REPORT

ON THE

OPERATIONS OF THE DEPARTMENT OF AGRICULTURE

MADRAS PRESIDENCY

FOR THE YEAR

1930-31

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OFFICE OF THE
DIRECTOR OF AGRICULTURE, MADRAS,
Dated the 16th August 1931.

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From

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GARU, B.SC.,
HEADQUARTERS DEPUTY DIRECTOR OF
AGRICULTURE IN CHARGE,
MADRAS,

To

THE SECRETARY TO GOVERNMENT,
DEVELOPMENT DEPARTMENT,
FORT ST. GEORGE, MADRAS.

SIR,

I have the honour to submit the report on the operations of the Department of Agriculture for the year 1930–31.

I.—ADMINISTRATION.

2. Mr. G. R. Hilson, B.Sc., was in charge of the Department throughout the year.

Indian Agricultural Service.

3. The short-term contract under which Mr. R. O. Iliffe was recruited as Paddy Specialist expired during the year. The post of Paddy Specialist in the Indian Agricultural Service was abolished, but one with the same designation was added to the Madras Agricultural Service cadre, Mr. K. Ramiah being appointed to it. The services of Mr. P. H. Rama Reddi were placed at the disposal of the Government of India for appointment as Deputy Secretary, Indian Central Cotton Committee.

Madras Agricultural Service.

4. Messrs. M. Mangesh Rao, T. V. Subrahmanya Ayyar and K. Venkatarama Ayyar were confirmed as District Agricultural Officer, Assistant Entomologist and Superintendent, Agricultural Research Station, respectively.

The probationers named below completed their probation satisfactorily during the year :—

(1) M.R.Ry. M. U. Vellodi Avargal, District Agricultural Officer, Salem.
(2) M.R.Ry. M. Viraraghava Rao Nayudu Garu, District Agricultural Officer, Kurnool.
(3) M.R.Ry. R. Swami Rao Garu, District Agricultural Officer, Vellore.
(4) M.R.Ry. G. Jogiraju Garu, District Agricultural Officer, Vizagapatam.
(5) M.R.Ry. V. K. Subrahmanya Mudaliyar Avargal, Superintendent, Agricultural Research Station, Kovilpatti.
(6) M.R.Ry. V. Muttuswami Ayyar Avargal, Lecturer in Agriculture, Agricultural College, Coimbatore.
(7) M.R.Ry. M. Kunhambu Nambiyar Avargal, District Agricultural Officer, Madura.

The question of confirmation of those for whom permanent vacancies exist is now under the consideration of Government.

The officers mentioned below were selected for admission to the Madras Agricultural Service towards the end of the year :—

(1) M.R.Ry. A. Chinnathambi Pillai Avargal, District Agricultural Officer, Cuddalore.
(2) M.R.Ry. A. Gopalakrishnayya Garu, Superintendent, Livestock Research Station, Hosur.
(3) M.R.Ry. J. A. Muliyil Avargal, Assistant Entomologist, Coimbatore.
(4) M.R.Ry. K. Raghava Acharya Avargal, District Agricultural Officer, Coimbatore.

There were no new additions to the Madras Agricultural Service cadre during the year.

Special posts.

5. Dr. J. S. Patel took charge of the post of Oil Seed Specialist, Coimbatore, on 1st November 1930, and Dr. T. R. Seshadri who was appointed as Soil Physicist, joined duty on the 12th November 1930.

Madras Agricultural Subordinate Service.

6. The number of upper subordinates in the Research and Agricultural sections was increased during the year by 4 and 8 respectively, the sanctioned strength at the end of the year being 97 in the former and 171 in the latter. Three posts in the lower subordinate cadre were abolished during the year.

II.—AGRICULTURAL EDUCATION.

7. *Agricultural College, Coimbatore.*—The activities of the Department in matters educational consist in the running of a College affiliated to the University of Madras, an agricultural middle school and three farm labourers' schools.

During the year the number of applications for this course of studies rose from 303 to 365. Out of these, 42 students were finally selected; in addition, 6 seats were reserved for students from the Agency tracts of Ganjām, Vizagapatam and Gōdāvari districts in accordance with G.O. No. 1373-22-5, Development, dated the 26th June 1930. Thus the full complement of 48 students was obtained at the end of the first term. The selection was made by a committee consisting of the Headquarters Deputy Director of Agriculture in the absence of the Director, the Principal and three non-officials, viz., M.R.Ry. Diwan Bahadur B. Munuswami Nayudu Garu, M.R.Ry. Diwan Bahadur M. Ramachandra Rao Pantulu Garu and Khan Bahadur P. Khalif-ul-lah Sahib Bahadur. The restriction in the selection of students to 48 provoked the criticism of the members of the committee, who opined, that steps should be taken to permit more students joining the College, as it appeared to them that this course was becoming more and more popular. The cause of its popularity was, however, not investigated.

The possession of a separate building and a separate staff for teaching did not deter the students from being benefited by the existence of the research staff at the Institute. A number of special lectures delivered by them pertained to subjects like plant breeding, statistical interpretation of crops, animal nutrition, bacteriological technique, base exchange and kindred subjects which are dealt with only in an elementary way in their usual course.

Examinations.—For the first B.Sc., 46 students appeared in March–April 1930 and 38 students completed it. In Part II, 43 appeared while 24 students passed qualifying themselves for the B.Sc., Ag., degree.

Scholarships.—Five scholarships are sanctioned every year of which one was awarded to a Muhammadan student, two to poor and deserving students from the agricultural community and two to depressed classes. The one intended for depressed classes and kept in abeyance last year was utilized this year.

Students' Club.—Hockey, foot-ball, and cricket are the recognized compulsory games at the College. The increase in the number of admissions meant a rush for these games but tennis, which has been popular all along, relieved it since its addition to the compulsory list. Government sanctioned a non-recurring grant of Rs. 3,000 to provide extra games equipment. This grant was also helpful in providing necessary equipment for basket-ball and tenikoits. Officers evinced their interest in students by joining them in games and helped to keep alive the spirit of comradeship between the teacher and the taught. Literary activities received their due share of attention by the arrangement of a number of lectures delivered by outsiders as well as by officers at the College.

Tours.—The increase in the number of students in each class made it inadvisable to continue the former practice of conveying students on tour from one part of the country to another, as it meant great expense and insufficient individual attention. Tours were, therefore, restricted to the agricultural research stations and their immediate surroundings. The students of Class II were taken on a ten days' tour to Hagari and Hosūr Research Stations and of Class III to

Kovilpatti and Palūr Agricultural Research Stations for a similar period. The latter class in addition, was given opportunities to make short tours of enquiry to the neighbouring villages.

8. *Conference.*—The College Day and Annual Conference which used to be an occasion for the meeting of the Gazetted and non-Gazetted officers of the Department had to get on this year without the presence of those of the former grade. This was due to the fact that a conference of all Gazetted officers of the Department was held six months previous to the College Day, and in view of economy, it was considered unwise to hold two conferences of this magnitude within so short an interval. For this reason the conference lasted only a day and the attendance was smaller than in previous years. Mr. G. R. Hilson as President of the conference delivered a thought-provoking address on the "Duties of an Agricultural Demonstrator." The subject for discussion at the conference was a "A Symposium on Sugarcane."

9. *Agricultural middle schools.*—It is unfortunate that even the only one school of this nature maintained at Taliparamba did not function as satisfactorily as it used to during the early years of its existence, in spite of the usual propaganda by demonstrators inviting the attention of boys belonging to the agricultural classes. Twelve boys were admitted into the first year, of whom four left in the course of the year. In the second year there were eight so that the total strength of the school was only sixteen as against twenty-three in the year previous. The history of the school dates back to 1922 and although it seems to have enjoyed some popularity during the first few years, it is clear, that for this kind of education, there is no demand from the agricultural classes. Since this course is intended mainly for the sons of farmers who would go back to their land, two years seem too long a period for the boys to be kept away from their parents who need their presence during the busy agricultural seasons. If, on the other hand, this course was intended also for non-agricultural classes, it is not sufficiently attractive to them inasmuch as it does not help to qualify them for employment under the Government, as the college degree course does. It is, therefore, obvious that this course does not meet the need of

either the agricultural or the non-agricultural community. If the agricultural middle schools are to be more popular it is evident that the present order must change. One way of mending this unsatisfactory condition seems to lie in the direction of instituting short practical courses in farm management and its allied branches. The period may extend from a few weeks to a year depending on the kind of courses given. Facilities should be available for young men from the country who wish to take short courses in insect pests and diseases, dairying, poultry management and the like, which would enable them to utilize the training with profit when they go back to their farms.

It is also regrettable that the agricultural middle school intended to be started at Kalahasti could not be opened even this year. A sum of about Rs. 34,000 has been sunk on buildings and equipment ; the school farm is under the management of a Farm Manager who is also trained in teaching.

The school at Usilampatti continued to be under the management of the District Board of Madura. The Department lent two officers for teaching and the Government gave a half-grant for its maintenance. Even here the attendance in the school was not encouraging. To the first year there were five admissions of whom three left in the course of the year. There were thirteen students in the second-year class and with such paucity in numbers the prospects of the school do not seem at all bright.

10. *Farm labourers' schools.*—These schools continued to function at Anakapalle, Pālūr and Coimbatore, with a fair measure of success. At Anakapalle, there were 33 boys in the day school against 35 in the previous year, and 21 as against 22 in the night classes.

At Pālūr, there were 14 and 16 boys in the day and night classes respectively as against 14 in each in the year previous.

At Coimbatore there were 14 in the day and 11 in the night classes as against 8 and 11 respectively in the previous year.

It is gratifying that these schools are supplying a want, viz., the education of the children of labourers at and near the agricultural stations who otherwise are

likely to be deprived of it. These schools also aim at inculcating to the boys improved methods in farming practices obtaining in their neighbourhood. It seems desirable that these schools are made permanent and the experiment be extended to other agricultural stations where there is scope for this kind of education.

III.—SEASON.

11. The south-west monsoon became active on the West Coast only after the 19th of June. A depression formed on the Orissa-Ganjām coast towards the end of the month caused widespread and locally heavy rains on the north Madras coast on the last two days of the month. The rainfall in the month was generally above the average. The monsoon was generally weak in July and August. A general revival of the monsoon took place in September in connexion with a depression which formed in the Bay at the end of the first week and brought a fair amount of rain throughout the Presidency though the rainfall was still below the average except in Ganjām, Tinnevelly and the West Coast. On the whole, the south-west monsoon was generally below the average. There were freshes in the main rivers, and the channels and tanks fed by them received adequate supplies.

12. The north-east monsoon commenced in right earnest early in October and brought heavy rains throughout the month. A depression on the south-west of the Bay of Bengal developed into a storm on the Coromandel Coast by the 23rd of the month, crossed the coast near Negapatam on the 24th, and weakening into a depression, passed out into the Arabian Sea by the 26th, giving extensive and, in places, unprecedently heavy rains along its track. The depression again intensified into a storm towards the end of the month. These rains caused great floods in the Cauvery and its tributaries, damaged roads, railway bridges, and crops, especially in Tanjore and Trichinopoly and cut off the south from the rest of the Presidency for about a week. A terrific thunderstorm passed over Madras on the 29th October between 10 a.m. and 12 p.m. The monsoon was active during the first week of November. A depression formed in the southern

portion of the Bay of Bengal on the 15th of the month, intensified into a storm, and moving in a north-westerly direction, crossed the coast near Masulipatam on the 18th morning, causing very heavy rains and floods locally on the North Madras coast which resulted in breaches in railway lines in that part. A deep depression developed on the 27th November in the south-west of the Bay of Bengal intensified into a storm of severe intensity with centre on the 28th November at a distance of about 200 miles to the east-south-east of Negapatam, moved in a north-westerly direction, crossed the Coromandel Coast between Cuddalore and Madras at 8 a.m. on the 29th, lay as a depression near Salem on the 30th morning, and moving westwards, rapidly weakened. The wind blew in heavy gales and rain fell in torrents, tanks breached in a number of places in Chingleput, South Arcot and North Arcot, trees were uprooted, telegraph poles fell down, and the railway line was washed off in parts between Tindivanam and Madras and Sulurpet and Polireddipaliem. Crops and property were damaged to some extent. The monsoon was generally weak in December and January. On the whole, the north-east monsoon was generally above the average.

13. The effect of the season on the crops at the various agricultural stations is described below :—

At Anakapalle, Samalkot, and Maruteru, the heavy down-pour of rain accompanied by strong winds lodged the paddy crop in some fields.

At Guntūr, all crops, especially chillies, were adversely affected by the abnormal rainfall and suffered from the attacks of insects ; most of the groundnut pods germinated before lifting ; variga and pairu jonna had to be re-sown ; the growth of cotton was arrested and flowering delayed resulting in a poor outturn ; tobacco alone survived under the influence of the southern wind.

The season at Nandyal and Hagari was unfavourable for cotton and cholam.

