculture Department provides a practical course of instruction in the management of tractors and small power plants.

Subjects like commerce, agriculture, wood-work, music, metal-work, painting and art needle work have been introduced in the High School curriculum. In middle schools also several forms of hand-work, viz., tailoring, spinning, weaving, basket-making, clay-modelling, cardboard modelling, wood-work, etc., have been added. In the revised primary school syllabus provision for the teaching of cottage industries has been made. The whole question of vocational training will be reconsidered on receipt of the proceedings of the Central Advisory Board which met in December last and of the report of the

special committee appointed by the High School Education Board for the purpose with the following as one of the terms of reference :—

“The course of study for vernacular middle schools be revised on a vocational basis as an alternative scheme. The vocation should be so chosen as to suit the needs of the locality where the school is situated.”

Delhi.—Little actual progress has been made under this head, though interest has been stimulated by frequent exhibitions of improved implements. The argument that repairs are beyond the powers of village artisans is still used to justify the uneconomic hiring of sugarcane crushers, which are bought outright and repaired when necessary in Central Punjab villages.

Madras.—Manufacturers seek the advice of the Research Engineer's section of the Agricultural department on various subjects, designs are submitted for criticism and many implements and machines are sent for test. The section provides them with full information on those items, detailed reports of tests and many helpful suggestions. The implements designed by the section are put to test with a view to their improvement and simplification for local manufacture and the results of examination are brought to the notice of makers.

The Government had under consideration proposals for opening of special classes in Government industrial schools to train village artisans in the manufacture of implements and their care and maintenance. But they could not be given effect to owing to financial stringency.

Punjab.—A class in Oil engines and improved implements is held in the workshop attached to the Punjab Agricultural College. Instruction is given to village blacksmiths.

Sind.—This recommendation is receiving attention in the Agricultural Engineering Section of the Agricultural Department (see remarks under item 8).

United Provinces.—The technical schools at Lucknow and Gorakhpur continued to assist in repairing agricultural machines and replacing parts thereof, and in training men to do this work.

Iron parts of Olpad threshers are manufactured in the agricultural engineering workshop, and wooden parts of improved ploughs are got made at different centres.

Efforts have been made to evolve improved types of bullock cart wheels and churns.

125. *Development of Poultry Industry (paragraph 497).*

Assam.—An experiment was begun at the Upper Shillong Farm in 1928-29. It was at first unfortunately not successful owing to a widespread outbreak of disease but is being pursued and now promises better results. The work is placed under the Deputy Director of Agriculture, Livestock, who also reports on applications for poultry breeding loans. Enquiries have been made as to the history of passed stipend holders and persons to whom loans have been given, and it is hoped that these efforts will now be made and watched more systematically than before.

Bengal.—Under the scheme for the improvement of poultry, financed by the Government of India's grant, eggs and cockerels of improved stock were distributed free of cost in certain rural areas to encourage the poultry industry.

Bihar.—The progress of the white Leghorn flocks at Kanke and Patna has continued to be satisfactory. The demand for good fowls and eggs is on the increase.

It is proposed to start a flock at Pusa and Sabour in the near future. A new poultry house was constructed at the Patna farm to study the egg laying performance of each hen with a view to developing a high egg laying strain.

Bombay.—The Scheme for replacing country cocks by purebred cocks to give the village-poultry keeper a high yielding cross-bred is undertaken in concentrated areas. The progress from a few in the beginning has extended to about 70 villages. Marked difference in size and number of eggs is seen in places where the work was first initiated by the department. Regular courses in practical poultry farming are given at the Government Central Poultry Farm, Kirkee, and 28 students were thus trained at these classes.

Coorg.—According to the suggestions of Colonel Sir Arthur Olver a scheme for developing poultry industry in the Province was formulated but it has been held in abeyance for want of funds. The Veterinary Department encourages this industry through propaganda.

Delhi.—Two poultry farms have been established in the suburbs of Delhi. In a few villages improved strains have been introduced, but the rearing of fowls is generally regarded as a disreputable pursuit, so that interest is confined mainly to the poorer classes who cannot afford to do very much.

Madras.—The poultry section in the Hosur Cattle Farm is the central breeding station for the Presidency and supplies stock to district agricultural research stations where small flocks are maintained for demonstration and propaganda. An agricultural demonstrator was specially trained in poultry in the United Provinces. After his return he has re-organized the poultry section in the Hosur Livestock Farm and has also done similar work at the district stations where flocks are maintained. He is now doing propaganda work in poultry-keeping in the districts. A woman maistri has recently been appointed to be in charge of chicken-rearing.

In December 1936, the Government sanctioned a grant-in-aid of Rs. 1,000 per annum for a period of three years to the American Arcot Mission Agricultural Institute, Katpadi, for work on development of poultry. Under the subsidized scheme, the mission distributes pedigree cockerels at concession prices in select villages in the North Arcot district and also conducts propaganda for the popularization of poultry industry in the surrounding villages.

The Co-operative department has recently started societies for poultry farming and egg production. Two such societies have been started at Tanjore and at Mayavaram (Tanjore adistrict). In 1938 another society was started at Tiruttani (Chittoor district).

North-West Frontier Province.—Improved breeds of Poultry are kept at Tarnab and Naurang Serai, for demonstration and distribution to Zamindars.

Orissa.—For introduction of a good egg-laying breed, a flock of white Leghorn birds was maintained in the Cuttack farm. Another flock was started at the Angul farm.

Punjab.—Fair progress has been made in the Poultry Section of the Department. A large collection of Desi fowls has been made from various parts of the Province and work in connection with the improvement of the Desi breed is in progress. The principal work of the Poultry Expert was directed to the evolution of improved egg-laying strains of Desi Poultry. Foreign breeds were also kept to meet a definite demand which exists for eggs for hatching purposes.

Sind.—A beginning has been made in the improvement of poultry industry at the Government Fruit Farm, Mirpurkhas, the scheme being financed from rural uplift funds.

United Provinces.—There has not been much headway with the development of poultry industry, although the Central Union of Etah which opened a number of branch farms continued to do good work in this direction. The Provincial Government appointed a committee to enquire into the working of the Provincial Poultry Association and to suggest measures necessary to organize its activities and to develop poultry industry. The report of the Committee is under consideration.

126. Organisation of village artisans on a co-operative basis (paragraph 501).

Assam.—In some places, particularly Karimganj, credit societies have been successfully established among weavers and matmakers. There are at present no non-credit societies, but the Registrar still hopes to establish some in the spheres of weaving and sericulture.

Bihar.—The staff employed to supervise the weavers' co-operative societies was further increased and some more societies were organised. At the end of 1937, there were in all eight weavers' co-operative societies in Bihar, and the staff for supervising these consisted of one organiser and six weaving supervisors. The value of hand-loom cloth produced by these societies during the year 1937 amounted to Rs. 42,887. It was marketed by the Bihar Cottage Industries, Patna. The hand-loom marketing organisation was financed by the Government of India.

Bombay.—Action is being taken in consultation with the Director of Industries.

Coorg.—There is no organisation of village artisans in Coorg.

Madras.—Co-operative societies for weavers have been organized. There were 55 such societies exclusively for weavers on 30th June 1929. Many of them were not functioning successfully owing mainly to the absence of a central agency to co-ordinate their activities and find a market for their output. In 1934, the Government of India announced their decision to assist, by the grant of a subsidy, schemes drawn for developing co-operative buying and selling on behalf of the cotton handloom weavers and generally for the better organization and improvement of the handloom weaving industry. The scheme provided for the setting up of a central weavers' co-operative society at Madras, with a number of district primary production societies linked to it. The production societies are assisted by the central society in securing supplies of raw materials such as yarn, dye-stuffs, chemicals, and also improved appliances and designs, and in disposing of the surplus stock of goods left over after local sales. In pursuance of the scheme, a Provincial society under the name of "The Madras Handloom Weavers' Provincial Co-operative Society" was registered under the Madras Co-operative Societies Act No. VI

of 1932 with an authorized share capital of Rs. 5,00,000. With the appointment of the Secretary, Marketing Officer and Supervisors of production societies the Provincial society commenced work in the latter part of 1935. The grant allotted to this Presidency was Rs. 26,500 for 1934-35, Rs. 59,500 for 1935-36 and Rs. 68,800 for 1936-37.

The Madras Handloom Weavers' Provincial Co-operative Society is rendering useful service to the handloom industry through the production societies in the several districts affiliated to it. With the initial facilities afforded by the Provincial society, hand-sizing machines supplied by the Industries Department have been taken up by the Melapalayam Weavers' Co-operative Society, and Adoni Weavers' Co-operative Society. Primary societies composed of weavers have been started at important weaving centres. On 30th June 1937 there were 80 societies. Raw materials and prepared goods to the value of Rs. 1.54 lakhs were purchased by the societies during the year ending 30th June 1937. Finished goods to the value of Rs. 1.60 lakhs were sold. The Provincial Handloom Weavers' Co-operative Society gives the affiliated societies a subsidy not exceeding Rs. 60 per mensem for meeting the establishment and contingent charges. The Provincial society subsidized, during the year 1936-37, 52 societies to the extent of Rs. 16,596. The central society allows the primary societies also a cash credit for the purchase of yarn in the cheapest market. It has also arranged with a few mills for the supply of yarn to societies and has guaranteed the payment of cost of yarn supplied. Thus every attempt is made to provide the members with a continuous supply of yarn. The central society has opened an emporium at Madras, and sales depots at Madura, Bellary, Calicut and Bezwada, where the goods produced by weavers are exhibited and sold. There is however no objection to the goods being sold locally.

