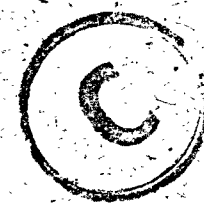


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REPORT
ON THE
OPERATIONS OF THE DEPARTMENT
OF AGRICULTURE
MADRAS PRESIDENCY
FOR THE OFFICIAL YEAR

1914-15



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செப்பனிலுதற்காக எடுத்த
கொள்ளப்பட்ட நான்
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கையாப்பம்.

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3

OFFICE OF THE
DIRECTOR OF AGRICULTURE, MADRAS,

R.O.C. No. 455 B of 15.

Dated 1915.

ENCLOSURES.

From

D. T. CHADWICK, Esq., M.A., I.C.S.,
DIRECTOR OF AGRICULTURE,
Madras.

To

THE SECRETARY TO THE COMMISSIONER OF REVENUE,
SETTLEMENT, SURVEY, LAND RECORDS AND
AGRICULTURE,
Madras.

SIR,

I have the honour to submit the annual report on the Agricultural Department for the year 1914-15.

I.—ADMINISTRATION.

A.—STAFF.

2. I was in charge of the office of the Director of Agriculture throughout the year and inspected all centres in which work was in progress except Tanjore and South Canara. I also attended the Planters' meeting at Bangalore, a subsequent meeting of their Executive Committee in Madras, a conference with the Educational Department on Nature study, the Cotton Conference at Delhi, a conference in Madras with representatives of the leading trading and agricultural interests of the Presidency, a discussion with the members of the Indian Committee on Co-operation, agricultural meetings at Tiruppur, Berhampur, Madurantakam and Koilpatti and was present at His Excellency the Governor's inspection of Taliparamba and Palur farms, besides being a witness before the Madras Survey Committee.

3. During Mr. Hilson's absence on six months' leave Mr. Thomas was in charge of the Northern Division with M.R.Ry. K. Ramasastrulu Nayudu as Assistant Director. Mr. Sampson was single-handed in the south. M.R.Ry. D. Ananda Rao was posted as Assistant Principal to Coimbatore and during Dr. Barber's absence on leave M.R.Ry. T. S. Venkatarama Ayyar held charge of his office. A Personal Assistant has been posted to the Head Office, for which I am grateful. Rao Bahadur M.R.Ry. J. Dharmaranga Razu was appointed but unfortunately died before he could join and his place was taken by M.R.Ry. V. S. Asvatha Ayyar. Mr. Mehta's services were dispensed with on the termination of his probationary period at the close of the year. Otherwise there were no changes in the gazetted staff. The organization of the college has been further regularised by the formal constitution of a College Board.

4. The year closed with six vacancies in a sanctioned subordinate staff in the districts of 51. Some of these have been filled subsequently. Special arrangements were made during the year to depute an Assistant Farm Manager to the

Parlakimedi Estate Farm. Men were transferred as little as possible and as junior men are beginning to relieve the seniors of much of the farm work it is possible to keep the latter more continuously on district work. The generally excellent effect of this will be seen in the section below which deals with district work for which concentration, continuity and friendly relations with the local ryots are indispensable. Towards the close of the year information was received that the Secretary of State had accepted the proposals for the expansion of the department. These provide for seven divisions in the districts, the establishment of more district farms, the recruitment of a trained district staff in every district, the co-ordination of the prospects of assistants in the scientific sections with those of men in the districts and a general improvement in the pay and prospects of most of the men in the service. The department thus possesses for the first time an ordered scheme along which development can take place.

5. Mr. Coventry, C.I.E., the Agricultural Adviser to the Government of India, inspected Coimbatore and also the farms in the south and west in February. He appeared to be well satisfied on the whole with what he saw and his report is with Government. Five gazetted officers from other provinces came on tours of inspection in the year to different parts of the Presidency.

B.—BUILDINGS AND LAYING OUT OF FARMS.

6. No new farms were opened during the year, but an additional area was added on lease to Samalkota, and a stretch of waste sand dunes was added to Hagari. The buildings at Anakapalli were completed and have been very well designed and arranged by the Farm Manager. Most of those at Sirvel were finished and both farms were put into order. Both however suffered, Anakapalle from a flood and a cyclone, Sirvel from a breach in the Kurnool-Cuddapah canal which effectively cut off all supplies of water. The ginnyery at Hagari was not finished in the year.

7. As regards Coimbatore, it is satisfactory to say that the difficulty of the water-supply has been solved at least for the present by fixing an engine to another well and reserving it for drinking and household purposes. Sanction has been obtained for the following works, the construction of rooms for forty more students, quarters for the Lecturing Botanist and nineteen more houses for the employees at the College. The site for the Rest House for Indian visitors, and dispensary, etc., has been acquired but the buildings have not yet been started.

II.—AGRICULTURAL EDUCATION.