At Pālūr and Palakuppam, the scanty and ill-distributed rainfall during the south-west monsoon period reduced the yield of cumbu, while sugarcane at Pālūr was damaged by the rains of October-November.

The heavy rains of October at Aduturai submerged the kuruvai crop and caused it to sprout and interfered with selection work.

At Kovilpatti, cotton suffered from the attack of gram caterpillar and spotted boll worm.

At Taliparamba, Pattambi, and the Coconut Stations, the season was good.

Most of the kolukkattai grass plots at Hosur were harvested twice during the year owing to the favourable season.

At the Central Farm, Coimbatore, the season was not, on the whole, favourable for dry crops.

The early varieties of paddy at the Paddy Breeding Station, Coimbatore, suffered from drought as well as an infestation of pests and diseases.

At the Cotton Breeding Station, Coimbatore, the season was unfavourable for cholam and pulses but beneficial to cotton at the later stages.

The heavy rains in May and October caused soil-wash and damage to potato crop at Nanjanad.

At the Kallar fruit station, the heavy north-east monsoon rains destroyed some land under rubber and fruit trees. Heavy rains in October did much damage to the garden and the lake at the Sim's Park, Coonoor.

IV.—RESEARCH.

14. The main activities of the Department may be divided broadly into research and demonstration. In a Scientific Department, that research should precede demonstration is obvious. Before any attempt is made at demonstration, the research officer should be conversant with the why of things in the practice of agriculture. New problems continue to face him whipping him into continued activity. The chief centre of research is the Institute at Coimbatore equipped with a staff of specialists. Here, plant breeders are at pains to evolve new strains in paddy, cotton or millets, patbological problems affecting crops are investigated by the Entomologist and the Mycologist, the Chemist is engaged in matters dealing with the nutrition of plants and animals or with conservation of moisture, and the Research Engineer is concerned with the improvement of the various indigenous implements, bearing in mind the needs and limitations

of the ryot. In intimate association with these officers are those in the districts—the Deputy Directors of Agriculture—who in their agricultural research stations have two-fold functions to perform, viz., the putting to test on a field scale the discoveries made at Coimbatore in places which are dissimilar in soil and climate and in the investigation of the various local problems in farming practices which await solution. Therefore the two sets of officers—those at Coimbatore and in the districts—work in collaboration with the one object of gaining exact knowledge which would ultimately result in benefiting the cultivator. Research, however, needs time and here patience is a virtue in the investigator as well as in the one who looks to him for help.

A.—Botany.

15. Apart from the several items of routine work indicated in last year's report, the Systematic Botanist was engaged in the formation of a reference or a working herbarium to facilitate quick naming of plants, gathering materials for the formation of a herbarium for woody fungi, algæ, mosses and liverworts, collecting specimens of medicinal plants of British and Indian Pharmacopœa as well as of important South Indian poisonous plants.

Four thousand five hundred and fifty-six specimens were identified during the year as against 2,520 in the year previous. Thirteen thousand six hundred and sixteen herbarium sheets were stamped and numbered. A new species Scirpus Jacobii, *Fischer*, was added to the collection. One thousand six hundred and forty-four duplicates were distributed to foreign and Indian herbaria like the Botanic Gardens of Kew, New York, Pretoria and Calcutta, Forest Research Institute, Dehra Dun, and some educational institutions. The importance of the Madras herbarium is being recognized by educational institutions and its popularity can be gauged by the increased number of requests received from them for botanical specimens. Six hundred and sixty-five sheets of cultivated crop plants illustrating the several stages in their growth were prepared and 544 specimens of economic value collected by Dr. Barber were arranged.

An item of special work at which the Systematic Botanist was engaged during the year was the survey of the grazing areas at the Livestock Research Station, Hosūr, Agricultural Research stations at Palūr, Palakuppam and Nanjanad, and parts of the districts of South Arcot, Tanjore, Gōdāvari, Vizagapatam, Ganjām and Ootacamund and Pykara. One hundred and seventy grasses were collected of which nine have been added to the list of grasses suitable for feeding. A survey of weeds was made in the IV and V circles as well as in several agricultural stations in order to study their spread and damage done to crops. About 600 species were collected. A survey was made also of the Flora of the north-western half of Coimbatore forests and 4,500 specimens were collected.

B.—Chemistry.

16. The Chemistry section is the largest at the Research Institute and is equipped with five gazetted assistants besides a large subordinate staff. The work is of four-fold nature dealing with analytical and advisory work, animal nutrition, plant nutrition and soil sanitation—

(1) *Analysis.*—During the year 8,179 samples were dealt with as against about 5,000 in 1929-30. Of these, 37 samples were analysed in behalf of ryots, private persons and planters. The rest of the analysis was due to the various requests from research officers at Coimbatore and circle officers in the districts. The majority of the analysis was on soils whilst those on sugarcane and grain and straw of various cereals were next in demand. Irrigation waters, dairy products, samples of animal nutrition and of activated sludge were also analysed. Other Departments of Government, e.g., Department of Industries invoked the assistance of this section in regard to the analysis of samples of water obtained from bore-holes in the Bellary district. Food-grains and edible oils to test their fitness for human consumption were received from the Inspector-General of Prisons and Lecturer in Domestic Science, Madras.

(2) *Animal nutrition.*—Previous investigation showed that cattle manure possessed better nutritive

value than other manures. Further work in this branch indicated that plots treated with cattle manure possessed greater digestibility for proteins, that the effect of manure is evident even in the vegetative stages of plant growth and that seedlings like ragi and cumbu manured with it when fed to rabbits were found to be more nutritious than those grown on the mineral and unmanured plots.

The food requirements of the Indian bullock, taking the Ongole breed as a type, was investigated again this year and paddy straw being substituted for cholam straw was taken as the basal ration. It was found that paddy straw was less nutritious than cholam straw and required 212 grams of concentrate to make it as nutritive as cholam straw with only 63 grams of concentrate.

The animals when put to light and heavy work, whether fed on paddy straw or cholam straw—as they were last year—the amounts of proteins digested varied from 300 – 450 grams, which indicates that the Ongole animal is an economic consumer in comparison with the American animal. It has also been observed that the protein requirement is not a function of the intensity of muscular work although it seems to increase with the intensity of work.

In dealing with experiments on large animals like bullocks the limitations are that one has necessarily to be confined to a limited number, owing to the high cost in their purchase and maintenance ; the large amount of feed required to maintain a large number would rule out of court an experiment of such a magnitude. On the other hand, such a contingency could be obviated if such experiments could be conducted on small animals like rabbits provided one is sure that the results so obtained could be considered applicable to large animals. Be that as it may, in a feeding test on rabbits and sheep with Guinea and Elephant grasses it was found that both types throve better on the former grass than on the latter. If similar results are obtained even when bullocks are used, which is going to be the next step in the experiment, it will be smooth sailing in the future conduct of experiments on animal nutrition.

With regard to the advantage of a mineral supplement to the ration of young stock to which reference

was made in the report of last year, the results this year were similar. A mixture of bone-meal and lime in the feed of dairy cows was found to increase the live-weight more than a ration which did not contain the minerals.

(3) *Plant nutrition.*—A re-examination was made of the work done by Dr. Harrison and the late Mr. Subrahmania Ayyar on the action of green manures in paddy soils.

The use of sodium nitrate for paddy has been under trialfor the last six years. It is found that the manure gives 15 to 20 per cent increase in yield but is not economical at the prices now prevailing for both paddy and the manure. The effect of sodium nitrate seems to be more physical than biological.

A set of experiments to test the efficacy of composts as compared with cattle manure collected in the heap system showed that one is as good as the other.

(4) *Soil sanitation.*—The effect of repeated use of fertilizers on the composition of soil clay was investigated. It was found that the continued use of ammonium sulphate, superphosphate and potassium sulphate changes the cationic composition of the soil clay.

The study of moisture movement in the soil and of the effect of cultural and manurial practices on the movement of moisture was continued at Hagari. Although it is too early to draw definite conclusions, the experiments seem to indicate that the upward movement of moisture from lower layers seems to be too slow to be advantageous to the growing crop at a season when it is most required and that mulching did not give the expected benefit. Again, it revealed that too frequent deep ploughing tends to lower the yield in a year of drought. This investigation which is of momentous importance to tracts of limited rainfall will be continued.

Previous experiments in the nitrification of manures and the movement of nitrates in the soil show that the loss was greatest in plots receiving ammonium sulphate and least in those manured with cattle manure and green manure. These, when repeated this year, confirmed previous results. If such a loss does occur without being used by the crop, the wisdom underlying

the practice of applying such manures is questionable. Since it is a very important matter affecting the present demand for artificials, this problem needs further careful investigation and will have to be tackled from several other view points than the chemical one.

Miscellaneous.—With a view to find out what part the covering of green Batavian orange fruits with leaves, a practice obtaining in parts of the Vizagapatam district, plays in the process of ripening, samples of fruit were periodically analysed which indicated that wrapping hastens maturity by a month. However, when the fruit was fully ripe the total sugar content is in excess in the uncovered by 1 per cent.

Another investigation to study the progress of maturity in sugarcane under normally irrigated and unirrigated conditions and the effect of flooding fields a month prior to harvest on the ripening, indicated that early planting by two months in the case of non-irrigated conditions did not suffer and that by flooding, canes mature a little earlier.

C.—Crops.

(1) *Cereals.*

17. (*a*) *Millets.*—Occupying as they do over 14 million acres of cultivable land in the Presidency, the importance of millets cannot be overestimated. These are grown in tracts where rainfall is treacherous, soil unkind and where the ryot is not sure of his next meal ; so also the breeder dealing with such crops is often placed in the most embarrassing situations and confronted at every turn with a possible loss of a year's hard work. Research of any kind involves time. But in dealing with millets it seems to be more so as it often is due to causes beyond the control of man. Therefore, a sympathetic frame of mind is necessary when criticisms are made in public on those engaged in this most important and yet most disheartening piece of work.

Though his main sphere of activities is at the Breeding Station, Coimbatore, the Millet Specialist is connected with breeding work on Millets at the agricultural stations at Hagari and Nandyal which are situated in conditions similar to those mentioned

above and where assurity of a crop is often in doubt. At Nandyal, N. 23/10, a strain from yellow sorghum which is reported to have done well last year yielded only 281 lb. due to bad season. This was about 70 lb. more than the yield of the old strain. For a similar reason in Hagari the yield of sorghum was only 50 per cent of last year.

Wide spacing of cholam 27 inches apart was compared with the normal spacing of 14 inches. The yields were in favour of wider spacing.

Cumbu.—A variety grown in Ganjām for fodder purposes was tried at Coimbatore and found to tiller profusely and has in addition given a remarkably good yield of grain. This promises to be a good fodder variety.

With regard to *Ragi*, E.C. 47, a selection by the Millet Specialist, which has been with the ryots under trial plots is likely to be replaced by another, E. C. 593, in tracts where the former is not doing well. At Anakapalle, some single plant selections which had come to the field scale stage were under trial during the year and it is gratifying that selection No. 525 yielded 2,500 lb. of grain per acre. Considerable knowledge was also gained at Coimbatore in the selection and study of over 1,000 units in ragi. It is believed that ragi could be grown practically all through the year. In order to test the popular opinion, a seasonal experiment is being laid down where two varieties of ragi are transplanted every month.

The effect of artificial manures like ammonium sulphate and super on ragi gave decreased yields at Hagari unlike last year probably due to deficient rainfall. The residual effect of the manure on cotton was that its yield was nearly doubled.

(*b*) *Paddy.*—This is the oldest among plant breeding sections. Work has progressed to such an extent that more stations had to be added from time to time. There are, at present four stations at Coimbatore, Aduturai, Maruteru and Pattambi. At these stations, work, both economic and agronomic, is being carried on a well-laid plan and the index of the popularity of the strains evolved and seed selected could be gauged by the amount of seed distributed to ryots annually. The

following list gives the amount of seed distributed to circles from various stations during the year:—

	LB.
Coimbatore	23,348
Aduturai	60,000
Maruteru	57,200
Pattambi	25,056
Total ...	165,604

It is needless to say that this quantity does not by any means indicate that the full needs of ryots for these seeds have been met.