The society will install a calendering and finishing plant and a bleaching apparatus shortly and it is expected that when the handloom goods are calendered, they will compete well with mill-made cloths.

Societies for labourers.—There were 63 labour contract societies on 30th June 1929. This number was reduced to 16 by 30th June 1937. This is due to the fact that several societies had to be liquidated as they could not secure contracts of work from the public, local bodies or Government; the competition of private contractors was too strong for the societies. The only society that is at present doing useful work is the Madras District Labour Society. During the year 1936-37 the society executed work to the extent of Rs. 35,433 and work to the value of Rs. 17,350 was pending execution at the end of 1937. The society completed the construction of 47 dwelling houses.

A society for button manufacturers in Tiruppanangadu in North Arcot district was started in May 1935 and it has been doing useful work.

A society for shoe-makers was started in November 1936 at Vellore (North Arcot district). There are 31 members in the society. It sold finished goods to the value of Rs. 1,400 during 1936-37.

Other artisans.—A society for stone-image workers in North Arcot district has been started recently. Proposals are under the consideration of the Registrar for the formation of two societies for brass-metal workers in the Tanjore and Tinnevely districts. Efforts are being made to start more artisans' societies wherever possible. It is necessary to proceed cautiously in the matter of organization of co-operative societies for artisans, as they are most heavily indebted to middlemen.

Orissa.—During the years 1936 and 1937, Government of India sanctioned grants of Rs. 9,400 and Rs. 13,400 respectively to Orissa for the improvement of the handloom industry. A scheme for the manufacture and sale of handwoven goods has been sanctioned.

Under the scheme Weavers' Co-operative Societies were organised, by the organiser specially appointed for the purpose. These societies being guided by the Weaving Supervisors, manufactured and supplied handwoven goods to the Central Marketing Organisation, Gulzarbagh, which served both Bihar and Orissa till the 31st November 1937.

United Provinces.—The Blanket Spinning and Weaving Society at Najibabad (Bijnor) has recently put up a milling and finishing plant as a result of which the quality of its produce may improve and consequently fetch better prices.

The Co-operative Weaving and Sale Society at Sandila continued to manufacture jaconet cloth for the United Provinces and Bihar Governments and gauze cloth for hospitals. It manufactured two lakhs of yards of various kinds during 1937.

The Mason Industrial Federation of Bara Banki put up a weaving factory and sold cloth worth Rs. 16,537 during 1937.

The number of Durrie-maker Societies in Agra was four. They manufactured durries of superior quality which were sold through the Central Stores at Agra.

Six more societies have taken up the weaving of durries of cheaper quality which found a ready market.

127. Government assistance to industry (paragraph 504).

Assam.—The views of the Commission are generally accepted. The question of framing a State aid to Industries Bill was again considered, but set aside as premature. Government have at present not the funds to investigate new forms of industry or give technological instruction. The conditions on which loans can be given and the rate of interest have been thoroughly reviewed, in view of the serious disclosures of misapplication that have recently been made, and the rise in the rate of Government borrowing.

Bihar.—The Cottage Industries Institute at Gulzarbagh, the Silk Institute at Bhagalpur and the Wool Weaving Institute at Gaya continued to impart training in such Cottage Industries as the agriculturists could take up as a part-time occupation. The Half-time Weaving School at Biharsharif continued to impart vocational training as well as general education up to the middle English standard. Seven cotton weaving demonstration parties, one dyeing demonstration party, one rope twisting demonstration party, one party for eri rearing and spinning and one for blanket weaving continued to tour throughout the Province to introduce improved methods and cottage industries by the use of labour saving appliances among cottage workers, both artisans and agriculturists. Eri silk-worm rearers were supplied with disease free seed eggs from the Ranchi Eri Seed Supply Station. The Tasar Seed Supply and Research Station at Chaibasa conducted experiments and supplied disease free eggs to the tasar rearers of Chota Nagpur. The two marketing organisations, one for cotton weavers and the other for blanket weavers of the Province, both financed by the Government of India, organised production of cotton and woollen fabrics by cottage workers and helped to market them both in India and abroad.

Bombay.—The Department of Industries organises various peripatetic demonstration parties such as wool-weaving demonstration, dyeing demonstration and tanning demonstration and maintains peripatetic institutions for imparting instructions in certain rural industries like art-crafts, cane and bamboo work, etc., and renders assistance for the development of industry in general.

Central Provinces.—The rules under the Central Provinces State-aid to Industries Act 1933 (XII of 1933) were issued and the Act was brought into force in the Central Provinces on the 1st September 1934 and in Berar on the 1st January 1935.

Coorg.—No Government assistance is given to industry.

Delhi.—The Government Cottage Industries Institute, Delhi, was established in 1935, with a grant from the Government of India and provides training in spinning, weaving, gota making, manufacture of carpets and durries, dyeing and calico-printing, dry cleaning and washing and clay modelling. No tuition fee is charged and free accommodation is provided in the hostel.

Practical demonstrations of various cottage industries are given at rural and other village exhibitions. The most hopeful lines are probably (i) spinning and weaving, and (ii) dyeing and calico-printing. Efforts are now being made to attract to the Institute village boys who will at the end of their training resume their traditional work in the villages.

Madras.—The assistance rendered by Government to the several classes of industries is as below :—

Handloom woollen industry.—From the year 1937, assistance has been rendered under the Government of India and Provincial subvention scheme for the development of the cottage and small scale woollen industries in this Province. The amount of grant available for this Province for 1937-38, was Rs. 21,700. A pile carpet weavers' co-operative society was started at Ellore and *cumbly* weavers' societies were started in the Bellary and Godavari districts. Under the subvention scheme these co-operative societies are being assisted with working capital, improved appliances and some special staff comprising a designer, a dyer, demonstrators, and co-operative inspectors.

Hand-spinning and khadi-weaving industry.—In 1937, a scheme of subsidy for the hand-spinning and khadi industry in this Province was inaugurated. The Government sanctioned a subsidy up to a maximum of Rs. 1,25,000 on the actual audited increase of production of khadi during the year 1937-38. They also sanctioned a grant of about Rs. 60,000 for designing, manufacturing and supplying more efficient wheels and carding bows and for training and engaging necessary instructors for the introduction of improved implements among the spinners.

Sericulture.—There are four silk farms at Coonoor, Hosur, Palmaner and Thadaguni engaged in the production and supply of disease-free layings. Practical demonstrations have been held in rational methods of rearing silk worms at the

rearers' houses with special reference to timely feedings, cleaning of litter, spacing of worms to avoid overcrowding, better ventilation in rearing rooms and the quality of mulberry leaves to be used at different stages of the worms.

In order to meet the increasing demand for tested seeds some intelligent rearers were trained in the microscopic testing of silk moths with a view to eliminating diseased layings. These trained rearers have been induced to start aided grainages for testing and distributing disease-free layings to other rearers under the supervision of the departmental officers. Six aided grainages have so far been started and are now working in Kollegal taluk.

Cross-breeding work was also undertaken on an experimental scale after the Sericultural Expert's return from Japan and China with eggs brought from those countries. These seeds are proving themselves to be a boon to the rearers on account of the increased yield of cocoons with richer silk content and shorter period taken in rearing. The cross-breed worms are also disease resisting.

Cottage industries.—The question of the development of cottage and small scale industries has been engaging the attention of the Industries Department for sometime past and for the promotion of small scale industrial operations other than weaving and sericulture, intensive courses of training have been provided in certain small scale industries, namely, leather goods manufacture, casting and metal working, pottery, and coir making, in addition to the usual courses of instruction in the Government and aided industrial schools. A leather goods manufacturing class is run in the Leather Trades Institute where students, preferably of the shoe-making class, are given a year's course of training in shoe-making and the manufacture of simple leather goods. A casting and metal working class has been opened in the Government School of Technology, Madras, and instruction is given in the preparation and manufacture of articles of brass and other metallic alloys using modern moulding methods. It is expected that the students, on the completion of their training, will be able to set up small establishments of their own. A pottery class is attached to the School of Arts and Crafts, and instruction is provided in the manufacture of articles, such as, jars and domestic pottery including glazing. A coir-working class was started in Malabar with a view to giving instruction in producing thinner and more evenly twisted yarns for which better prices and a uniform demand are forthcoming.

Coconut jaggery.—Preliminary tests have been conducted in the manufacture of jaggery from coconut juice with a view to ascertaining whether the keeping qualities of coconut jaggery would be improved to an extent which would enable it to be transported over a distance and used for refining purposes, and if so, at what cost it could be prepared and supplied. The results have been promising and steps have now been taken to carry out a practical refining test of the jaggery in a sugar factory. A similar demonstration of improved methods of manufacture of palmyra jaggery in the Salem district has also been conducted. An experiment was also conducted in order to ascertain the yield of oil from copra obtained from the coconuts available in the Salem district and the cost at which the oil could be supplied, since although an appreciable quantity of coconut oil is imported into the Salem district, little or no coconut oil is at present extracted.

Large scale industries.—An investigation was carried out in regard to the possibilities of attracting industries to Mettur and a report was published on the subject. A factory for the manufacture of caustic soda, bleaching powder and chlorine is being established whilst a mill for the production of the finer quality textiles is under construction. The possibilities of establishing new large scale industries of economic importance have received attention and among the industries which were subject to preliminary examination may be mentioned staple fibre and calcium carbide and also power alcohol and fertilizers. The question of the development of the Salem iron ores is receiving attention and the further steps to be taken in regard to their development are under consideration.