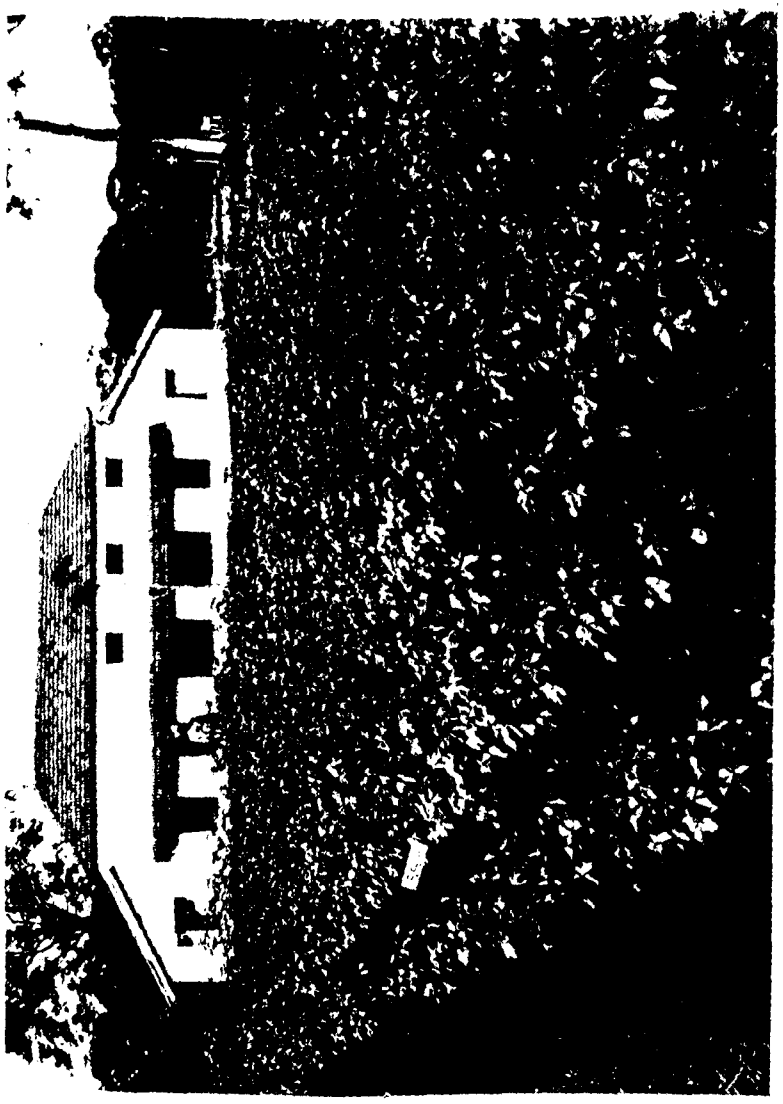
With regard to economic work, at Coimbatore the strains from *Anaikomban*, a variety from Tinnevelly, had been under trial for the last four years. It is gratifying that two of these have given a 20 per cent increase over the standard. It is hoped to put them out in districts on field trials. Some of the strains in *kar* paddy have been under test for two years and have given an increase of 15 to 20 per cent over the standard.

At Maruteru, several strains have been under trial for four years and two of these are fit for trial in the districts having given between 15 and 25 per cent increase over the standard.

At Palūr, single plant selections of *Garudansamba* and *Chitrakali* are under progress.

A study of the character of tillering in paddy, which is largely an environmental character, indicated that a definite correlation exists between tillers of plant and yield in several varieties. This is, however, not universal with all varieties and the reason for this has to be investigated.

In agronomy, a number of manurial experiments had been in progress in different agricultural stations. In the sodium nitrate experimental plots closed last year, paddy was grown again for residual effects. Those that received a large dressing of green manure and a small quantity of sodium nitrate showed a slight residual effect, whereas those that received a small quantity of leaf and a large dose of nitrate did not show any. On the other hand, at Aduturai, no differences were noticed between the two series. At Anakapalle, the green manure experiment which has been in progress for some time continued to show that on clay



Cambodia cotton, three months' old, in Modan land—Agricultural Research Station, Pattambi.

loam 2,000 lb. of green leaf was able to increase the yield of paddy from 15 to 20 per cent provided the soil received a good basal dressing of a phosphatic manure. At Samalkota, ammonium sulphate at 1 cwt. per acre in combination with superphosphate gave an increase of 12 per cent over the no-manure plot.

The plant breeder apart from evolving high yielding and good quality strains should also concern himself with evolving strains of disease resistance. In fact, this line of work is coming more and more into prominence and should receive the earnest attention of breeders, as disease resistant varieties would stand the ryot in good stead even to a greater extent than high yielding varieties but susceptible to disease. Diseases in the country are so diverse and frequent that the ryot has come to look upon them as visitations of Providence and, therefore, to take things with stoical calmness. In a cross between *Korangusamba* and G. E. B. 24, out of 450 families 41 showed promise of resistance to Piricularia fungus. At Maruteru, G.E.B. 24 was found to be more resistant to stem-borer than others. At the same station, treatment of seed with a 2 per cent copper sulphate to effectively immunize the seed against fungus disease has become the normal practice.

Reference was made in last year's report to the necessity to discover means to reduce the cost of production and to alter the system of cultivation to permit more profitable crops than paddy being grown in rotation with it This idea was kept in view during the year at all the agricultural stations. The most important crops under test were sugarcane, plantain and groundnut. In Maruteru, in *dalwa* land, gingelly, onion, castor and ragi, and in high level land, cotton, maize and turmeric were grown. In Pattambi, where paddy is grown even in dry lands, samai, groundnut, cotton and red-gram mixed with *modan* paddy were under trial. If these trials show promise of success, steps will be taken to demonstrate them to ryots.

(2) *Fibres.*

18. The most important crop under fibres is cotton. Work on this is being done at the Cotton Breeding Station, Coimbatore, and the research stations at

Guntūr, Nandyal, Hagari and Kovilpatti on the usual lines. Cambodia cotton is usually recommended to be grown under irrigation, but owing to the common practice among ryots to grow it as a dry crop, it has been found necessary to evolve a strain suited to such conditions. Nine hundred and thirty-four plants were selected for their high yield.

With regard to cotton work at Hagari and Nandyal, a number of selections gave better yields than their adjacent standards. At Nandyal, a comparative test for yield showed that all strains yielded better than N. 14, but none of them were equal to it in quality.

Further trials at Avanashi on ryots' land this year with early sowing of Cambodia, on the 15th September, showed a 37 per cent increase over plots sown late, on the 20th October. A phenomenal yield of 1,488 lb. as against 1,090 lb. over late sown crop was obtained. Ryots could increase their profit considerably if they are prepared for a small additional expense in two irrigations which they may incur by sowing early.

There is another point which ryots are well advised to follow, viz., the strict observance of the rules relating to the Pest Act. By having a long interval between the old crop and the new, they would not only increase their yield but also improve the quality of their cotton.

In regard to the so-called harmful after-effects of cholam on cotton, a test is being carried out at Kovilpatti where fortnightly soil moisture determinations are being made at different depths. Cumbu, horsegram, and fodder cholam precede cotton. The test indicated that cotton in cholam plots is not able to fully utilize the moisture present in the soil, while moisture is depleted in plots where cumbu and horsegram have been grown.

An experiment was also laid down at Coimbatore where Cambodia cotton was grown after summer cholam, cumbu, green manure and fallow. The green manure and fallow showed better growth and gave the highest yield ; those after cumbu were the poorest, a result contrary to the Kovilpatti experience.

The fodder cholam scheme above referred to, and the Madras herbaceum scheme for hybridization work on cottons are financed by the Indian Central Cotton Committee.

(3) *Fodders.*

19. The necessity for growing more fodder, increasing its yield by adequate manuring and the desirability of reducing the present excessive number of cattle in the country was clearly brought out in last year's report. Similar conditions continue and the problem is still acute. With regard to the trial of grasses there has been nothing more to add to what was said last year except that an experiment to test the relative merits of Kikyu, Rhodes and Paspalam grasses was started at the Agricultural Station, Nanjanād. The manurial experiments conducted last year at Kovilpatti to which a reference was made in last year's report yielded similar results with, however, less striking differences in favour of ammonium sulphate and superphosphate. The residual effects of the manure, if any, will help to produce a bigger crop in the succeeding season, a point which should be borne in mind by those who wish to follow the system suggested.

(4) *Fruit.*

20. The demand for fruit from the middle classes is on the increase. A large number of requests continue to be received in different circles so much so that more attention is now being paid to the growing of fruit in several agricultural stations. There are, however, three research stations where fruit is mainly grown, viz., Pomological Station at Coonoor, Burliar and Kallar, and on the plains some attention is being paid to plantain at Samalkot. At Coonoor, among a large number of varieties, plums occupy a prominent place. Two varieties, hale and alu bokara yielded 45 lb. and 35 lb. per tree, respectively. Budding and grafting with plums, peaches, pears, etc., were done, the number amounting to 1,400.

In response to calls from outside 567 fruit plants were sent out from Burliar. In Kallar, the heavy rains of the north-east monsoon damaged 1·5 acres of land and destroyed a large number of fruit and rubber trees. The total amount of fruit disposed of during the year was 18,194 lb. At Samalkot, four varieties of plantains, viz., white chakrakeli, karpura chakrakeli, bontha and Mauritius were under trial and a study of

their flowering was in progress. Irrigation was reduced below the quantity usually supplied and moisture was conserved by inter-cultivation.

(5) *Oil-seeds.*

21. The appointment of an Oilseed Specialist having been made during the year, future work on these will be entrusted to him. He will be engaged at present on the study of coconut, groundnut, castor and gingelly. During the year, however, the coconut stations on the west coast, and the groundnut station in the IV circle were under the Deputy Directors concerned. The chief aim of improvement in oil-seed crops will be to obtain an increase in quantity and quality of oil by selection and agronomic studies.

(1) *Coconut.*—The stations solely concerned in the work of coconut are Kasaragod, Nileshwar and Pilicode. The chief investigations on these included manurial and varietal trials, depth of planting, crossing and selfing. The investigation into the production of nuts from month to month indicated that the maximum yield is between March–April but goes down from May onwards ; the weight of copra was highest in nuts harvested in May and low from July to January. In a manurial trial with cattle manure, fish-guano and ashes, it was found that the weight of copra obtained from 100 nuts was the greatest in plots treated with cattle manure at 1,000 lb. per tree. Trees which have not been manured in Kasaragod since the inception of the station have now become uneconomical, a loss of 1 anna 2 pies per tree being obtained as compared with a profit of 5 annas 3 pies per tree manured with 40 lb. of green leaf, 40 lb. ashes and 5 lb. fish-guano.

(2) *Groundnut.*—Botanical studies of groundnut gave no clue to differences between one variety and another, but for the main differences found between bunch and spreading varieties and the variation in colour of seed coat. It is also observed that there are variations within a variety, that only 20 per cent of flowers develop pegs and 75 per cent of these form good pods and the percentage of loss between wet and dry weight is about 25. Two hundred and fifty fresh selections were made during the year.

Spacing trials were continued and it was observed that a spacing of $6'' \times 6''$ in the spreading variety and $6'' \times 4''$ in the bunch variety gave the best yields. Varietal trials continued but no definite conclusions could be arrived at in the spreading varieties but Gudiyattam bunch, among the erect varieties, continues to be the best. The results of harvesting trials confirm previous results that spreading and bunch varieties take 135 and 105 days respectively to mature.

(6) *Root-crops.*

22. *Potato.*—The research station at Nanjanād is solely intended for work on potatoes. The yields when compared with last year were poor except in the early crop. This when planted yielded five-fold whereas the main crop planted in April and the second crop planted in September gave 4·3 and 4·8 folds, respectively.

A manurial experiment with artificials was in progress.

(7) *Spices and condiments.*

23. Work on pepper is being done at Taliparamba. Studies in the correlation between season and shedding of pepper, suitable standards for and manurial requirements of it and preventive measures for pollu disease were the investigations made during the year.

(8) *Sugarcane.*

24. The agricultural stations at which research work is being done on sugarcane are Anakapalle, Samalkot and Palūr. The chief experiments are concerned with varieties and manures. The manurial experiment at Anakapalle is in general agreement with the results obtained last year, viz., that a combination of artificials with organic manure gives a better result than organic manure alone. Large doses of farmyard manure are employed for this purpose and owing to its limited availability it is desirable that a substitute of an equal if not a better value is found. One-third the quantity of the usual application of farmyard manure together with less than 2·5 cwt. of ammonium sulphate gave a

net increase of 13 per cent over the application of farm-yard manure alone. Another test made at Samalkot with ammonium sulphate and cake when compared with ammonium sulphate alone showed that there was no advantage in having the combination.

In regard to varietal trials, attempts are being made to replace J. 247 at Samalkot. POJ. 2878, the wonder cane of Java, is showing promise. The yields at the station this year are better than the average, as much as 12,230 lb. of jaggery having been obtained, due it is believed to the introduction of a longer rotation, and growing the crop on new land free from water-logging. At Palūr, varietal trials are being continued in garden and wet lands and J. 247 still seems to lead having yielded 77,902 lb. cane per acre followed by POJ. 2714 giving 73,032 lb. In yield of jaggery, however, J. 247 came next.

An irrigation experiment to which a reference was made in the previous year's report, completed its fourth year. The conclusions are that planting early in February is not an advantage and that Co. 213 can be grown with the normal rainfall supplemented by only 4-acre-inches of irrigation at the time of planting. It is found that this variety is more drought-resistant than J. 247.