Coir production.—Attempts have been made from time to time to encourage the people on the East Coast to adopt improved methods of retting coconut husks, as it is considered that if the West Coast methods are adopted, coir fibre and yarn could be produced on the East Coast approximately equal in quality to those produced on the West Coast. A demonstration of improved methods of coir-retting and coir production was conducted by the department at Baruva in the Vizagapatam district. A maistri conversant with West Coast processes of coir-retting and coir-spinning was employed to demonstrate these methods

to the fisherfolk and other people at Baruva and the necessary hand operated machines were lent from the Textile Institute, Madras.

At the instance of the Amalapuram Loan and Sale Society a demonstration was held by the department at Kodurpadu, a village three miles from Amalapuram in the production of coir under the supervision of the departmental chemist.

Kerala Soap Institute, Calicut.—The institute was started primarily to impart instruction in soap-making and allied industries and to carry out experimental and advisory work in the sphere of oils and fats. Enquiries from private people regarding oil-crushing, soap-making, essential oil distillation, etc., are answered. Besides manufacturing household, laundry, textile and high class toilet and saving soaps, the institute is making medicated soaps, insecticidal soaps, etc. Many new preparations for eradicating estate and garden pests have been manufactured experimentally of which special mention may be made of an insecticide for killing leeches. Research work on oils, fats and allied products and experiments in the manufacture of plastics, moulding compositions, lacquers, etc., from cashew rind oil were carried out at the institute. A model hand cashewnut roaster has been devised and a bulletin explaining its construction and working has been published. Arrangements have been made to equip the institute with an essential oil distilling plant for experimental and demonstration purposes, while preliminary experiments on the preparation of cosmetic articles, such as hair oils, creams and pomades have been completed.

Manufacture of white sugar and improved jaggery from palmyra juice.—A demonstration of white sugar manufacture from palmyra juice with the aid of centrifugals was conducted at Rettakulam in the Tinnevely district and it was shown that good marketable white sugar could be prepared from palmyra juice by the open pan system, and that the molasses obtained in the process could be converted into jaggery by reboiling with fresh juice. Another demonstration was carried out at Navadur in the West Godavari district. The results went to confirm the conclusions arrived at from the Rettakulam experiments that marketable white sugar could be produced from palmyra juice, and that it is possible to prepare from palmyra juice sugar jaggery of a superior quality which should realize a higher price than the jaggery at present prepared.

State-aid to industries.—Since 1928, 13 loans aggregating Rs. 12,850 have been granted under the State Aid to Industries Act. In addition, a subsidy of Rs. 108 was sanctioned to a button manufacturing co-operative society and Government have subscribed for shares of the face value of Rs. 17,850 in a silk filature manufacturing concern. Under the Madras State Aid to Industries Act as it stood before 1936, State-aid could be given only to three classes of industries, namely, (a) new or nascent industries, (b) industries to be newly introduced into areas where such industries are undeveloped, and (c) cottage industries. The Act was amended in 1936 and clause 3 (i) of the amended Act provides for the grant of aid to old or established industries also in suitable cases, if special reasons exist therefor. Under section 9 of the old Act, loans could not be granted for an amount exceeding 50 per cent. of the net value of the assets of the industrial business or enterprise, but the proviso to this section permitted the grant of loans up to Rs. 40,000 even though they exceeded the 50 per cent. limit. In the amended Act, the proviso has been omitted, and the limit of the loan which may be granted under the Act, in all cases, fixed at 50 per cent. of the value of the assets of the business *plus* the value of the other property if any, offered as collateral security. Section 14 (a) of the amended Act also exempts industrial businesses or enterprises, with a capital outlay not exceeding Rs. 2,000 from certain restrictions imposed by the Act as against the previous limit of Rs. 1,000. The definition of "Cottage Industries" has also been liberalized. Formerly the term "Cottage Industries" occurring in section 5 (i) (c) of the Act, was taken to refer only to "Industries carried on exclusively for the benefit of, and by, workers in their homes" and not industries carried on for the benefit of middlemen, though the workers happen to work not in factories but in their own cottages. In practice, this definition was found to be restrictive since it is often not possible completely to dissociate the workers from the middlemen capitalists. The definition of the term has, therefore, been modified so as to permit of the grant of loans to cottage industries carried on by workers in their own homes even though the middlemen stand to benefit, in greater or less degree, by the cottage workers' labour. A new clause (d) has been added to section 20 of the Act so as to enable the Government to assist a village industry in any manner which may be determined by the Provincial Government. The improved facilities for the grant of financial

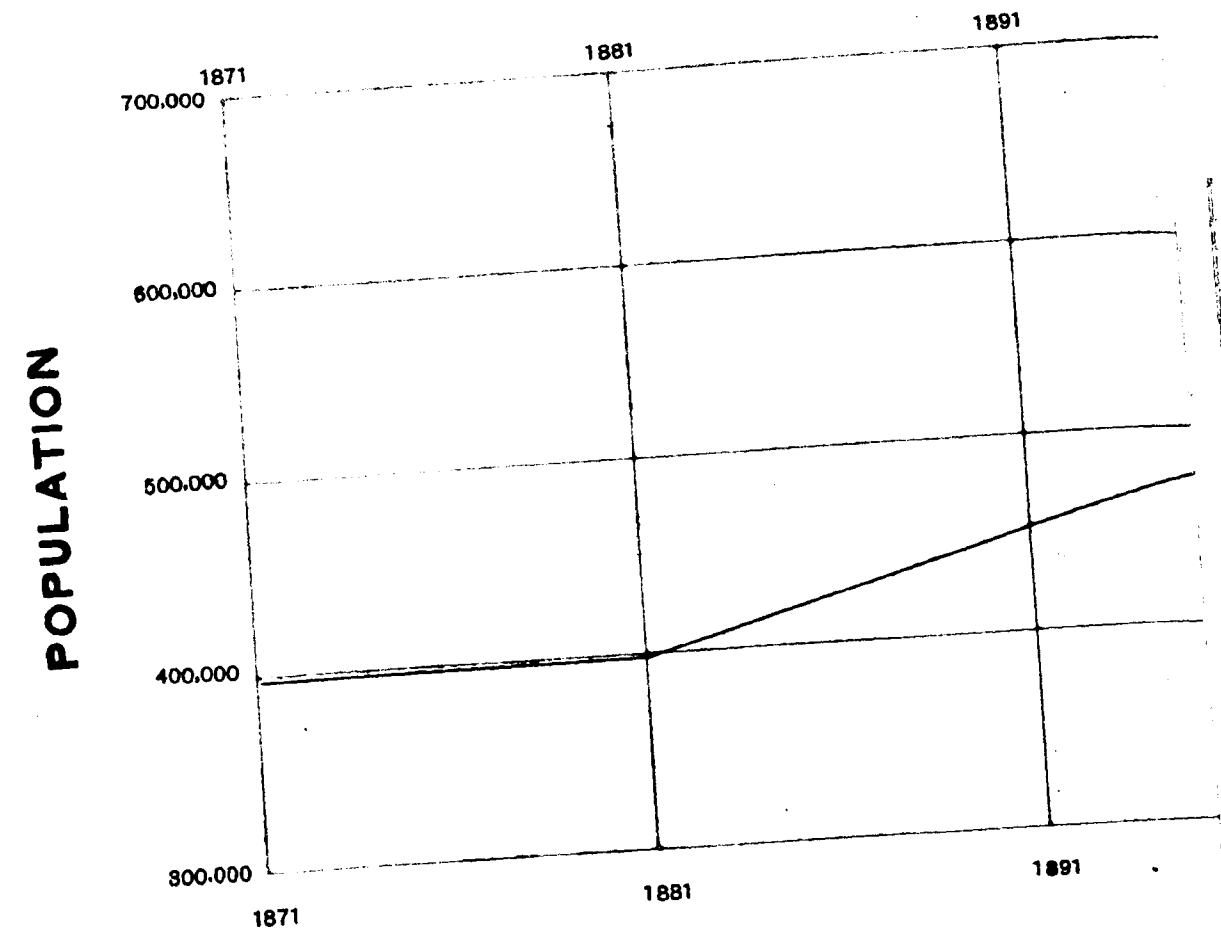
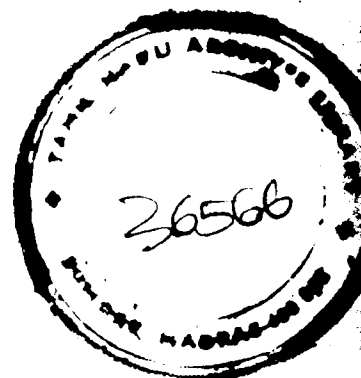


PLATE No. 13



assistance to cottage industries have been widely advertised by notification in the newspapers and district gazettes as well as by the distribution, throughout the Presidency, of printed leaflets in English and the principal vernaculars.

Orissa.—Two demonstration parties with 2 Weaving Supervisors, 14 Weaving Mistries and 2 Dyeing Mistries worked in villages and introduced improved looms, dobbies and new designs among village weavers. They also introduced modern methods of weaving and dyeing by actual demonstration in villages.

Government sanctioned in 1937 two such additional demonstration parties for the above work and the post of Textile Expert for supervision of the work of demonstration parties and for giving technical advice.