The rotation experiment on sugarcane at Palūr has reached its eighth year. The yields of cane of the four, three and two-year rotations were 33·74, 29·28, and 24·32 tons per acre respectively. The outturn of sugarcane in each rotation showed a net profit of Rs. 359, Rs. 280 and Rs. 258, respectively, for all the eight years. The net profits of the several rotations taking all the crops together are respectively Rs. 81, Rs. 51 and Rs. 49. These results argue in favour of a wide rotation for sugarcane.

D.—Entomology.

25. This section is concerned with the study of the life-histories of various insects affecting animals and plants and the discovery of cheap remedies and preventive or control measures. The ryot would not be in the helpless and unfortunate plight that he is at present, if he does not accept these visitations as mere acts of God but takes at the very outset as any

business farmer should, precautionary measures however simple they may be. Unfortunately, lack of conjoint action on the part of ryots militates against any measures taken by a few in the protection of their crops. Speedy and united action is necessary to give effect to any suggestion that this section can offer to the ryots at large. The several special investigations made during the year are mainly a continuation of past work ; the coconut caterpillar, cottony cushion scale on the Nilgiris, paddy grasshopper and red hairy caterpillar on groundnut are a few examples. It is gratifying to note that with regard to the coconut caterpillar, owners of gardens by themselves readily adopted the necessary mechanical measures of control. Besides, the introduction of natural enemies of the caterpillar helped the situation. A moving boat laboratory did good work in the liberation of parasites in villages situated along backwaters.

The paddy grasshopper was so serious in Ganjam that a special staff of one assistant and two fieldmen was sanctioned to supervise digging operations to bring the egg-masses of the grasshopper to the surface. The cost of the remedial measures suggested works out to only Rs. 1-8-0 per acre. Any good effect that the previous trial had was neutralized by young hoppers coming in numbers from adjacent untreated fields.

In regard to the red hairy caterpillar, the area in which the Pest Act operated was fairly free from attack this year. The peculiarity of this pest seems to be that there is no certainty that it will make its appearance in the same locality year after year. Therefore, it is advisable that in the interests of the ryot a Pest Act be introduced for all districts with instructions that it should be enforced in any given year only in localities where the pest makes itself felt ; in other places the Act will not function.

With regard to the serious *Stephanoderes hampeii*, a beetle pest in coffee, a survey of the existence of the pest was made by two assistants in different coffee plantations on the Shevaroys and the Nilgiris. As far as reports go, there appears to be no serious infestation of this pest in the estates but Java coffee seeds sold in Salem were found to contain these beetles. There was a serious recrudescence of tobacco aphis this year in

different tracts of the Presidency. As an insecticide, tobacco decoction was found to be very useful. Fumigation and issue of pest-free certificates form a part of the activities of this section. Several consignments were disinfected and sent to countries outside India like Java, Ceylon, Russia, Malaya, Australia, and Bulgaria, etc.

E.—Horticulture.

26. The Botanic Gardens at Ootacamund and Coonoor continue to render useful service by stimulating the aesthetic tastes of the visitors who go to these hill stations during the summer months of the year. The gardens are always kept in order and no efforts are spared in beautifying their surroundings. The heavy rains during the north-east monsoon caused land-slips in several places which meant extra expense in repairing footpaths, filling land-slips, putting back fallen arches, etc. The damage in Sim's Park, Coonoor, was equally bad affecting both garden and the lake. A new bridge had to be put up to replace the old one damaged.

Several additions were made in the form of rockeries in different parts of the gardens. About 15,000 ornamental and economic plants were raised. Half-a-dozen rare glass-house plants flowered for the first time. As usual, additions to the gardens took place by purchase and interchange. Nearly 1,000 ornamental plants were distributed in exchange to other Government institutions and several members of the public. In accordance with the recommendations of the Malaria Committee a sluice was erected near the lake after first thoroughly draining it. The old practice of selling cut flowers was abandoned during the year as it was considered desirable to foster local enterprise and not to compete with it.

The receipts during the year amounted to Rs. 4,654 as against Rs. 6,577 last year.

F.—Implements.

27. Research work on implements is undertaken by the Research Engineer who during the year was provided with a well equipped workshop at a cost of

Rs. 21,000. This would enable him in future to carry on his investigations unhampered by space and equipment.

Reference was made last year to the introduction of two dry land ploughs, small and medium types, which had been approved by the Department. These are now stocked by Demonstrators for demonstration and sale. With a view to aim at good quality of work and service, almost all ploughs in use at several of the agricultural stations are being fitted up with short-beams and double-handles. Avery's Hindustan plough was subjected to a further trial in wet lands. The concensus of opinion was in its favour as the output of work is 30 per cent more than that of the Meston plough, but its price being on the high side prevents cultivators from purchasing it in large numbers. Tenders are being called for, which would ensure good quality at reasonable prices.

The Research Engineer's attention was directed to the improvement of ceded districts drill. Ingenious as its construction is, the defects are that sowing is by no means regulated due to differences in size and spacing of delivery holes and to the uneven manner in which the sower drops the seed with his hand. To obviate these, a small mechanical seed-distributor which could be used for a variety of seeds was constructed and is under trial.

Improvements to the roll-easy mhote-wheel by providing it with a hiat steel sleeve race and roller-bearing were under investigation. Different types of hand-driven groundnut decorticators and chaff-cutters were tested and reported upon.

The circular mhote so popular in South Arcot suffers from being crude and complex. Improvements in its design were under consideration. Observations on the two wind-mills at Coimbatore and Chintaladevi were recorded daily and Robinson anemometers were provided at twenty agricultural stations to test wind velocities as a preliminary to the possibility of erecting more wind-mills.

G.—Livestock.

28. The activities of this section spread practically throughout the Presidency. Research work is confined

to the Livestock Research Stations at Hōsūr, Chintaladevi and Guntūr. A dairy herd is maintained at Coimbatore and a number of bulls are kept at Madras, besides premium bulls distributed in different parts. There are altogether 964 cattle with 29 bulls, of which only one is of the Ayrshire breed. The chief milking breeds are classified into Bangalore, Coimbatore and Scindhe herds.

There are 78 animals in the Bangalore herd. These are crosses between Ayrshire bulls and Scindhe and Saniwal cows. This half-bred tendency is maintained by mating the males of one generation crosses with females of the same generation. Work is naturally slow as it would take at least about nine years before the effect is seen in the progeny taking for granted that the first calf born is always a heifer. The experience gained so far seems to show that they begin to degenerate from the second generation as indicated by their poorer yield and greater susceptibility to disease. The experiment will, however, be continued. The average milk yield per lactation of a cow in the herd amounted to 4,260 lb., the best cow giving 10,530 lb.

The Coimbatore herd has 121 members and consists of various proportions of imported and Indian blood ranging from one-fourth to fifteen-sixteenths. These cross-bred cows are remnants of the old Coimbatore College herd. The best cow of the herd gave 11,890 lb. during the last lactation.

The Scindhe herd consists of 141 cows. At Hōsūr, they thrive very well and are good milkers. The chief object of maintaining this herd is to supply good breeding bulls for improving the poor milking breeds like those, for example, on the west coast.

Besides these, there are the Kangayam and Ongole herds. There are 210 of the former at Hōsūr and 308 of the latter both at Hōsūr and Chintaladevi. The Kangayams are excellent draught cattle and the demand for this high class breed is on the increase. The Ongoles are a good milking strain and also suitable for draught purposes. The object in maintaining these two herds is to produce, by careful selection, animals which combine in them the qualities that go to make good draught cattle and heavy milkers.

Buffaloes.—There are 89 of these at Guntūr. Here, pure-bred Delhi bulls are mated to country stock to

Crossbred cow No 177 at the Agricultural College Dairy, Coimbatore, which yielded 11,890 lb. of milk in 414 days with a daily average of 28·7 lb.

obtain better-sized half-bred bulls and to improve the milking quality of the cows. Limitation in space makes expansion in this line impossible.

In Madras, there are eight stud bulls which did 634 services as against 529 last year. The Assistant Agricultural Demonstrator in charge of these bulls inspected their progeny and found that heifer-calves are retained while bull-calves are sold within the year. There were 82 approved premium bulls, of which 50 are farm-bred. These are placed in different parts of the Presidency, and a premium of Rs. 100 is paid for their good maintenance and proper service.

Sheep.—These belong to the Bellary breed, of which there are 147 at Hōsūr. The object of maintaining them is to increase the quantity of wool. The average yield of wool worked up to 2 lb. 12 oz. as against 2 lb. 5 oz. obtained last year, the best giving as much as 6 lb. 15 oz.

Pigs.—There are 21 maintained at Hōsūr and Coimbatore, chiefly on the by-products of the farm, viz., skim milk and waste grain, etc. The object is to grade the country pigs but so far their popularity among the class of people connected with pig-rearing has not been great.

Poultry.—White Leghorns, Rhode Island Reds and Light Sussex are the three breeds maintained at Coimbatore and Hōsūr. Trap-nesting is taken recourse to for recording correct number of eggs laid. The average yield per bird at Hōsūr was 167 and at Coimbatore 120. The flock consists of 132 birds at Hōsūr and 78 at Coimbatore. The demand for eggs and birds is on the increase. An Assistant sent to Lucknow for training in poultry has just returned and is at present getting things straightened at Hōsūr. With some experience of the local conditions he should be able to begin work on the improvement of local poultry.

H.—Mycology.

29. Investigations on Piricularia on paddy and Mosaic on sugarcane were continued. A new disease known as Foot Rot in paddy was discovered in Gōdāvari district and later at the Paddy Breeding Station,

Coimbatore. Steeping paddy seed for 30 minutes in a 2 per cent copper sulphate solution was most effective both in the nursery and the field. In regard to Mosaic, further work showed that out of the 19 varieties under trial a number of Coimbatore canes evolved at the Imperial Breeding Station and P.O.J. 2714 and P.O.J. 2878 and Cossier showed either complete freedom from disease or a high degree of resistance. Discarding varieties susceptible to this disease and replacing them by those which are immune to it are the directions along which eradication of Mosaic is possible. At Taliparamba, an experiment is being laid down to see if loss in tonnage is to be expected as a result of this disease.

Cotton seedling blight and wilt on groundnut were also under investigation. The latter showed that 8 out of 19 spreading varieties and 6 out of 7 of the erect varieties showed a small percentage of wilt. The kernels were infected in almost all varieties, the erect being more susceptible than the spreading.

I.—Trial plots.

30. Field trials on ryots' lands are the continuation of research work at the agricultural research stations. When a practice or strain is found after repeated tests suitable to local conditions, and before it is actually demonstrated to ryots, it should pass through the intermediate stage—the plot trial stage—in the fields of ryots with the same care bestowed on it as at the agricultural stations. This is necessary as conditions in the ryot's land are not always similar to those at the station. If the trial meets with an equal measure of success, then it goes on to the final stage, namely, demonstration. Field trials were conducted with paddy varieties in the I, II, V and VI circles. Varietal trials on cholam, ragi and cotton were made in the VIII circle. Manurial trials were also done on cholam in Kurnool district, paddy in Kurnool and Coimbatore districts, and on ragi, Cambodia cotton, tobacco, cumbu, cholam and groundnut in the VIII circle. The trials, as was expected, were not an unqualified success everywhere.

V.—DEMONSTRATION.

31. A change in the policy of our methods of demonstration was foreshadowed in last year's report. Concentration of work of the Agricultural Demonstrator in 4 or 5 centre villages replaced the long established method of covering a large number in one or two taluks. Both methods are recognized to have their defects and advantages but given the necessary time, concentration is likely to achieve more speedily the end in view. Concentration means putting more attention to detail, better acquaintance of the cultivator and his needs, more knowledge of local conditions, and greater opportunities for demonstration of the improvements because of the longer stay at each centre. Personal contact being the key-note of this concentration, it is expected that work will be more intensive and results more telling. It is, however, proposed to take stock of our experience of this new policy at the next Gazetted officers' conference.

32. The second change aimed at was that the Agricultural Demonstrator should, first of all, concern himself mainly with what are called fundamental items of propaganda which every ryot should be able to adopt, be he a wet land or a dry land farmer. Clean cultivation, preservation of cattle manure, care of cattle, manufacture of composts, preservation of pure seed, prevention of land from erosion, etc., are a few examples. These are, as it were, the foundation of agricultural improvement over which it would be safer to build the superstructure of specific items of improvement.

A.—Demonstration plots.

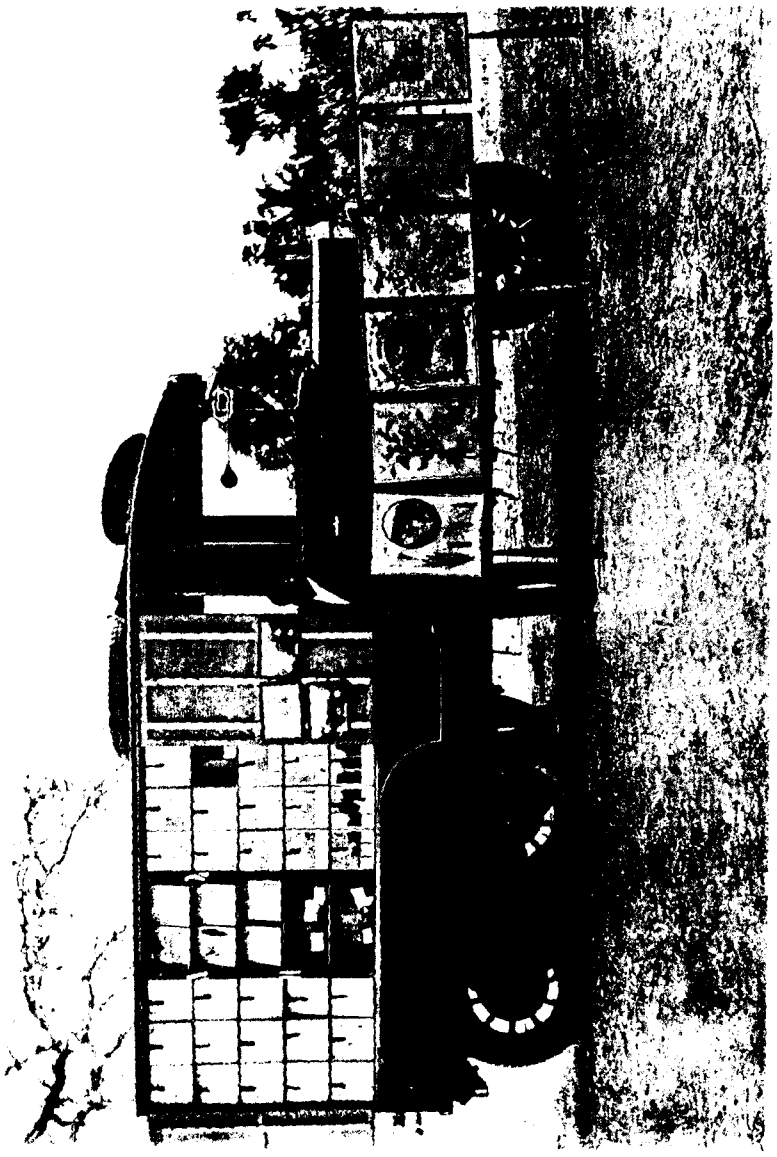
33. In the centres of work, demonstrators carried out a number of demonstration plots on various items of propaganda. It was possible for them to organize a large number because of their concentrated work and because they were not expected to maintain profit and loss accounts for such plots. For it was rightly stated last year that the demonstration plots are run "to demonstrate a proved fact and not to elicit the fact." Nearly 2,000 demonstration plots were arranged in ryots' lands. They included improved varieties of

paddy, sugarcane, cotton, ragi, sorghum, cultural, varietal and manurial methods, demonstrations on improved implements, manure pits, compost pits, etc. The low prices of important food-crops made profits less attractive but all the same the difference due to demonstration was obvious in almost all cases.

B.—Exhibitions.

34. This line of activity has been in the fore-front of our propaganda for the last few years. The demand for staging them has been great with the result that the Department is often brought into the lime-light on such occasions. The occasions on which the exhibitions are arranged are cattle fairs, jamabandi camps, ryots' conferences, health week celebrations, co-operative district conferences, etc. That these exhibitions have an educational value is undoubted but whether they should be held in areas where we are not known with the object of advertising ourselves, is debatable. So long as they do not interfere seriously with the work of demonstrators and as far as funds permit these may be staged wherever there is a demand. The total number of exhibitions amounted to about a hundred. Opportunity was taken to deliver lantern lectures at these exhibitions.

35. To the two motor-units we had last year one more was added; these are distributed to different circles; one unit is ear-marked for the first three circles, another for IV and V circles and the third for the VI, VII and VIII circles. The third unit which is a six-wheeler van has an arrangement by which the demonstrator and the staff are also accommodated in it. This is an improvement upon the previous two in that it is possible here to dispense with the caravan and that it is able to negotiate roads of varying conditions.



C.—Items of propaganda.

(1) *Crops.*

36. (*a*) *Methods of cultivation.*—Under this head may be included improvements like drill sowing, reduction in seed-rate, line planting of sugarcane, etc.

In the VI circle, due to the unfavourable season, cotton was drilled in only about 10,000 acres as against nearly 18,000 the previous year. Progress in this item in the VIII circle has been slow. The initial expense of the drill sets and the unenterprising nature of the ryots seem to have stood in the way of their greater popularity.

Improvement in the reduction in seed-rate of paddy has been for years an item of demonstration in different parts of the Presidency. In almost all districts, save perhaps portions of Vizagapatam and Ganjām districts, the reduction in seed-rate has been marked, especially in the V and VI circles, where much advance has been made in this direction.

Line-planting of sugarcane which helps to reduce the seed-rate from 25,000 to 15,000 or 18,000 setts per acre is being demonstrated in the I circle. In Vizagapatam district alone 2,900 acres of sugarcane were planted in lines this year. In the same circle, short planting is making slow but steady progress.

Lifting groundnut by guntaka was demonstrated in the II and IV circles.

About 1,900 acres of coconut were intercultivated in the V circle, a practice quite common on the west coast.

Demonstrations in clean cultivation of various crops were arranged in several circles.

(*b*) *Methods of manuring.*—With the exception of recommending suitable manures for paddy and sugarcane which are already on well-established lines, and the manurial trial on coconut, nothing new was attempted in this direction on other crops due to the paucity of reliable information. It is hoped that research in this direction will, in future, be augmented. Groundnut cake, ammonium sulphate and superphosphate for sugarcane and green manure of different sorts and superphosphate or bone-meal for paddy were the manures recommended. In the V circle, where cattle manure is largely used for paddy, the recommendation was to reduce its quantity and in its place the substitution of ammonium sulphate to make cattle manure go a longer way than before.

Seed.—The distribution of different strains of seed has been the greatest achievement of our demonstrational activities. In fact, this has been our strongest point in the past and will, no doubt, continue to be so for a long time to come. This is because the ryot is unable to maintain for himself a pure seed supply and is, therefore, in constant want of it. Stocking seed in depots for sale unfortunately seems to leave an impression among some of the demonstrators that they should successfully play the part of "salesmen" even at the expense of other more difficult but less spectacular though equally important items such as demonstrations in cultural and manurial practices. This tendency wherever it exists has to be checked.

Cotton.—The chief work on cotton consists in the distribution of strains of Cambodia, Karunganni, Westerns and Northerns.

In the VIII circle, seed farm work on Cambodia cotton was handed over in 1929-30 to the Co-operative Department keeping only Tiruppur, Coimbatore and Annur centres under the Department. Two lakhs pounds of seed were obtained from strain Co. 2 for distribution. The lint obtained was sold at a premium of Rs. 20 to 30 per candy above market rate. About 1,640 bags of seed obtained by the ryots of Gobichettipalaiyam and Pollachi after ginning co-operatively were distributed to ryots in those areas alone. In 1930-31, the seed farm area was confined to Tiruppur and Annur centres where an area of 958 acres was sown.

In the VI circle, where Cambodia cotton is usually sown as a mixed crop, ryots have been persuaded to grow it pure. To this end, 44,845 lb. of seed were distributed.

On a small scale Cambodia cotton was introduced in the IV and V circles.

The total amount of seed distributed among ryots in the Presidency under Cambodia cotton comes to about 275,000 lb.

Karunganni cotton is making headway in the VIII circle. About 100,000 lb. of seed were distributed during the year.

In the VI circle, C. 7 and A. 10, strains of Karunganni, are becoming popular and about 115,000 lb. were issued. Karunganni cotton not having done well

during the last three years did not find a ready sale. Uppam is said to have done better during this period, but the experience of previous years was in favour of Karunganni. Over 200,000 lb. of seed of Karunganni were sold to ryots.

It is unfortunate that *Pulichai* cotton continues to be mixed with other varieties in the VI circle. So far persuasion having failed, and before more drastic action could be taken, a survey of the villages where this mixed crop is grown was made and firms which deal in cotton were informed of the desirability of their refusing to purchase cotton containing *Pulichai* mixture. It is hoped that it will have a salutary effect on the cultivators indulging in this malpractice.

H. 1, a strain from the westerns is being popularized in Bellary district. The area under seed farms during 1930-31 dropped from 7,500 to 6,400 acres, for the reason that ryots are keeping their own seed for sowing. Seed farms are confined to half-a-dozen villages near Guntakal and Adōni. Over 300,000 lb. of seed were obtained and 168,000 lb. were sold to ryots and 90,000 lb. issued on loan for seed farms to be sown next year. Eight hundred bales of lint were sold at premiums varying from Rs. 14 to Rs. 25 per bale of 400 lb.

Northern cotton comes from Kurnool district. N. 14 is the strain that has been popular for several years. The area under seed farms increased from 1,649 acres to 1,700 acres. It is confined to 13 villages in three taluks. In 1930-31, 91,900 lb. of seed were sold to ryots. The lint from seed farm cotton obtained a premium of Rs. 35 to Rs. 47 per bale.

Cholam.—Introduction of strains in cholam is confined to III circle, T. 1, T. 6, and T. 12, being the strains under demonstration. Eleven thousand two hundred and eighty-six pounds of seed were distributed. Yields were poor due to prolonged drought. Nevertheless, a 20 per cent increase over the local variety was obtained.

Coconut.—This is one of the most important crops of the west coast and naturally great importance is attached to its improvement. Large areas are being planted in the dry lands of the circle and the demand for seedlings is increasing. Nurseries are raised at

Nileshwar station and at Calicut and seedlings raised from nurseries by private people were indented upon. Over 3,700 seed nuts and 24,000 seedlings were supplied to ryots from this circle. The low price of coconut has been against its further expansion. A certain amount of activity was evidenced in its introduction in the IV circle where 575 coconut seedlings were distributed in Vellore and Madurantakam taluks. In the V circle, 1,875 good seed nuts were obtained from the west coast for sale to ryots.

Paddy.—Several paddy strains introduced as suitable to different parts of the Presidency have established their fame. Of all these, G.E.B. 24, one of the earliest, may be considered a cosmopolitan strain being found suitable to different varying conditions. It is a short-duration variety, excellent in quality, a heavy yielder and seems to meet the desires of a very large number of cultivators. In Palghat, it occupies several thousands of acres. Siruguppa in Bellary district, claims 60 per cent of the area under paddy to this variety. Being drought-resistant, it is treated as a semi-dry paddy in certain parts of central districts. Other strains of importance are Co. 2, Co. 5, Co. 7, Adt. 1 and Adt. 4. One hundred and sixty tons of seed were sold during the year in different circles. The need for obtaining seed annually to meet the full demands of ryots is engaging the attention of our district staff. In the V circle, the agencies for multiplying seed are seed farms under the supervision of the Department, private seedsmen and co-operative societies who have stocked in all about 1,600,000 lb. of seed for sowing next year. The natural spread under these varieties must be very large although actual figures are not available.

Potato.—The distribution of potatoes is confined to the Nilgiris. One thousand five hundred maunds of seed were supplied under seed farm conditions and 618 maunds were sold to the public. The demand for this seed is heavy as ryots attach a great value to the carefully selected seed of the Department.

Ragi.—The strains in this crop are T. 8, H. 22, E.C. 47 and E.C. 593. The first is being distributed in II and III circles. The last two which are selections of the Millet Specialist are being introduced in the

VIII circle. The former on account of its longer duration requiring a large number of irrigations than the local variety is being withdrawn. The latter strain seems to be promising in Salem district. H. 22, a strain evolved by the Mysore department and tried in the VIII circle is now withdrawn as it matures later than the local variety and the extra yield is not commensurate with the extra irrigations necessary to mature the crop.

Sugarcane.—247-B, the correct name for J. 247, continues to be popular in the I and IV circles and is being introduced in practically all other circles. Although it is slightly later in maturity in some parts, it tillers profusely and therefore gives an excellent tonnage and is drought resistant. Steps are however being taken to replace this variety wherever necessary and that is where research stations come in handy. In the V circle, sugarcane is being introduced in new tracts where formerly only paddy grew in order to demonstrate to ryots the advantage of introducing it in rotation with paddy. About 11 acres of sugarcane, an area good enough for a start, were grown on pure wet lands.

The short crop method to which reference was made in the previous reports is making satisfactory progress in the I circle and some attempts to introduce it were made also in the VIII circle.

(2) *Fodder.*

37. Intimately associated with the improvement of livestock of the country is the raising of crops specially for fodder. The popular practice of growing sunnhemp for fodder prevalent in the II circle is being recommended in others, especially in the III and VI circles. *Pillipesara*, besides being a valuable green manure, is also a good fodder crop. It is becoming extremely popular in parts of Gōdāvari, Kistna and Guntūr districts. Among sorghums, *kakijonna* in Chittoor district, and *periamanjal cholam* in the Coimbatore district, continue to be popular and their use is being extended to other districts. Guinea grass and Elephant grass are excellent fodder crops for milch cattle. Silage-making is being taught to

cultivators. Progress in this direction is appreciable in the VII and VIII circles. In the former, hill grass growing rank immediately after the close of the south-west monsoon and often being wasted at present is now conserved and converted into silage. Similarly, conversion into silage of ragi straw hitherto considered an indifferent fodder is being demonstrated in different areas in the latter circle.