Connection with the Bihar Handloom Marketing organisation was severed from the 1st December 1937 and an independent organisation for Orissa with the Government of India grant has been sanctioned. Arrangements are being made to establish it early.

Disease-free eri seeds were supplied free to the agriculturists of North Orissa through the Honorary Organiser of Sericulture from the Eri Seed Supply Station, Ranchi, which was established with the Government of India grant. A scheme for a separate Eri seed supply station for Orissa was prepared and is under consideration.

To introduce wool weaving in Orissa two wool weaving demonstration mistries were sanctioned.

A scheme of the All-India Spinners' Association for training in hand spinning and weaving and for cultivation of cotton was approved and a grant sanctioned.

A scheme of the All-India Village Industries Association for training in date palm gur, apiculture, hand-made paper and palmyra was approved and a grant was sanctioned.

United Provinces.—The Provincial Department of Industries continues to pay special attention to the development of small industries and various experiments connected with several industries were undertaken at Government institutions.

A central marketing organisation for finding sales of handloom was opened at Lucknow. It is assisted by six stores at important weaving centres which supervise the production of cloth. Research and design sections also are attached to the Central Weaving Institute, Benares, and the Government Central Textile Institute.

A scheme for developing the woollen industry has been introduced. It comprises (1) the putting up of a raising and finishing plant, (2) the supply of improved appliances, (3) the improvement of designs, and (4) the provision of marketing facilities.

In 1936 schemes were introduced for (1) marketing the produce of village industries, (2) marketing of ghee through co-operative societies and subsidized trade associations, and (3) the development of selected village industries by means of co-operative stores. With the exception of no. (2), the others had to be given up after 4 months' working.

A sum of Rs. 1 lakh was provided for giving grants to young men to set up new business or to expand the existing ones.

Fifteen tuitional classes to train artisans in improved methods at important centres have been started.

A scheme for the improvement of Gur industry has been introduced in 30 districts. The work will consist of mainly :

- (1) Distribution of improved bullock power crushers and pans.
- (2) Tuition in improved methods.

Besides, at seven centres intensive work consisting of the following is being carried out :

- (1) Trying out the results of small scale experiments on a big scale under village conditions ; and
- (2) the marketing of the improved product.

For the improvement of the hand-spinning industry, the assistance of the All-India Spinners Association is being taken.

Another scheme relates to the improvements in the raw hide industry by the demonstration of improved flaying, curing, etc.

128. Qualifications of Directors of Industries (paragraph 505).

Assam.—The department of Agriculture having been separated, an Indian Civil Service Officer was appointed Registrar, Co-operative Societies, and Director of Industries with effect from 24th November 1930. Some assistance especially in regard to the technical schools has been realised from the appointment in 1930 of a Factory Inspector who now inspects the schools.

Bombay.—The question of framing an amended rule in regard to recruitment for the post of the Director of Industries is under the consideration of this Government.

Orissa.—There is no separate post of Director of Industries in the province. The Director of Development, who is an officer of the Indian Civil Service, discharges the duties of the Director of Industries.

United Provinces.—The post of Director of Industries is held by an Indian Civil Service officer.

129. *Encouragement of migration (paragraph 509).*

Assam.—For a number of years migration from Eastern Bengal to the Assam Valley has been very considerable and has indeed formed a serious problem in view of the complaints that the Assamese population are being driven out. Government recently appointed a Committee to examine this question in detail with a view to initiating and furthering colonisation schemes for immigrants and indigenous people so as to develop more quickly the available waste lands. The Committee's report is still under consideration.

Central Provinces.—On the passing of the Tea Districts Emigrant Labour Act, 1932, the whole of the Central Provinces has been declared as a "Controlled emigration area" and the free recruiting obtaining in the districts of Jubbulpore and Saugor to which reference was made in the report of 1931 is no longer in force.

United Provinces.—The only portion of the province to which migration could be encouraged, if health conditions were improved, is the Tarai and Bhabar area; no arrangements for improving health conditions here could be made owing to financial difficulties.

CHAPTER XVII.—Horticulture and Plantations.

130. *Development of the cultivation of fruit and vegetable with special reference to picking, packing, transport and the use of suitable containers, the establishment of regulated markets and improvement of marketing conditions generally (paragraphs 514—517).*

Assam.—The possibility of growing certain varieties of deciduous fruits successfully on the hills of Assam has now been demonstrated to a considerable extent. Oranges also do particularly well in parts of the plains, and reach distant markets, such as Akyab, Benares and Calcutta. The culture of fruit is, however, capable of much development, and a great deal requires to be done in the selection of stocks and varieties, manurial experiments, picking, packing, transport and marketing arrangements. A scheme has been worked out for the development of fruit culture under the Economic Botanist to be financed partly by the Imperial Council of Agricultural Research and partly by the Provincial Government.

Baluchistan.—Development of the fruit growing industry was dislocated by the earthquake in 1935. The process of reconstruction has been accompanied by a determined effort as far as possible, to improve and market the agricultural products of the province. A Government Fruit Farm has been in existence in Quetta since 1911 but as a result of the local Administration's proposal in 1936, its work was expanded by the addition of a Marketing Staff on a temporary basis at a cost of Rs. 6,200 to Rs. 6,800 per annum. The possibilities of fruit culture in Baluchistan are great and with organisation and expansion it is hoped that much can be done to capture the Indian Market in competition with the Afghan fruit trade. It is believed at present that about 1/3rd of the fruit taken down the Quetta Railway into Sind and Punjab, etc., consists of Baluchistan products, 2/3rds being imported from Kandahar.

The efforts of the central Fruit Farm are being supplemented by a scheme for a vineyard at Mallezai in the Quetta-Pishin District and for almond plantations in the Loralai District. The principle on which these are conducted is that Government should pay for the staff and obtain from the land-holders a certain area to be administered through Government Agency for a specified period with the aid of a Taccavi loan. The staffs for these ventures are still on a temporary footing.

The vineyard is now in being, planting having been undertaken over 100 acres early in 1938. The plants are in trenches and present indications are that at least 60 per cent. will grow successfully.

For cereal crops a seed Farm exists in the plains portion of Baluchistan at Usta in the Nasirabad Sub-Division of the Sibi District under irrigation from the Sukkur Barrage canals. At this Farm experiments on wheat, cotton and oil seeds are regularly carried out and quantities of improved varieties of these crops are distributed to cultivators.

Bengal.—The horticultural work at Krishnagar under the scheme financed by the Imperial Council of Agricultural Research for the improvement of fruits in the plains of Bengal was continued with satisfactory results.

Bihar.—With a view to developing the fruit export trade of this Province with special reference to mangoes and lichis, steps are being taken to study the keeping qualities of these fruits on long distance rail journeys. Arrangements are being made to send fruits to Bombay.

Bombay.—As a result of the report by the committee on the improvement of fruits and vegetables in the town of Bombay in 1934 which was in itself the outcome of the two fruit conferences held by Government, a Provincial Fruit and Vegetable Market Committee was appointed with Dr. G. S. Cheema, Horticulturist to Government, as its Chairman, in October 1936. The committee met twice in the year 1937 and submitted useful suggestions to Government for ameliorating conditions of trade and transport of fruits and vegetables. The committee also sponsored the export of mangoes to England at the time of Their Majesties' Coronation in 1937, similar attempts having been previously made in the years 1932 and 1933. This committee is likely to prove a useful liaison body between the Government on the one hand and traders and fruit growers on the other for the solution of difficulties and grievances.

The outstanding improvements in fruit crops are the guava Lucknow no. 49, pomegranate G. B. no. 1, Washington variety of papaya and the spread of Basrai variety of banana in the Deccan districts. Grape fruit and Italian lemon are the new introductions which have been tried with success. A large number of these plants was sold both in 1936 and 1937.

Statement showing the improved plants and seeds distributed and the approximate area covered in different tracts.

Name of crop.	Tract.	1936-37.		1937-38.		Remarks.
		No.	Approximate area.	No.	Approximate area.	
Lucknow no. 49 Guava graft.	Gujarat	..	*A. †G.	14	0 3½	Distance 15 feet between plants
	Deccan	2	0 ½	15	0 4	
	Karnatak	3	0 ½	53	0 13	
	Konkan	2	0 ½	6	0 1½	
	Outside Bombay Province and States.	5	0 1½	54	0 13½	
	Cash sales	52	0 13	315	2 18½	
		64	0 16	457	3 14	
Basrai Banana	Gujarat	..	..	..	..	Distance 6 feet between plants.
	Deccan	875	0 26	3,007	2 20	
	Karnatak	..	..	107	0 3½	
	Konkan	..	..	..	..	
	Outside Bombay Province and States.	95	0 3	163	0 5½	
	Cash Sales	978	0 32½	943	3 20½	
		1,948	1 21½	4,220	3 20½	

*Acres.

†Gunthas.