(3) *Fruit.*

38. In various circles, the demand for growing more fruit is increasing. In the II circle, the demand for country oranges was so great at one time that at present there is a glut in their production. The area under these is not likely to be extended. Growing of plantain is increasing in the II, III and VIII circles. Kew pine apples introduced into the west coast are so popular that large areas are being planted and the produce exported even to Mysore. Some of them weigh as much as 15 lb. and fetch from Re. 1 to Rs. 2 according to size. Seeds and plants of oranges, sapotas, mangoes, and plantains were supplied to cultivators.

Intercultivation of fruit trees is a fundamental item of propaganda and ryots are being frequently taught to conserve moisture and prevent weeds by such intercultivation.

(4) *Implements.*

39. The advantages of efficient preliminary cultivation are being brought to the notice of the cultivator in the centres of work. The ryot is accustomed to leave his land unploughed until the actual season for sowing approaches, so that weeds take a firm hold of the land even before a crop is sown. There is not sufficient time for the fields to be ploughed and weeds killed efficiently with the result that the latter get the upper hand of the crop. Therefore not only early but efficient ploughing should be the aim of the ryot. During the year, two standard types of ploughs to which a reference has been made in the earlier portion of the report were introduced. These having been stocked with the demonstrators only during the latter part of the year many sales could not be effected.

Prices at Rs. 12 for the bigger plough and Rs. 5 for the smaller one are attractive. But unfortunately there having been already a variety of ploughs in the market any further additions, however intrinsically superior to them, will only add to the confusion of the cultivator. His natural shyness to purchase more new types is understandable. Again, having purchased some types of ploughs recommended by the Department years ago, the ryots would naturally use them until they are completely worn out. Such being the case, the immediate requirements of the ryots by making spare parts readily available should be borne in mind. During the year, till the introduction of these new types, ryots purchased implements from firms ; hence it is not possible to know the exact number sold. It is gratifying that as many as 2,000 ploughing demonstrations were held.

In order to keep down prices and guide the ryot as to the correct implements he should purchase, it seems essential that the Department should go back to the former policy of stocking these implements, however much one is conscious that it does not strictly come under the purview of the work of the Department. No sooner the Department ceased to sell ploughs than prices soared high, another reason for paucity in their sales. It is hoped that in the coming year we should be able to make better progress in this direction.

H.M. Guntaka, an excellent harrow, was very thoroughly demonstrated throughout the Presidency, as many as a thousand demonstrations having been held during the year. There are three sizes of this intended to be used according to the distance at which the crops are sown. It is also intended to be used as an implement to lift groundnut, but its success as such has not been universal. Its high price is an obstacle to its sale in large numbers.

Several demonstrations were also held with the roll-easy mhote-wheel, chaff-cutters and hand-winnowing machines.

(5) *Livestock.*

40. Mention has already been made under Livestock section, to a number of bulls approved by the Department and maintained by the public to which

the Government give a premium varying from Rs. 100 to Rs. 150. Besides the 82 approved breeding bulls, others maintained in Jails and by Government amounted to 15 making a total of 97. Demonstrators periodically inspected the bulls and calves born to them, checked registers and took advantage of these visits to advise ryots on the proper housing, feeding and management of cattle and their selection for improving the milking capacity of cows. Advice was also given on the protection of valuable animals against serious diseases like Rinderpest, in several instances ryots taking heed to such advice. Castration of bull-calves has become a marked feature of activity in certain circles. Low prices of oil-cakes were taken advantage of by demonstrators in impressing on ryots the desirability of their being fed to cattle. Growing of fodder crops and preparation of silage are other aspects placed before the ryot for the improvement of livestock.

A desire for improvement in poultry is coming into prominence in different parts of the Presidency. There is a large demand for European breeds maintained by the Department, but steps will also be taken to see that work is done in the improvement of indigenous breeds.

(6) *Manures.*

41. Demonstrations in farmyard manure, compost, green manures, oil-cakes and artificial manures were carried out as before.

Farmyard manure.—The energies of the demonstrators were particularly directed towards improvement in the method of collection and preservation of farmyard manure. Although intensive effort was made during the year, the ground yet to be covered is so vast that for any marked improvement of a permanent nature the campaign should be continued with renewed activity. According to the practice of ryots, the manure is preserved in heaps and rarely in pits. A good deal of urine is allowed to run to waste ; the pits are exposed to sun and rain. The object was to remedy these defects by seeing that manure is put into pits and covered over occasionally with either

waste straw or earth. Secondly, the floors of the cattle-sheds are covered with litter or loose-earth to absorb the urine. Simple as these improvements are, ryots evince great disinclination to systematically carry out these suggestions, although they appreciate their value in theory. However, with the co-operation of ryots, over 2,000 manure pits were dug and about 1,100 improved byres, loose-boxes and dry earth sheds were constructed. These improvements, if persisted in, and systematically carried out by ryots, will go a long way in increasing the quality and quantity of cattle manure.

Compost.—According to the local practices of the ryot, there is a good deal of waste in organic matter. It is either not collected or, if collected, burnt as fuel. Intensive propaganda in this direction helped ryots to realize the great possibilities they have in conserving and augmenting the organic material that is at their disposal. Over 700 compost pits were made of waste material like sugarcane and plantain trash, village sweepings, prickly-pear and groundnut husk, etc.

Green manures.—The most popular green manures are dhaincha, sunnhemp, wild indigo, indigo and of recent date pillipesara (*Phaseolus trilobus*) specially in the II circle.

The demand for these is so great that it is considered practically impossible to supply them in full without the ryots themselves helping in their production. Attempts are being made to make each circle self-supporting in the production of green manures suited to each locality, and in certain circles seed farms are being thought of to achieve this end. About 115 tons of seed of various kinds of green manures were supplied to ryots. It is interesting to record that in the V circle co-operative societies purchased sufficient amount of seed to sow over 14,000 acres.

Oil-cakes.—Propaganda in the greater use of oil-cakes in combination with bonemeal or superphosphate was recommended for various crops. These were available at much cheaper rates than even artificial manures so that an impetus was given for their trial in large quantities.

Artificial manures.—These manures are stocked only by a number of manure firms and their popularity among ryots continues. Superphosphate and ammonium sulphate are the most in demand. The demonstrators are concerned chiefly in recommending the kinds of manures to be used for different crops and their correct doses.

Bone-meal.—Ryots are being educated in the use of bone-meal, but on account of its slow acting nature and their anxiety for quick returns, they prefer superphosphate instead. The good effect that would accrue by the use of bone-meal in conjunction with green manure is being constantly brought to the notice of the ryot. Being an indigenous manure, provided it could be cheaply had, its greater use is only a matter of time.

(7) *Pests and diseases.*

42. The very heavy rains of the north-east monsoon increased the number of pests during the year. Scores of these made their appearance on different crops and in the II circle alone no less than ten crops were affected. Aphis on tobacco seems to have taken its toll practically throughout all tobacco-growing areas. Paddy suffered from grasshopper very seriously in Ganjām district. Hairy caterpillar on groundnut, stem-bleeding disease and nephantis on coconut, spodoptera on paddy, mahali disease on arecanut, budrot on palmyra in Palghat, were other diseases that affected the crops during the year. It is hoped that demonstrators now working in concentrated areas will cope with the situation to a greater measure than before. In order to help others who are beyond their jurisdiction, special demonstrators are being employed in different circles so that they may deal directly with the ryots who need their assistance.

Among minor pests which affected crops during the year may be mentioned smut on sorghum, thrips on chillies, paddy blast and caseworm on paddy, mangohopper and betelvine bug.

The cochineal insect for controlling prickly-pear was in great demand by ryots although in some instances unnecessary excitement and prejudice prevail against it.

D.—Work Through other agencies.

(1) *Co-operation.*

43. The co-operative agricultural societies of the V circle evinced the greatest activity. Six societies did useful service by running demonstration plots, seed farms and storing manures and paddy for sale to ryots. The Sivagnanam Society at Lalgudi and the co-operative agricultural society at Mulangudi maintained breeding bulls.

A special Agricultural Demonstrator was deputed to resuscitate the inactive sale society at Kovilpatti. Several co-operative societies in the VIII circle were active in ginning and collecting cotton seed under the supervision of the Department. The loan and sale societies at Bellary and Adōni and the Agricultural Improvements Society at Bantanahal engaged themselves in the distribution of cotton seed.

The field for varied activities is so vast that there is scope for every co-operative institution in the country to follow their example.

(2) *Agricultural associations.*

44. During the year, efforts were made to start agricultural associations with the object of utilizing them as agencies for stocking and sale of agricultural produce but with very little success. With the exception of the association at Trichinopoly which helped poor ryots affected by floods by distributing over 12,000 lb. of *Kar* and *Samba* paddy seed besides organizing and conducting an agricultural exhibition and the one at Chittoor which purchased seed drills and staged an exhibition, all other associations remained moribund.

VI.—LEGISLATION.

45. *Cotton Ginning and Pressing Factories Act.*—This Act continued in force during the year. Government empowered the District Agricultural Officers to inspect factories, with a view to give relief to the Inspectors of Factories, until orders are passed on the proposals for the special staff of inspectors for the work. Government also empowered the Sub-divisional Magistrate, Markapur, to inspect the cotton ginning factory at Tarlupad in the Nellore district.

There are 523 ginning factories and 63 pressing factories. In twenty cases only, it was necessary to take legal action in order to enforce compliance with the provisions of the Act. Steps have been taken to make the factories at Bellary and Adōni use iron platforms, chains, and English weights in the place of hessian bags, ropes, and stone weights. It was found in some places that the stamping establishment assumed 1 lb. weight to be equivalent to 40 tolas instead of 38·88 tolas. Necessary action was taken to remedy the defect.

46. *Cotton Transport Act.*—This Act continued in force during the year.

At present, there is no restriction on movement by road and river. Complaints were received that the merchants of Tiruppur carted Mysore kapas from Bangalore to Hosur and then railed it to Tiruppur with a view to mix it with Cambodia. Also about 15,000 bales of cotton were imported into Adōni by road and about 2,000 bales to Kurnool by boat across the Thungabadra from His Exalted Highness the Nizam's Dominions every year. About 45 tons of seed were imported this year mostly for sowing from Gadag side into the northerns area, mainly Nandyal. *Pulichai* cotton seed was imported into parts of Rāmnād and Tinnevelly for sowing. The question of controlling the growth of this cotton in the south is under the consideration of the Government.

Licences to import cotton were issued as usual, the details of which are shown below :—

Single licences.—Five licences were issued for the import of ginned cotton and corded cotton into the southerns area.

Annual licences.—The table below gives information about the licences issued from February 1930 to January 1931 :—

Cotton year 1930-31 *(licences which lapsed on* 1st *February* 1931*).*

Name of protected area. (1)	Kind of cotton. (2)	Purpose for which licences were issued. (3)	Number of licences issued. (4)	Number of certified copies issued. (5)	Number of certified copies used. (6)
Southerns tract ...	Ginned cotton.	Mill consumption.	9	225	186
Do. ...	Cotton waste.	Do.	1	15	6

Licences issued from 1st February 1931 to 31st arch 1931 :—

…tton year 1931-32 *(licences which will expire on* 1st *February* 1932*).*

Name of protected area. (1)	Kind of cotton. (2)	Purpose for which licences were issued. (3)	Number of licences issued. (4)	Number of certified copies issued. (5)
Southerns tract ...	Ginned cotton.	Mill consumption.	7	133
Do. ...	Cotton waste.	Do.	1	10

Import by sea.—Twenty-one licences were issued for the import of 2,985 bales of cotton into Tuticorin.

Cotton market.—A bill to provide for the establishment and the better regulation of markets for commercial crops in the Madras Presidency is under the consideration of the local Government.

47. *Pest Act.*—Acts affecting coconut, cotton, groundnut and palmyra were in force during the year.

Coconut.—The Act is to control the spread of *Nephantis serinopa*. The measure adopted in controlling this pest is to cut and burn the infested leaves of coconut. Three revenue inspectors, one in South Kanara, and two in Malabar, assisted by an Agricultural Demonstrator were responsible for the enforcement of the Act. Steps were also taken to liberate the parasites in infected areas. It cannot be said that the pest has been completely checked, but there is no doubt that it is not as serious as it was before.