Name of crop.	Tract.	1936-37.		1937-38.		Remarks.
		No.	Approximate area.	No.	Approximate area.	
Pomegranate G. R. no. 1 and other selections.	Gujarat	..	*A. †G.	80	0 20	Distance 15 feet between plants.
	Deccan	100	0 25	9	0 2½	
	Karnatak	..	..	..	..	
	Konkan	4	0 1	..	..	
	Outside Bombay Province and States.	57	0 14½	137	0 34½	
	Cash sales ..	11	0 2½	160	1 0	
		172	1 3	386	2 16½	
Grape fruit	Gujarat	..	..	288	4 4	70 plants per acre.
	Deccan	44	0 25	293	4 8	
	Konkan	7	0 4	371	5 12	
	Karnatak	34	0 20	216	3 4	
	Outside Bombay Province and States.	72	1 2	557	7 38	
	Cash sales ..	353	5 2	313	4 19	
		510	7 13	2,038	29 5	
Italian lemon ..	Gujarat	..	..	83	0 20½	Distance 15 feet between plants.
	Deccan	137	0 34½	335	2 3½	
	Konkan	..	..	192	1 8	
	Karnatak	6	0 1½	208	1 12	
	Outside Bombay Province and States.	5	0 1½	169	1 2½	
	Cash sales ..	95	0 23½	148	0 37	
		243	1 20½	1,135	7 3½	
Papaya Seeds of Washington variety.	Gujarat	4 15	79 0	6 5	101 0	Seed rate 1 oz. per acre.
	Deccan	1 11	27 0	5 7½	87 30	
	Konkan	0 10	10 0	2 13½	45 20	
	Karnatak	0 12	12 0	0 4	4 0	
	Outside Bombay Province and States.	7 1	113 0	5 1½	81 30	
	Cash sales ..	4 7	71 0	7 14	126 0	
		19 8	312 0	27 14	446 0	
Papaya Seedlings Warrington	Cash sales ..	2,544 nos.	2 0	1,342 nos.	1 0	
			314 0	..	447 0	

*A=Acres.

†G=Gunthas.

Name of crop.	Tract.	1936-37.		1937-38.		Remarks.
		No.	Approximate area.	No.	Approximate area.	
Lucknow no. 49 Seeds	Gujarat	0 6	*A. †G.	7 0	112 0	Seed rate 1 oz. per acre.
	Deccan	..	..	4 2	66 0	
	Konkan	0 3	3 0	2 8	40 0	
	Karnatak	..	..	5 6	86 0	
	Cash sales ..	0 4	4 0	..	..	
		0 13	13 0	19 0	304 0	

The cold storage investigations which were initiated in 1934 by the Imperial Council of Agricultural Research have shown that fully ripe Nagpur oranges, even if not completely yellow, can be kept in good condition at 40°F for three months. Preliminary cold storage trials of Malta oranges showed that when ripe they could be kept at 40°F. for four months without any wastage. The Alphonso mango has been found to keep well at 48°F. for 50 to 60 days.

Investigations in chillies and brinjals have given some promising strains, which are being grown in the district in comparison with local varieties to see if they are better in yield and quality.

Central Provinces.—A Horticulturist was appointed in 1937 in connection with the Citrus Research Scheme financed by the Imperial Council of Agricultural Research.

The Marketing Section has introduced grading in the Nagpur orange market and has conducted cold storage experiments in collaboration with the Horticulturist to the Government of Bombay.

An Orange Growers' Association has been formed in the Nagpur district with a view to secure better prices and find wider market for oranges. Government assists by advancing taccavi loans for orchard improvement and also finances marketing expenses.

Coorg.—The Government intends to establish a Provincial Marketing Society to deal with the problems of packing, transport and the use of suitable containers and for the improvement of marketing conditions.

Orissa.—The work in fruit growing was taken up a few years ago in certain Government farms. Citrus fruit cultivation was found eminently suitable in certain districts of the province. As a result of propaganda 240 private citrus fruit plantations have been started in the districts, under the guidance of the department. Cultivation of other fruits, like mango, litchi, sapota, rose-apple, Benares plum and banana has become very popular and the Department supplied during the last two years several thousands of grafts to the public.

Demonstrations in cultivation of vegetables were given on a large scale.

As citrus fruit cultivation has extended rapidly, a scheme for research on citrus fruit has been submitted to the Imperial Council of Agricultural Research which has been sanctioned.

Punjab.—No section of the Agriculture Department has grown so rapidly in recent years as that which is devoted to the development of fruit growing and fruit preservation. The demand for instruction in both these aspects of the fruit industry, and for information and advice in all matters relating to it has been and still continues to be so great that each year further facilities for teaching, research and advisory work have to be provided. Various schemes of Research on citrus fruit stock and preservation of fruit and vegetables financed by the Imperial Council of Agricultural Research and the Punjab Government are in progress. A canning hall has been erected at Lyallpur where experiments on fruit preservation are carried out on a semi-commercial scale and where instruction is given to those who desire to take up fruit preservation as a business.

*A=Acres.

†G=Gunthas.

Sind.—A Central Government Fruit Farm has been established at Mirpurkhas and considerable progress has been made in research work on fruit nursery plantations specially, citrus, grapes and mangoes. The work of handling and marketing is still in its infancy.

United Provinces.—The area under orchards is on the increase and selected fruit trees are propagated and sold to the public; for rural developments a rebate of 30 per cent. on fruit trees and of 60 per cent. on vegetable seed is allowed. Fruit and vegetable shows are also held at which horticultural exhibits are displayed and advice and lectures are given. A fruit stocking bucket which records the count is in use and fruit is graded for size in the Chaubattia orchard.

Grants were also made to the public for orchards, and *malis* are trained in Government gardens. Besides arrangements were made with the Allahabad Fruit Growers' Association to give regular training for six months in fruit preservation to selected students.

131. *Work of Agricultural Departments in the selection and classification of Root-stocks (paragraph 518).*

Assam.—The late Mr. Holder carried out a number of trials on indigenous and important stocks, and established certain points to his satisfaction. Budding of oranges on different stock has been carried out by the Department at Khanapara and Haflong. These operations will be continued and expanded if the scheme mentioned above can be financed.

Baluchistan.—A scheme for this work has been sanctioned by the Government and work will be started shortly. A small amount of work on Root Stock has been done and the results are promising.

Bihar.—Remarks under item 130 may be seen.

Bombay.—No such work worth mentioning has been undertaken on an elaborate scale.

Central Provinces.—This forms part of the programme of work of the Horticulturist.

Coorg.—Root stock selection has been taken up only in orange cultivation. It is too early to arrive at any definite conclusion as to its success.

Madras.—The Government sanctioned in 1936 a scheme for carrying on work on identification and classification of fruit trees which include mangoes, citrus, sapota and other cultivated varieties as grapes, figs, pomegranates, pineapples, etc. The work has been started at the Kodur Fruit Farm, Cuddapah district. The opening of a fruit nursery has also been sanctioned recently at this station for the cultivation and propagation of fruit trees of good parentage. It is the object of these experiments to standardize improved methods of selection of stock, and propagation and by correcting the present defective nursery practices, encourage fruit cultivation in this Presidency.

North-West Frontier Province.—The experiments on root stock given in the previous report are yet under trial. Wild peach is the best root stock for peaches and plums in the Province.

Punjab.—The Agricultural Department is now in a position to recommend specific varieties of many of the most important fruits. It now remains to produce sufficient nursery plants of these varieties to meet the demand for them and for this purpose the Government of India gave a grant for the provision of a large number of reliable nursery fruit plants for sale to the public at cheap rates. A fruit preservation plant on a semi-commercial scale for experimental purposes and to afford facilities for instruction has been undertaken. Work in connection with a scheme of research on citrus stock and grape vines in the Punjab financed by the Imperial Council of Agricultural Research is progressing.

Sind.—Work in this connection is in progress at the Government Fruit Farm, Mirpurkhas, and at the Fruit Sub-Station, Larkana.

United Provinces.—Different apple stocks are being tried at Chaubattia and efforts are being made to raise them vegetatively. A stock trial experiment for apple stock also has been laid out and planted up.

Observations on the bud take of different stock scion combinations were also taken.

132. *Experimental work by Agricultural Departments on fruit and vegetables (paragraph 519).*

Assam.—Work on citrus and deciduous fruits was continued. There are two small orange stations at Haflong and Khanapara and a deciduous fruit garden at Shillong.

Budded citrus and grafted deciduous fruit trees are being distributed among the general public. Moreover, vegetable seeds and plants were also supplied according to demand.

Baluchistan.—Considerable amount of work on the classification and selection of local varieties of fruit has already been done. Foreign varieties of outstanding merit have been introduced from England, California and France and are now under trial. Information regarding the best varieties of different types of vegetables is available. It has definitely been proved that under Quetta conditions half an acre under best varieties of tomatoes is capable of fetching up to Rs. 1,000.

Bengal.—Apart from the horticultural work at Krishnagar, experiments on fruits and vegetables were systematically carried out at the Kalimpong and Rangamati farms.

Bihar.—The Department is maintaining small orchards at most of the small farms, and the central farms in South Bihar and Chota Nagpur. The cultivation of vegetables is an important function of the Patna, Sabour and Kanke farms.

Bombay.—Varietal trials on banana, manurial experiments on banana, mango and mosambi, improvement of guava and pomegranate by selection, plant propagation experiments in mango and guava and orchard irrigation experiments are in hand at the Ganeshkhind Fruit Experiment Station, Kirkee.

Central Provinces.—Fruit trees and vegetable seeds have been imported from other provinces for trial in the various Government gardens under the control of the Agriculture Department and experience is being gained on them.

Coorg.—The most important fruit in Coorg is the orange and for its improvement a farm was opened a few years ago and experiments to discover the cultural and manurial needs, selection of root stocks and a sexual method of propagation are being conducted. Support is given to private enterprise by supplying the best varieties of fruit plants.

Madras.—There are three fruit research stations in the Nilgiris, viz., the Pomological Station at Cooroor and the Burliar and the Kallar Experimental Fruit Stations. Research work at these stations is being continued. Till recently work on fruit grown in the plains was confined to that carried on in small orchards attached to district farms devoted to other crops. A fruit station specially for work on fruit grown in the plains was opened in 1935 at Anantarajupeta near Kodur in the Cuddapah district with a grant given by the Imperial Council of Agricultural Research. The work subsidized by the Council is to be carried on till 1940. Considerable attention has been paid at this station to the testing of the different stocks for grafting purposes. Research work in regard to propagation of citrus by budding was done and technique suited to local conditions has been worked out. Steps were taken to propagate types of mangoes and citrus of good quality and of commercial importance. As a preliminary step to the improvement of fruit and its marketing, work on nomenclature, propagation and classification was started.

At the Samalkota Farm (East Godavari district) forty varieties of plantain were under study; attempts at hybridization were fairly successful and a few crosses obtained. At Taliparamba (Malabar district) a systematic study of pineapple was under way. The Government have sanctioned the establishment of fruit nurseries, one attached to the farm at Anantarajupeta and the other to that at Taliparamba, with the object of encouraging fruit cultivation by supply of plants of reliable parent stock.

At the Central Farm, Coimbatore, an orchard to study the possibilities of fruit growing was started. A vegetable garden is maintained close to the orchard, which helps to afford experience in kitchen gardening to the students.

Orissa.—See remarks under item 130 above.

Punjab.—Please see remarks under item 131 above.

Sind.—Please see remarks under item 131 above.

United Provinces.—Storage experiments with varieties of apples were carried out in the province and mango fruits were sent to Poona for storage experiments.

Mango grafts without soil were sent to Burma and to some stations in other provinces successfully. Hertemone was used on cuttings to encourage early rootings and this was successful on soft wooded kinds. An apple varietal trial was also carried out with early, mid-season and late varieties. Fruit diseases and insect pests were also studied and experiments were conducted which showed that mounds of earth round papaya stems prevented colour rot.

A scheme for the improvement of the marketing of fruits was also drawn up and approved by the United Provinces Fruit Development Board. It involves the appointment of a marketing supervisor and nine reliable subsidized commission agents in important markets in the United Provinces, and its aim is to build up a chain of reliable commission agents who will dispose of the fruits of the members of the United Provinces

Fruit Development Board. Their work will be inspected and supervised by the Marketing Supervisor. A number of surveys relating to the marketing of a number of products was conducted by the marketing staff. They include surveys on citrus fruit, coffee, loquats, potato, mango, maize, barley, gram, sheep, goat, wool, mustard, rapeseed, coconut, ghee and butter. In addition several investigations were conducted on different markets, fairs and co-operative societies of the province.

133. Recording of marketing information by Marketing Officers and Agricultural Departments (paragraph 519).

Assam.—Recording of marketing information has already been taken up and will continue for sometime more.

Bengal.—The staff employed under the Agriculture Department in connection with the marketing scheme of the Imperial Council of Agricultural Research was busy making a marketing survey and information was collected regarding a number of commodities.

Central Provinces.—This is being done by the marketing section.

Madras.—The staff under the Marketing scheme subsidized by the Imperial Council of Agricultural Research conducted marketing surveys of various fruits in this Presidency. A number of societies for fruit growers have been started by the Co-operative Department for marketing their produce. The Provincial Marketing Society in Madras helps the affiliated societies in marketing their fruits to the best advantage. The action taken to develop markets for fruits is referred to in paragraph 72.

North-West Frontier Province.—Marketing Officers of Agricultural Department have taken up the work and they provide all possible facilities to the agriculturist.

Orissa.—Marketing surveys are in progress.

Punjab.—The marketing staff is studying the marketing of fruit.

United Provinces.—Records of weekly arrivals, carry over and wholesale and retail prices are obtained from the important markets of the United Provinces and a fortnightly bulletin is published, giving the information in detail.

134. Encouragement of private enterprise in establishing nurseries for orchard stock and production of vegetable seeds (paragraph 519).

Assam.—This is being followed so far as practicable. It was made a condition of the lease of the La-Chaumiere garden that grafts should be made available for issue to local horticulturists, and much use has been made of the concession.

Grafts of oranges, pine-apple suckers, etc., are also issued on sale through the seed depots.

Baluchistan.—A number of private fruit nurseries has been established all over the country but they are still far behind the times.

Bengal.—High class vegetable seeds were sold in packets by the Agriculture Department at a low price. At the instance of this department the railway companies fixed quarter parcel rates for the transport of grafts and plants.

Bihar.—The Botanical Section prepares each year a large number of grafts, etc., of the best economic varieties of mangoes for sale at very low rates to the public with a view to encourage the supply of reliable grafts to those taking up fruit cultivation as an industry.

Bombay.—Twelve nurseries have been set up within the last ten years :—

Division.	Address.
N. C. D., Nasik ..	(1) Mr. Vishnu Sitaram Ranadive, Ranadive Gardens, near Railway Station, Dhulia, West Khandesh.
S. C. D., Poona ..	(1) Mahadu Savalaram Bhujbal, Talegaon Dhamdhere. (2) Mr. Ramchandra Govind Javlekar, Talegaon Dhamdhere. (3) Mr. Keshav Ganesh Pingale, Talegaon Dhamdhere. (4) Mr. Vasudeo Vishnu Kale, Talegaon Dhamdhere. (5) Mr. Yeshvant Mahadeo Kale, Talegaon Dhamdhere. (6) Mr. Shankar Gaikwad of Kondaipuri. (7) Mr. Sitaram Kashinath Jategaonkar. (8) Mr. Hambir Lal Punamchand of Valki, Nagar Taluka. (9) Rao Saheb N. S. Borawake of Rahata, district Nagar. (10) Rao Saheb G. G. Shembekar, Baramati.
S. D. Dharwar ..	(1) Karnatak Nursery Garden of Mr. K. G. Moktali of Haveri, district Dharwar.

N. C. D.—North Central Division.

S. C. D.—South Central Division.

There are other nurseries also the existence of which is being verified.

Registration of nurseries has been started. Observations on the spacing of seedlings, season for sowing, budding, stage and height of budding are being recorded in departmental nurseries. There are twenty-one registered nurseries :—

- (1) Khan Bahadur V. P. Bhiladwalla, Pardi, district Surat.
- (2) Framroze C. Batliwala, Esq., 361, Hornby Road, Bombay.
- (3) A. M. Patel, Esq., Proprietor, Patel Farm and Nursery, P. O. Udwada Railway Station, district Surat.
- (4) Proprietor, Modern Nursery, Bassein, district Thana.
- (5) Mr. Dhondiba Gopalrao Karanje Patil, Shikrapur, district Poona.
- (6) Mr. R. G. Pitambare, 307, Narayan Peth, Poona City.
- (7) Mr. G. M. Date, Manohar Nursery, Baramati, district Poona.
- (8) Mr. Pingale, Nurseryman, Ghorpadi, district Poona.
- (9) Mr. K. T. Karulkar, Umbergaon, district Thana.
- (10) Mr. S. K. Gavand, Thana.
- (11) Mr. M. M. Masani, B.Ag., Gholwad, district Thana.
- (12) Mr. Vasantrai Oza, Khatvachi Wadi, Borivli.
- (13) Mr. H. V. Gole, Grape Grower, Nasik.
- (14) Mr. Sadu Mahadu Bhujabal, Talegaon, Dhamdhere.
- (15) Mr. Hari Genu Landge, Talegaon, Dhamdhere.
- (16) Mr. Nivrti Gennuji Pingale, Talegaon, Dhamdhere.
- (17) Mr. Sitaram Vithoba Gaikwad, Talegaon, Dhamdhere.
- (18) Mr. Shankar Vithoba Gaikwad, Talegaon, Dhamdhere.
- (19) Mr. Tatyaba Mahadba Gaikwad, Talegaon, Dhamdhere.
- (20) Mr. Mahadu Savalaram Bhujabal, Talegaon, Dhamdhere.
- (21) Mr. Kisan Sahadu Bhujabal, Talegaon, Dhamdhere.

Central Provinces.—This is being done so far as fruit trees are concerned.

Goorg.—Please see remarks under item 132 above.

Madras.—The Government make grants to the Agri-Horticultural Society in Madras every year both for its general expenses as well as for its annual flower show and fruit exhibition. Similar societies in the Nilgiris at Coonoor and Ootacamund are also assisted with grants for annual shows. The Government also subsidize now a scheme for training in gardening instituted by the Agri-Horticultural Society, Madras, with a grant towards expenditure on the stipends paid to apprentices.

Advice and assistance are given by the Agricultural department to private fruit growers, wherever it is sought. It is for the purpose of assisting fruit growers in the Presidency in the purchase of reliable nursery plants, where private growers are now greatly handicapped, that nurseries are being started.

North-West Frontier Province.—About one dozen private nurseries are at present operating in the Province.

Orissa.—Please see remarks under item 130 above.

Punjab.—The formation of the Punjab Provincial Co-operative Fruit Development Board with prominent fruit growers as office bearers has given a stimulus to the encouragement of private enterprise in establishing nurseries. District Fruit Growers Associations are being formed. These will be affiliated to the Central Board.

Sind.—Subsidiary orchards and nurseries on selected cultivators' lands have been established in different districts and are managed under the supervision of the District Staff of the Agricultural Department and of the Horticulturist. There are 27 such plantations of fruit trees and nurseries. One Sub-Station has also been established at Larkana on zamindari land.