Cotton.—The notification is in regard to the stem weevil disease in Cambodia cotton. This has been existing for several years but ryots do not yet seem to have realized the importance of the enforcement of the Act. In Trichinopoly, ryots removed the plants without much pressure being brought to bear upon them, and it is hoped that they have realized the benefits of the operations. In the VI circle, propaganda by Demonstrators was done as usual ; but for over 225 acres all the area was completely eradicated by first of September. Seventy prosecutions had to be launched and final eradication was completed on the 11th

September 1930. In the VIII circle, while Salem showed a clean sheet on the first of September, in spite of 18 Agricultural Demonstrators in the Coimbatore district engaged in propaganda work, there were 4,700 acres of the crop still standing on the due date, half the area being in the Palladam taluk alone. Forty-seven prosecutions were launched and the final eradication was completed on the 15th September. The season being unfavourable the temptation to allow Cambodia cotton to grow was not as great as in the previous year.

Groundnut.—The Pest Act is with reference to *Amsacta albistriga*, the hairy caterpillar on groundnut and cumbu. This was introduced in 8 villages of Vriddhachalam taluk and 21 villages of Variyur firka of Tiruvannāmalai taluk in the IV circle, and 16 villages of the Udayarpalaiyam taluk of Trichinopoly district. On the whole, the emergence of moths was poor but where it was serious the villagers themselves were persuaded to resort to the collection of moths and destruction of caterpillars. The entomological staff assisted by Agricultural Demonstrators did the propaganda work. It is unfortunate that this pest takes an erratic course making its appearance in unexpected quarters. For example, in Rasipuram in Salem district there was an unexpected emergence.

Palmyra.—Although the Act was in force in East and West Gōdāvari, Kistna and Guntūr districts, the special staff attached to these operations was disbanded and Demonstrators carried out propaganda in regard to felling of infected trees in addition to their other work.

VII.—PUBLICATIONS.

48. The undermentioned leaflets and bulletins were published during the year 1930-31 :—

Number.	Subject.	Languages in which published.	Price.
	Leaflets.		
3	Rations for milch cows	English ... ... Tamil ... .. Telugu ... ... Malayalam ... ... Kanarese	Free.

Number.	Subject.	Languages in which published.	Price.
	Leaflets—cont.		
6	How to control the jasmine bug	English ... ... Tamil ... ... Telugu ... ... Kanarese	Free.
8	Water-rate or Faslijasti for certain crops ; concession to ryots in aid of cultivation.	English ... ... Tamil ... ... Telugu ... ... Malayalam ... .. Kanarese	Do.
9	Planting of trees on poramboke lands ...	English ... ... Tamil ... ... Telugu ... ... Malayalam ... ... Kanarese	Do.
10	Loans to ryots...	English ... ... Tamil ... ... Telugu ... ... Malayalam ... ... Kanarese	Do.
14	The army worm of paddy	English ... ... Tamil ... ... Telugu ... ... Malayalam ... ... Kanarese	Do.
18	Potatoes...	English ... ... Tamil ... ... Telugu ... ... Malayalam .. ... Kanarese	Do.
19	School garden	English ... ... Tamil ... ... Telugu ... ... Malayalam ... ... Kanarese	Do.
20	Turmeric cultivation...	English ... ... Tamil ... ... Telugu ... ... Malayalam ... Kanarese	Do.
21	How to send specimens	English ... ... Tamil ... .. Telugu ... ... Malayalam ... ... Kanarese	Do.
35	Prickly-pear cochineal	English ... ... Tamil ... ... Telugu ... ... Malayalam ... .. Kanarese	Do.

Number.	Subject.	Languages in which published.	Price.
	Pamphlets.		
1	Cultivation and management of grass land at the Livestock Research Station, Hosur.	English	Free.
2	Results of experiments conducted at the Agricultural Research Station, Palur.	Do	
	Notes		
1	Note on pure paddy seed ; VIII circle ...	English	Free.
		Tamil	
2	Note on pure paddy seed ; I circle ...	English	Do.
		Telugu	
3	Note on pure paddy seed ; VI circle ...	English	Do.
		Tamil	
	Broad Hints for Everyday Use.		
1	Feed your bullock	English	Free.
		Tamil	
		Telugu	
		Malayalam	
		Kanarese	
2	Feed your cow...	English	Do.
		Tamil	
		Telugu	
		Malayalam	
		Kanarese	
3	Plough early	English	Do.
		Tamil	
		Telugu	
		Malayalam	
		Kanarese	
4	Plough efficiently	English	Do.
		Tamil	
		Telugu	
		Malayalam	
		Kanarese	

The Villagers' Calendar for 1930–31 was published as usual in English and the vernaculars. Ninety-nine thousand and two hundred calendars were printed as shown below for sale and distribution :—

English	9,000
Tamil	40,500
Telugu	38,700
Malayalam	7,000
Kanarese	4,000
	99,200

The publication of the year book was discontinued.

The quarterly digests were continued to be issued in English, Tamil, Telugu, Malayalam and Kanarese.

VIII.—STATISTICS.

49. *Forecasts.*—The areas estimated in the crop forecasts in 1929–30 differed from the actuals by 0·5 per cent for groundnut and gingelly, 1·2 per cent for cotton, 2·1 per cent for paddy and sugarcane, and 8 per cent for castor. With the exception of castor the estimates were reasonably accurate.

The wholesale prices of forecast crops were published in the forcast reports issued in the year under review.

Government ordered the publication of the All-India forecast figures of crops at important centres of tahsildars.

50. *Rainfall.*—The Board issued instructions to Collectors to send copies of the weekly rainfall statement both to the Deputy Directors of Agriculture and to the District Agricultural Officers.

51. *Season and Crop Report.*—This was prepared as usual. The wholesale prices of forecast crops prevailing during the harvest months were also published in the report. The quinquennial table showing agricultural stock, ploughs, and carts was prepared and sent to the Director-General of Commercial Intelligence and Statistics, Calcutta, besides being published in the Season and Crop Report. A review on the table was also prepared and issued.

Government ordered that the extent irrigated from wells which lie in the ayacut of recognized sources of irrigation and which are used to supplement the supply in those sources, should be shown separately in the Season and Crop Report.

52. *Taluk and village accounts.*—Inspections of these accounts by the Statistical Assistant were carried out in thirteen districts of the Presidency and instructions issued on the spot for their proper maintenance in the future.

As a result of these inspections, it has been possible to suggest the abolition of Enclosure B to village account No. 2 and the annual outturn statement

prescribed in the instructions for the preparation of Enclosure A to village account No. 1, the simplification of village account No. 1 and Enclosure A thereto, and the maintenance of village accounts Nos. 1, 1-A, 2-B and 2-D necessary for the preparation of forecast and statistical returns in all villages of the Presidency except the Agency tracts. They were accepted by the Board of Revenue.

53. *Prices.*—Government revised the instructions in the Manual of Taluk Accounts relating to the taluk register No. 3 with a view to ensure that a careful record of prices is made.

54. *Weekly cotton mill and press returns.*—These returns were published and distributed as usual. The number of mills in the Presidency rose from twenty-two to twenty-four.

IX.—EXPENDITURE.

55. The receipts and expenditure for the year and the corresponding figures for the previous year are as follows :—

	1929-30.	1930-31.
	Rs.	Rs.
Expenditure	19,48,385	20,29,559
Receipts	2,64,224	2,28,196
Net expenditure	16,84,161	18,01,363

The increase in expenditure during the year over the previous year is mainly due to the general expansion of the Department, and to the *extra* award paid for the acquisition of lands for the Agricultural Research Station, Pattambi, and to the purchase of a third motor exhibition unit, and a tractor for the Live-stock Research Station, Chintaladevi.

The decrease in receipts during the year is chiefly due to the general depression in prices prevailing everywhere.

X.—PROGRAMME OF WORK FOR 1931-32.

56. The main lines of work are indicated below :—

I.—Research.

A.—Research sections.

(1) *Botany.*—Survey and study of weeds. Survey of grasses. Floristic surveys in Ganjām, Vizagapatam and Coimbatore districts. Revision of nomenclature of sheets in collections.

(2) *Chemistry.*—The following problems will receive special attention : the base exchange of typical soils, a critical study of estimating soil organic matter, laboratory and field studies of the movement and utilization of soil moisture, laboratory studies on the fate of added nitrogen to irrigated and dry soils, and evolution of nitrogen in swamp paddy soils.

Manures and plant nutrition.—Laboratory studies and effect of added nitrogen to irrigated and dry soil, on the evolution of nitrogen in swamp paddy soils, pot cultures to ascertain the optimum nitrogen and phosphoric acid ratio as judged by the yield of crops, the manufacture of poudrette and study of the effect of manure on the quality of seed.

Animal nutrition.—The following problems will be studied : determination of the digestibility of different roughages and concentrates, fixing of rations for different degrees of work, study of the effect of bone-meal on the growth and health of calves.

Bacteriology.—The investigations into the preparation of Trichinopoly phosphate, composts on a large scale and field trials with the same ; and bacterial content of milk will be continued. A special study will be undertaken on the activated sludge plant.

(3) *Crops*—(*a*) *Millets.*—Study of inheritance of characters, quantitative and qualitative, in *A. Sorghum*, *E. Coracana*, *S. Italica* and *P. Typhoideum*. Isolation and test of pure strains of sorghum and eleusine for cropping capacity.

Survey of the sorghum of the Presidency. Study of *D. Biflorus* and *D. Lablab*, two pulses grown in rotation with millets.

(*b*) *Paddy.*—Study of the inheritance of characters, qualitative and quantitative. Isolation and test of pure strains for disease resistance, cropping capacity. Study of the effect of fertilizers and the growth of the plant and yield. Study of the histology of the stem in connexion with "lodging" and of the grain with reference to quality and nutritive value.

(*c*) *Cotton.*—Study of inheritance of seed weight, lint weight and jassid resistance. Isolation and test of

pure strains for cropping capacity. Study of pollen sterility. Investigation of manure and water requirements, of the effect of different rotations and of time of sowing.

(*d*) *Oil-seeds.*—Groundnut. Study of types and isolation and tests of pure strains. Preliminary studies of gingelly and castor. Self-fertilization of heavy bearers of coconut.

(*e*) *Fruit.*—Test of varieties of plums, apples, peaches, figs, lemons, grape fruit, cherimoyers, plantains, oranges, mangoes and guavas. Investigation of methods of grafting, budding and pruning.

(*f*) *Potatoes.*—Testing of varieties and methods of manuring.

(4) *Entomology.*—Investigation of the life-history and methods of combating outbreaks of the following pests: borers of sugarcane and ragi, the sunnhemp moth, pests of citrus and stored grains, the paddy grasshopper, thrips of chillies and onions, earhead bug of sorghum, fruit-sucking moths, the army worm, the mealy-bug of paddy and the coconut caterpillar.

(5) *Implements.*—Trial of large mouldboard ploughs, disc ploughs for deep ploughing, ridging ploughs, sub-soil ploughs; improved types of cane mills for bullock and engine power; windmill trials. Tests of water-lifts and water-meters for irrigation. Trial of tractors, seed drills, and designing and construction of threshing and winnowing machines, etc.

(6) *Livestock—Buffalo.*—Establishment of a herd of graded buffaloes by crossing Delhi bulls on local buffaloes.

Cattle—Cross-breds.—Establishment of a cross-bred herd by breeding from the progeny of the Ayrshire-Scindhe crosses.

Scindhe.—Building up a herd of good milkers and regular breeders by selection.

Ongole and Kangayam herds.—Building a herd of animals of good draught type and fair milking capacity by selection.

Sheep.—Establishment of a flock of better wool-bearing capacity by selection.

Poultry.—Establishment of flocks of imported herds for distribution.

Investigation of the economics of tractor cultivation and of methods of manuring grass land and fodder crops.

(7) *Mycology.*—Investigation of the life-history and methods of combating the following diseases: blast of paddy, wilt and clump disease of groundnut, mosaic disease of sugarcane, sclerospora on millets, wilt of chilli, fusarium disease of plantains.

B.—Agricultural research stations.

(1) *Anakapalle.*—Isolation and test of strains of paddy and ragi. Test of varieties of sugarcane. Investigation of methods of cultivation, and manurial and water requirements of sugarcane.

(2) *Samalkot.*—Isolation and test of strains of paddy. Study of the effect of dry cultivation instead of puddling of land for paddy. Investigation of the water requirements of plantains, fodder crops and green manures. Study of the effect on sugarcane of artificial manure.

(3) *Guntūr.*—Isolation and testing of strains of cotton, chillies and tobacco. Testing varieties of maize. Investigation of methods of manuring and of cultivation of maize, chillies, tobacco, cotton, panicum and groundnut.

(4) *Nandyal.*—Testing of artificial manures for sorghum for grain and for fodder and for cotton. Spacing experiments with sorghum.

(5) *Hagari.*—As for Nandyal with in addition, a study of the economics of growing garden crops in black cotton soil.

(6) *Palur.*—Testing of varieties of sugarcane. Investigation of methods of manuring and of the effect of varying rotations in sugarcane. Testing of strains of paddy, investigation of methods of manuring of paddy. Testing the effect of artificial and organic manures on groundnut, ragi, and plantain.

(7) *Kovilpatti.*—Testing of strains of cotton. Isolation of strains of sorghum and pennisetum. Trial of leguminous crops for fodder. Testing the effect of manures on cotton, sorghum and pennisetum.

(8) *Taliparamba.*—Varietal and manurial trials of pepper ; investigation of the variation existing in the yield between vine and vine and of the estimation of loss due to "Pollu." Trials of green manures. Introduction of new crops in the dry land farming, methods of manuring and rotation of the same.

(9) *Coconut stations (Kasaragod, Nileshwar and Pilicode).*—Manurial requirements of coconut, the effect of cultivation on coconut ; conversion of coconut leaves into compost. Study of characters of the coconut seedlings ; study of the depth of planting and comparative study of coconut trees from different parts of the world. Study of cashew-nut.

C.—Trial plots.

(1) *Vizagapatam district.*—J. 247 and Co. 213 sugarcane with a restricted supply of water. Types of ragi isolated at Anakapalle.

(2) *Gōdāvari district.*—Salt resistant types of paddy. Irrigation water required for citrus trees.

(3) *Kistna district.*—Cotton strain No. 171.

(4) *Guntūr district.*—Cotton strain No. 171. Artificial manures on chillies.

(5) *Kurnool district.*—A strain of sorghum isolated by the Millet Specialist. Artificial manures on sorghum and chillies.

(6) *Tanjore district.*—Strains of paddy. Varieties of pennisetum.

(7) *Trichinopoly district.*—Strains of paddy. Varieties of pennisetum. Karunganni cotton.

(8) *Tinnevelly district.*—Strains of paddy. Karunganni strain No. 546. Artificial and organic manures on fodder, sorghum and pennisetum. Artificial manures on chillies.

(9) *Coimbatore district.*—Ragi No. 47. Karunganni cotton. Sowing cambodia cotton about the 1st September. Artificial manures for Cambodia cotton and cereal crops. Green manure plus phosphatic manure on groundnut.

(10) *Salem district.*—Ragi No. 593. Karunganni cotton.

(11) *Malabar and South Kanara districts.*—Artificial manures on paddy, chillies and sugarcane.

II.—Demonstration.

(1) *Crops.*—Strains of paddy, ragi, sorghum and cotton. Varieties of sugarcane ; short planting and line planting of sugarcane ; low seed-rate for paddy nurseries and clean cultivation.

(2) *Implements.*—Introduction of standard types of ploughs, H.M. Guntakas, drilling implements. Improved sugarcane pans.

(3) *Manures.*—Proper methods of preserving cattle manure and manufacture of composts. Introduction of green manure crop for increasing organic matter in both garden and wet lands. Oil-cakes for sugarcane.

(4) *Seed-supply.*—Increase of seed in different varieties, especially green manures.

(5) *Cattle.*—Stationing of stud-bulls, advice on proper care of cattle, demonstration of ensilage, fodder crops.

(6) *Jaggery manufacture.*—Clean preparation ; construction of sindewahi furnaces.

(7) *Insect pests and diseases.*—Advice on proper methods of combating with plant pests and diseases : sprayers, insecticides, etc.

(8) *Demonstration plots* in all centre villages in the holdings of ryots under Departmental supervision.

(9) *Exhibitions* at all important fairs and festivals ; motor exhibition vans, lantern lectures.

(10) *Associations.*—Formation of agricultural or co-operative associations to take up stocking and sale of implements, seeds, etc.

III.—Agricultural education.

Continuation of the Degree course at the College ; attempts at short courses at the College and agricultural middle school. Continuation of farm labourers' schools.

I have the honour to be,
Sir,
Your most obedient servant,

D. ANANDA RAO,
Headquarters Deputy Director of Agriculture in charge.

DIVISION INTO AGRICULTURAL CHARGES

I Ganjam, Vizagapatam, East Godavari and West Godavari
II Kistna, Guntur and Nellore
III Kurnool, Bellary, Anantapur and Cuddapah
IV Chittoor, North Arcot, Chingleput and South Arcot
V Tanjore and Trichinopoly
VI Madura, Ramnad and Tinnevelly
VII Malabar and South Kanara
VIII Salem, Coimbatore and the Nilgiris

MAP OF THE MADRAS PRESIDENCY

Scale of Miles
50 0 50 100 Miles

Showing

1 The division into Agricultural charges,
2 the location of the Agricultural stations &
3 the distribution of the main crops in each Agricultural charge.

Note :— (1) The charge of each Deputy Director of Agriculture is indicated by Roman figures.

(2) The seperation of one Agricultural charge from another or from an Indian State is shown thus.——

(3) The total cultivated area in each Deputy Director's charge is represented by a circle drawn to scale. The figure entered against each crop in the circle represents the percentage of the area under it to the total cultivated area.

(4) The head quarters of Deputy Directors in charge of each circle are represented,

(5) Agricultural Research stations

(6) Agricultural Middle Schools

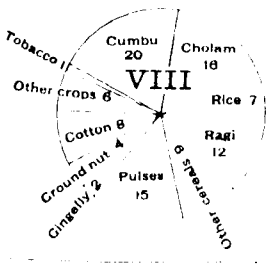
(7) The head quarters of Agricultural Demonstrators

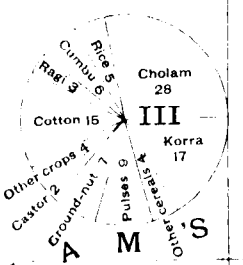
(8) The head quarters of District Agricultural officers

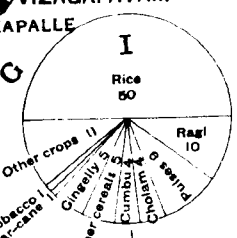
(9) Live Stock Research stations

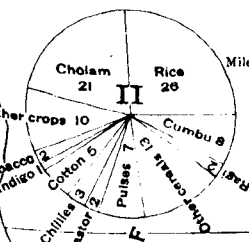
(10) Agency tracts

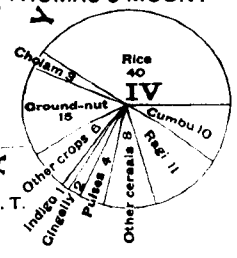
(11) Indian States

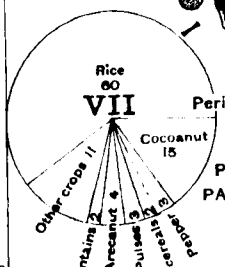


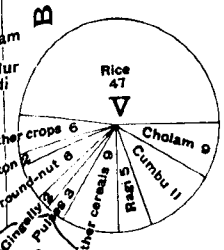


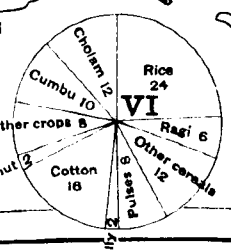












Helio-Zinco., Survey Office, Madras
1931

Government of Madras.

DEVELOPMENT DEPARTMENT

G.O. No. 1426, 29th September 1931

Agriculture—Administration Report—1930-31—Recorded with remarks.

READ—the following paper :—

Letter from M.R.Ry. Rao Bahadur D. ANANDA RAO Garu, B.SC., Headquarters Deputy Director of Agriculture in charge, Madras, to the Secretary to Government, Development Department, dated the 16th August 1931, R.O.C. No. D. 68-Pdl./31.

Order—No. 1426, Development, dated 29th September 1931.

Recorded.

2. During the year under review the Indian Agricultural Service post of Paddy Specialist was abolished on the termination of the contract of Mr. R. O. Iliffe and a Madras Agricultural Service post was permanently created to which Mr. K. Ramayya who was specially deputed for training in England for the purpose was appointed. The services of Mr. P. H. Rama Reddi were placed at the disposal of the Government of India for appointment as Deputy Secretary, Indian Central Cotton Committee. The two temporary posts of Oil-seeds Specialist and Soil Physicist were also filled up during the year.

Collegiate education continued to be popular, the full complement of 48 students having been obtained at the college. Six seats with scholarships were reserved for students from the Agency tracts of Ganjām, Vizagapatam and Gōdāvari districts. Middle school education was not successful and the results of the Taliparamba school are not satisfactory. The

Director of Agriculture has separately been asked to investigate into the causes of unpopularity of this type of education. The Government welcome proposals calculated to make these schools more popular. The Director suggests in this report that short practical courses in farm management and its allied subjects should be instituted. The Director of Agriculture is requested to submit separately a detailed report on the subject.

Research work on crops followed the usual main lines of plant breeding and agronomy. It is pleasing to note that over 1,000 units in ragi were selected and studied at Coimbatore and that seasonal experiments are conducted to test the possibility of growing the crop throughout the year. No new lines were embarked upon in paddy-breeding stations where the possibilities of hybridization and selection were being further investigated. Government note with satisfaction that a few of the improved strains of paddy are ready for trial in the districts. The Director of Agriculture reports that at all the research stations the object was kept in mind, in the work on this crop, of discovering means to reduce the cost of production and to alter the system of cultivation to permit of other profitable crops being grown in rotation with paddy. Work on cotton continued on the normal lines and it has been established by further trials that early sowing gives a heavier yield. Early sowing, however, involves a small additional expense. A test carried out at Koilpatti is reported to have indicated that cotton in cholam plots is not able to utilize fully the moisture present in the soil, while moisture is depleted in plots where cumbu and horsegram have been grown. With reference to the tendency of the ryots in the Tinnevelly area to grow an inferior variety of pulichai cotton mixed with karunganni noticed last year, Government have decided to prohibit its cultivation by legislation and steps are being taken for the introduction of a Bill in the Legislative Council.

Experiments on sugarcane, oil-seeds, potatoes, dry grains and fodder crops proceeded on the normal lines and steady progress is reported.

Good progress is also reported in the Botanical, Chemical, Mycological and Entomological sections. A special staff has been sanctioned for operations against

the paddy grasshopper pest in the Ganjām district. As already noticed in the last year's review what would have been a great calamity to coffee industry was averted by the timely prohibition of the import of coffee berries so much so that it is reported that the pest is not now found in any of the plantations. Government have been therefore able to dispense with the temporary staff sanctioned for survey work in regard to this pest. With reference to the work on agricultural implements, it is noted that the improvement of the Ceded districts drill is engaging the attention of the Research Engineer.

Work on the four cattle stations continued on the lines of previous years though progress is necessarily slow. Work on sheep and poultry is also conducted at Hosūr and the Upper Subordinate who has returned from training at Lucknow has been posted for work at Hosūr in the poultry section.

Demonstration was carried on as usual on the land of the ryots and by taking part in exhibitions, fairs and conferences. In regard to the methods of demonstration it is reported that in the year under review concentration of work of the demonstrator in four or five villages in a taluk replaced the long-established methods of covering a large number of villages in the taluk. As regards the advantages of this system, it is stated that it facilitates better acquaintance of the cultivator and his needs and gives the demonstrator more knowledge of local conditions and greater opportunities for demonstration of the improvements because of the longer stay at each centre. The work on this method is to be reviewed at the next Agricultural Officers' Conference. The Government watch with interest the results of this method of demonstration. Two exhibition vans to which a third has now been added continued to be popular in the villages. Demonstrations of improved seeds, improved methods of cultivation, manures and implements were conducted. Another interesting feature noticed in regard to the propaganda work of the department in respect of fodder is that silage-making is being taught to cultivators. The conversion into silage of hill grass which is otherwise wasted and ragi straw which is considered hitherto an indifferent fodder is being demonstrated in the VIII Circle.

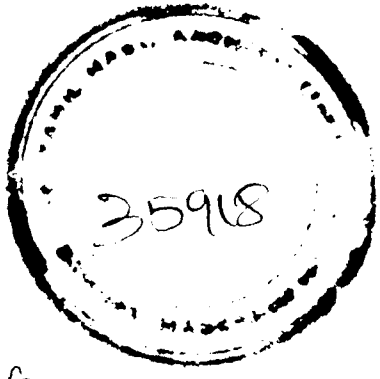
The Cotton Ginning and Pressing Factories Act and the Agricultural Pests and Diseases Act continued to work satisfactorily during the year under review. The Director of Agriculture reports some cases of evasion of the Cotton Transport Act. He is requested to watch further cases of evasion and report to Government on the question of their control, if necessary.

(By order of the Government, Ministry of Development)

S. V. Ramamurti,
Secretary to Government.

To the Director of Agriculture.
" Director of Veterinary Services.
" Registrar of Co-operative Societies.
" Law (Education) Department.
" Public Works and Labour Department.
" Public Department.
" Accountant General.
" Director of the Research Institute, Pusa.
" Government of India, Department of Education, Health and Lands (with C.L.).
" Secretary, Imperial Council of Agricultural Research.

Press.



தமிழ்நாடு ஆவணக்காப்பக நூலகம்,
எழும்பூர், சென்னை-600 008.

ஆவணஞ்நாள்.

சே எண் : 55118 ப. எண் : J. 2117

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