United Provinces.—There are arrangements for the training of gardeners at Government gardens and after training they generally find work in private nurseries. The number of private nurseries is now 300 as against 10, 20 years ago.

Technical advice is given to the owners of the nurseries by the garden staff of the Department.

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135. Preparation of forecasts of yield (paragraph 525).

Central Provinces.—Crop forecasts continue to be prepared in the Land Records Department as the staff of the Agriculture Department has not yet been strengthened for the purpose. The utility of forecasts in the vernacular has not yet been urged in this province.

136. Statistical publications (paragraph 525).

United Provinces.—The returns required for the publication of the "Agricultural Statistics of India" are submitted as far as possible by the prescribed dates.

Forecasts are published in leaflet forms and are translated into the vernacular. They are supplied to the public free of cost.

Statistics of well irrigation are included in the annual irrigation administration reports.

Separate statistics are given for urban and rural areas in the reports on education.

The question of the re-classification of uncultivated lands into "culturable waste" and "not available for cultivation" is still under consideration.

137. Improvement of crop statistics (paragraph 527)

Assam.—There are considerable difficulties in the way of utilising the panchayats in the permanently settled areas, arising from the expense involved in checking and the burden it would cast upon them. The proposal was considered as long ago as 1915 but rejected for these reasons, and it is doubtful whether improved results could be obtained. The question may be reconsidered when the financial position is more favourable to the improvement of statistics.

Bihar.—The Royal Commission recommend that the method now in use in collecting statistics of jute production in Bengal should be extended to other provinces. The Provincial Government understand that the results obtained by this method in Bengal are far from satisfactory. They consider that it would be unwise to attempt to extend the use of the panchayat system to other crops until the new Central Jute Committee has examined the matter in detail and reported on its efficiency.

The testing of the correctness of the formula used in arriving at the areas under mixed groups is not an urgent matter and there are more urgent problems to be dealt with first in improving area statistics. The Provincial Government propose, however, to have tests made whenever crop-cutting experiments are conducted during settlement operations to ascertain the proportions between the different constituents of a mixed crop.

Orissa.—The Government of Bihar and Orissa were not in favour of introducing the Panchayat system in collecting crop statistics, as the results were far from satisfactory. Different agencies collect crop statistics in the various parts of this province. The village chowkidar is the agent who finishes crop statistics in the areas transferred from Bihar and Orissa. In the areas transferred from Madras such statistics are collected by the village officers under the Revenue Department. There is no agent directly under the control of Government in some parts of the proprietary estates in those areas. Further a greater part of the proprietary area is still unsurveyed. There is, therefore, no uniform system in the province. Government, however, do not consider that the panchayat system is any way better than the agency of police or of village officers, now employed in some parts of the province, for collecting statistics. The 'mixed crop' is not much of a problem as there is very little of it in the province.

United Provinces.—This question will be taken up after the results of the new methods of crop cutting experiments which are still under trial, are known.

138. Crop cutting experiments (paragraph 528).

Assam.—Mixed crops are not common in this province.

The Government of Assam agree that the system is capable of improvement when funds enable a larger agricultural staff and a statistical bureaux to be maintained. Experiments for five years in regard to sugarcane indicate that there is great possibility of inaccuracy and doubt where such experiments are carried out by two different staffs, though there was closer correspondence at the end of the period. On the whole the results did not tend to discredit the work of the Land Revenue staff.

Bihar.—The Provincial Government accept the recommendation in paragraph 538 that the formation at the headquarters of each Provincial Agricultural Department of a statistical branch should precede any attempt to transfer all crop-cutting experiments from the Revenue to the Agricultural Department or to improve the technique of the experiments. This accords with their existing policy. They consider that crop-cutting experiments must generally be carried out by the Revenue staff until such time as the Agricultural Department is much more strongly staffed.

The following recommendations are accepted by the Provincial Government. They have already adopted these principles in the new system of crop-cutting experiments which has been under trial for the last three years and was generally introduced in 1928 :—

- (1) Changes in the figures of standard yield of crops should be made only on data supplied by crop-cutting experiments (paragraph 528).
- (2) Before a system of random selection of villages and fields for crop-cutting experiments is introduced, the means to carry out far more numerous experiments must be provided (paragraph 529).
- (3) No attempt should be made to teach the primary reporting authority to form an exact mental picture of a "normal" crop (paragraph 529).

Bombay.—These have been discontinued pending establishment of a satisfactory organisation for the purpose.

Central Provinces.—Crop-cutting experiments are conducted by the officers and the sanctioned staff of the Agriculture and Revenue Departments. The results are utilized in checking the estimates of normal yield of principal crops which are reviewed every fifth year and discussed in detail in the report on the review of returns of experimental crop cuttings. The method of sampling of rice which was under trial in the districts of Drug, Raipur and Bilaspur for checking the normal yield of rice was discontinued for financial reasons.

Coorg.—Crop-cutting experiments are conducted in the case of paddy to ascertain the yield in different fields.

Delhi.—The Punjab Standing Orders on this subject are followed.

Madras.—Two schemes of crop-cutting experiments based on a system of random selection of villages and fields, one for ascertaining the yield per acre of paddy, cholam, cumbu and ragi and the other for ascertaining the yield per acre of sugarcane have been sanctioned. The work is being done by agricultural demonstrations and revenue inspectors. The results of the experiments for the first year have been received and are being examined.

North-West Frontier Province.—Crop-cutting experiments are constantly carried out by the Agricultural staff in the whole of the Province with all major crops.

Orissa.—Government accept the recommendations of the Royal Commission on Agriculture regarding improvement of crop statistics. Any progress in this direction depends on the adequacy of the staff to be maintained. With their limited resources this Government are not able at present to provide the staff in the Agricultural Department necessary for carrying out crop-cutting experiments independently.

Punjab.—Crop-cutting experiments are now being conducted on a larger scale by officers of both the Agricultural and the Revenue Departments.

Sind.—Crop-cutting experiments on cotton have been conducted by the District Officers of the Revenue Department during 1937-38 and the results obtained are being examined.

United Provinces.—The new system of crop-cutting experiments to ascertain the yield of different crops was continued in a limited number of districts. Its further extension will depend on the results achieved.

A bureau of statistics has been created under the Director of Industries who is also the Director of Statistics.

138-A. Maintenance of vital and health statistics separately for rural and urban areas (paragraph 535).

United Provinces.—Vital and health statistics are shown separately for urban and rural areas.

Vital statistics for rural areas include particulars about the strength and distribution of the medical and health services.

139. *Appointment of a Statistical Assistant to the Provincial Agricultural Departments (paragraph 538).*

Assam.—No action can be considered at present as many equally and more urgent obvious improvements than the improvement of statistics are held up by lack of funds.

Bihar.—The post of a statistical assistant has been sanctioned by Government as a temporary measure and a science graduate of the Patna University appointed to the post.

Central Provinces.—There is no separate statistical assistant in the cadre but one of the recently recruited Deputy Directors of Agriculture is a Statistical Expert.

Coorg.—The Agricultural Department in Coorg has no statistical Assistant.

Orissa.—Government recognise the importance and the use of a statistical officer placed in the Agricultural Department. But for financial reasons they are not in a position to give preference to this proposal.

140. *Appointment of Provincial Statistical Officers (paragraph 538).*

Assam.—The Government of Assam agree that it is highly desirable to secure accurate and intelligent statistics in all matters related to the development of resources and that these should be elaborated and studied by an officer trained in economics and experienced in local conditions. But the appointment of such an officer, if he could be found, is beyond the scope of practical politics, for difficulty is still found in providing sufficient officers of the necessary standing to carry on ordinary administration, and the Assam Government are not prepared to sacrifice control of administration for the financing of expensive statistical enquiries.

Bihar.—The proposal is accepted in principle but must, for financial reasons, be postponed. It is not at present possible to frame any estimate of the cost of appointing a Statistical officer and subsequently a provincial bureau.

Coorg.—There is no Provincial Statistical Officer but statistics are maintained by the Revenue Department.

Madras.—All statistical work including the compilation of agricultural statistics is now concentrated in the Department of Industries and the Statistical Officer and his staff who were formerly attached to the Board of Revenue have been working under the Director of Industries since 1st July 1936.

United Provinces.—The Director of Industries is the Director of Statistics and is in charge of a Bureau of Statistics. A whole-time statistician is also maintained; he works as Executive Officer of the Bureau.

141. *Use of non-official agencies in collection of agricultural statistics (paragraph 541).*

Assam.—The Government of Assam agree that the mere multiplication of facts will not in itself mean progress.

Bihar.—Preliminary enquiries from district officers do not give much promise of success in carrying out this recommendation even in one district as an experimental measure.

Bombay.—Use is already being made of non-official agencies in the collection of agricultural statistics. Traders and merchants supply wholesale and retail prices for the various price returns prepared by the Revenue Department and published by the Agricultural Department. Statistics regarding the amount of cotton pressed are obtained weekly from the owners of cotton presses under the Cotton Ginning and Pressing Factories Act. Attempts are also being made to get figures from important commercial firms who prepare their own estimates of the outturn of cotton for comparing with those prepared by the Agricultural Department and published in the Cotton Forecasts. The estimates of the crop prepared by firms pertain to probable arrivals in markets, whereas those published in the Government forecasts refer to production in the administrative Divisions.

Central Provinces.—Non-official agencies are consulted for preparing certain crop forecasts.

Orissa.—Government have not yet considered any proposal to this effect.

United Provinces.—The Bureau of Statistics and Economic Research continued to function. Non-official agencies are not yet available for systematic collection of statistics though their services are occasionally utilized.

CHAPTER XIX.—The Agricultural Services.

142. *Qualifications, pay and status of Directors of Agriculture (paragraph 547).*

Assam.—A temporary post of Director of Agriculture in Class I of the Assam Agricultural Service is being continued and is being held by a qualified member of the Indian Agricultural Service. Rai Bahadur J. N. Chakravarty, retired on the 31st August 1937 and Dr. S. K. Mitra, Ph.D., I.A.S., is now holding the post.

Bihar.—The Provincial Government accept the recommendation that the Director of Agriculture should be an officer combining administrative capacity with high scientific qualifications and that his post should be scheduled as a selection post outside the cadre. They do not, however, wish to lay down any hard and fast rule as to how it should be filled up when a vacancy occurs. The question of pay is now under consideration.

Madras.—*Vide* remarks against item 144.

Orissa.—There is no Director of Agriculture. The duties of the post are discharged by the Director of Development who is an I. C. S. officer.

Punjab.—The post of the Director of Agriculture is held by an officer of the Indian Agricultural Service. The status has been put at a par with the Heads of other important departments. The senior scale of pension has also been granted.

Sind.—With the separation of Sind from the Bombay Presidency, the temporary post of the Chief Agricultural Officer in Sind in the scale of Rs. 2,000—50—2,250 has been abolished, and has been replaced by that of the Director of Agriculture, Sind, in the scale of Rs. 1,200—50—1,500.

United Provinces.—The post of Director of Agriculture is held by a qualified Indian Agricultural Service officer.

143. *Qualifications, pay and status of Principals of Agricultural Colleges (paragraph 547).*

Assam.—There is no Agricultural College in Assam.

Bihar.—The recommendation that the post of Principal of an Agricultural College should be a selection post outside the cadre of the Indian Agricultural Service has been accepted. As regards pay, the Provincial Government do not wish to commit themselves to anything definite at this stage. The recommendation will be kept in view when an Agricultural College is started and a Principal for it is appointed.

Madras.—*Vide* remarks against item 144.

Orissa.—There is no Agricultural College in the province.

United Provinces.—The post of Principal is held by an officer of the Indian Agricultural Service.

144. *Recruitment to and organization of the new superior Provincial Agricultural Services (paragraphs 549—556 and 568).*

Assam.—The Government of Assam are not in a position at present to contemplate provision for expert agricultural research, nor are they concerned with teaching posts. They agree that a considerable number of vacancies in any new superior service must fall to officers who have qualified by experience of, and proved merit in, local administration. They also agree that academic qualifications and practical experience of agriculture are required. The small numbers that will be required for years to come preclude any necessity for further elaboration. Two officers of the provincial service have already been promoted to special posts of Deputy Director of Agriculture in prospect of the formation of new superior services.

Bengal.—The cadre of the Bengal Higher Agricultural Service now consists of the following posts:—

- (1) Deputy Director of Agriculture, Western Circle.
- (2) Deputy Director of Agriculture, Northern Circle.
- (3) First Economic Botanist.
- (4) Second Economic Botanist.
- (5) Agricultural Chemist.

Bihar.—The new Superior Provincial Agricultural Service has been created with effect from April 1935.

Coorg.—There are no research officers.

Madras.—In 1930, it was decided that there should be only one class of service called the Madras Agricultural Service on a pay of Rs. 250—25—750 with 10 per cent. of the cadre as selection grade posts on Rs. 800—25—1,000. The pay of the Director of Agriculture under the revised scale was to be Rs. 1,000—50—1,500. But since then, the scales of pay of the service have been revised twice, once in April 1933 and again in February 1938. The scales of pay as they stand at present are given below :—

(i) Director of Agriculture ..	Rs. 850—75 2—1,000.
•(ii) Headquarters Deputy Director of Agriculture ..	Rs. 650—75 2—800 without any special pay or Madras house allowance for the Headquarters Deputy Director. (The question of special pay for the Principal has not yet been decided).
•(iii) Principal of the Agricultural College, Coimbatore ..	
(iv) Other gazetted posts in the department except Agricultural Research Engineer ..	Rs. 190—25 2—240—30 2—480—40 2—560.
(v) Agricultural Research Engineer ..	Rs. 405—35 2—440—40 2—680.

Punjab.—The Provincial Agricultural Service, Classes I and II, have been constituted.

United Provinces.—Rules for the recruitment of officers to the Superior Provincial Agricultural Service have been issued and are in operation since 1st October, 1934. Most of the recommendations made in paragraphs 549—556 have been incorporated in the rules.

145. *Interchange of officers between Provinces for study of special problems (paragraph 557).*

Assam.—Theoretically the Government of Assam share the hope that co-operation between provinces will be maintained.

Bihar.—The recommendation has been accepted.

Central Provinces.—The necessity for such action has not yet arisen.

Coorg.—There has been interchange of officers.

Madras.—There have been no such cases.

United Provinces.—There was no occasion for the interchange of officers.

146. *Grant of Study Leave to Officers of new Superior Provincial Agricultural Services (paragraph 559).*

Assam.—Since research work on any notable scale cannot be contemplated, and most local problems are familiar to the north eastern part of India, the occasions upon which study leave in Europe will be advantageous must be expected to be few.

Bihar.—The Provincial Government have accepted the recommendation that officers in all branches of the Superior Provincial Agricultural Service should be encouraged to avail themselves of opportunities for study abroad afforded by the study leave rules and that the programmes of work in England should be arranged through the office of the High Commissioner for India. They also accept in principle the recommendation that officers on study leave in Europe should take the opportunity to visit the International Institute of Agriculture at Rome if it possesses information bearing upon their line of work.

Bombay.—The Assistant Professor of Dairying at the College of Agriculture, Poona, in the Provincial Agricultural Service, Class II, was granted study leave for training overseas in America and Europe in animal husbandry problems.

Madras.—There have been no such cases.

United Provinces.—No study leave was granted to any officer during the last two years.

*The new revised scale will not come into effect so long as there are two or more officers of the Indian Agricultural Service other than the Director in the Department and, when there is only one such officer, the scale will come into force for one post.

CHAPTER XX.—Miscellaneous.

147. *Establishment of Local Self-Government Institutes (paragraph 576).*

Assam.—Conferences between representatives of the local authorities in the Surma Valley for particular purposes have occasionally been held. The suggestion of a regular provincial Local Self-Government Conference has been made in non-official quarters. No action has been taken by the Ministry in this direction. Travelling is expensive, and the sessions of Legislature have hitherto provided the most convenient means for informal discussion of common problems. The establishment of an Institute is not contemplated. The then Minister for Local Self-Government decided in 1922 that no Local Self-Government Board, advisory or otherwise, should be considered until there was a definite demand from the public, which then appeared loath to agree to any organisation that might mean interference with the local bodies.

It is in contemplation of the present Government to hold shortly a Conference of Chairmen and Vice-Chairmen of Local Boards of the province to discuss certain questions of common interest relating to those boards.

Bihar.—The Bombay Local Self-Government Institute is a self-constituted body, which has organised itself under the patronage of the Minister, and has chosen the Minister as its President. The corresponding body in Bihar is the 'Local Bodies Conference' which is run on political lines, and could not therefore be developed on the Bombay model. Similar purposes are served in this Province by the Local Self-Government Board which is on a statutory basis, supplemented by occasional conferences of representatives of local bodies convened by the Minister. The recommendation of the Royal Commission is not therefore acceptable to the Provincial Government.

Central Provinces.—The question is under consideration.

United Provinces.—It is not feasible to establish a Local Self-Government Institute in the province at present.

148. *Establishment of meteorological stations of the "Second Order" on experimental farms in areas in which climatic conditions are of importance (paragraph 577).*

Assam.—Climatic conditions scarcely represent an immediate problem in this province. Instructions have however been issued that humidity and maximum temperature should be recorded at the departmental farms.

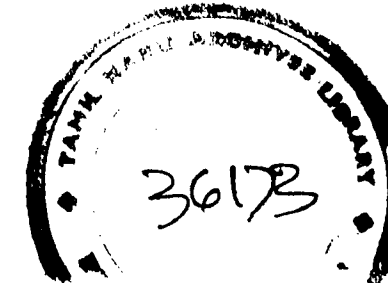
Bihar.—There is a second class observatory at Sabour. Complete meteorological equipments have now been installed at the Rice and the Sugarcane Research Stations.

Orissa.—Rainfall is recorded in all Government farms. In the Cuttack Farm humidity and maximum and minimum temperatures are also recorded.

Punjab.—All departmental farms are now equipped with simple meteorological apparatus such as rain gauges and maximum and minimum thermometers. In addition special meteorological equipment has been installed on various experimental farms in different parts of the Province.

United Provinces.—A first class meteorological station has been established at Shahjahanpur and regular climatic observations regarding atmospheric temperature, humidity, evaporation, barometric pressure, wind velocity, direction, rainfall, soil temperature, moisture content and solar radiations are made. Meteorological observations are also made at Muzaffarnagar and Nagina farms but not so elaborately as at Shahjahanpur.

A meteorological laboratory has also been fitted at the Agricultural College, Cawnpore; the officer in charge has received the requisite training at Poona.



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