8. The year was noticeable for the introduction on June 7th of the new scheme sanctioned in G.O. No. 2381, Revenue, dated 17th August 1914. By this, instruction in the first two years is devoted mainly to general agriculture and its allied occupations, *e.g.*, the dairy, cattle feeding and rearing, care of implements, etc.,—the lectures in both scientific and agricultural subjects being fitted in with the general scheme of practical work. It is possible to take in 40 students a year for this course. Those who wish to prosecute their studies further may be taken for an additional 18 months' course devoted mainly to the sciences as applied to agriculture. About 100 applications were received and just as in previous years a week's preliminary examination at Coimbatore was held to pick out the most promising students. The result was that 42 were admitted. The year thus opened with a total strength of 74 in the College and closed with 70 still in residence. Stimulated undoubtedly to some extent by the publication of the scheme for the development of the department there have been 200 applications for the 40 seats in 1915. This competition for admission to the College is an encouraging feature in this agricultural work. It promises to give a wider scope of selection for the department, in itself a great advantage, and it means that a start has been made in getting hold of the younger generation. Very great progress has been made in district work in persuading the working ryot to adopt improvements, etc., but this annual small stream of boys from the College means that more and more of the sons of the middle class landholders are obtaining a knowledge of agricultural principles and practice which they could not otherwise get. If this only grows

and increases, it should have in time considerable economic effect in the districts. Practically all the students who leave Coimbatore become members of the Madras Agricultural Students' Union which is doing most excellent work in keeping the old boys together as members of a corporate body. Without such a bond of union those who do not join the department are apt to get lost in the districts. The Union has changed its magazine from a quarterly to a monthly one. Most of the work connected with the Union naturally falls on the Assistants at Coimbatore and though it is often heavy it is ungrudgingly performed. Founder's Day was kept as usual as an Old Boys' Day, this time under the presidency of the Hon'ble Mr. L. E. Buckley. The Hostel has continued to work satisfactorily under the Warden. With the increase of students it has been necessary to appoint a steward paid out of Hostel funds. The services of a retired Taluk Head Accountant have been obtained. The tone of the College throughout the year has been uniformly good. The work of a Principal of a College may not at times appear to be so showy as that of a District Officer who can point to the sales of so many thousands of pounds of seed, etc., but the department knows that it is the labours of Mr. Wood and of the whole College staff that make these other things possible.

9. All the third year students (15) got through their examinations but the general standard was low. They were not as good as the year which preceded them or as the one that is following on promises to be. They were weakest in Agricultural Engineering. The post of Engineering instructor is the one which it is always the most difficult to fill satisfactorily. As usual the students in the third year were taken on two tours—one to Kistna and Gōdāvari and the other to Madura and Tinnevely. These tours are of the greatest instructional value. The second year students were examined in Chemistry, Botany, Mycology and Entomology by examiners from other Provinces. They did very well, especially in Chemistry—credit for which is mainly due to the careful teaching of M.R. Ry. Ramaswami Sivan.

III.—RESEARCH AND EXPERIMENTS.

A.—AGRICULTURE.

10. An attempt is made below to collect most of the important or interesting results obtained from the work on the agricultural stations and to indicate the main lines of work there in progress. For greater details reference is solicited to the reports of the different stations. The farms had their full share of the vicissitudes of the season. Anakapalle had six feet of water over it as a result of a breach in the river embankment and consequently some of the buildings were damaged and some fields scoured. After a prolonged shortage of rain Coimbatore suddenly got 3 inches of rain in one night in February when, as a rule, they rarely get 1 inch in the first three months of the year. The green manure crop at Sirvel did very well and the succeeding paddy was most promising when the Kurnool-Cuddapah canal breached and there was no more water. The whole crop died. This was most unfortunate as it was the first year of the farm and the demonstration promised to be most successful. Alike in Bellary and Kurnool the south-west monsoon was good but the north-eastern rains were poor, so that the early-sown crops did well but the late sown ones, *e.g.*, cotton and sorghum, did poorly. A farmer always dilates on the occasions on which the season has not behaved exactly as he thought it ought to have done; and in spite of this list of irregularities some very good crops and useful results were obtained.

Crops—(a) Sugarcane.

11. *Varieties and cultural methods.*—This section deals only with the work on the district farms. Dr. Barber's work is dealt with separately whilst the missionary work in the districts falls under the heading of demonstration, etc. It was due to the presence of the red-rot disease in Gōdāvari that the first district farm was ever started, viz., at Samalkota. The great achievement there was the discovery of a cane very much more immune to this disease than the local variety, viz., Red Mauritius. But even so there is still some red-rot about. The last three years' work at Samalkota has clearly shown that the loss from this disease may be

entirely prevented by the exercise of a little care. There the practice is to harvest the canes clump by clump and tie together all those from one clump. As the canes are cut they are carefully looked over and any setts cracked or bored or with broken buds are discarded, and if there is any sign of disease in any cane from a clump no setts whatever are taken from the canes of that clump for planting next year. The results have been as follows: out of 18,000 clumps which were grown in 1912-13 only 70 subsequently showed any traces of disease, in 1913-14 out of 38,500 clumps only 888 and in 1914-15 out of 32,200 only 175 or taking the three years together the incidence of the disease is only 1½ per cent—a very different state of affairs from the time when the area under sugarcane in Gōdāvari was rapidly decreasing because the majority of the clumps were so badly diseased that the cultivation of cane more often resulted in loss than gain. Among the varieties tested at Samalkota B. 3412 for the second year in succession topped the list in yield of raw sugar per acre with 8½ tons. Java 247 again came second. On the average of the last three years the positions of these two are reversed but if B. 3412 maintains its position this year it will be put out in the district. For the conditions in Vizagapatam on the other hand B. 1529 appears to be suitable—a cane which is steadily improving its relative position at Samalkota but as yet has only reached fourth place there. Much reliance however cannot be placed upon the Anakapalle results this year as the farm was first flooded and later many of the canes were laid low by a cyclone. At Nellikuppam Messrs. Parry & Co. are testing most of our varieties of cane on field scale and under factory conditions. These results are not yet to hand.

12. *Manurial*.—Sugarcane is one of the most paying of crops and requires intensive cultivation. Questions therefore connected with its manuring are of importance. A series of experiments tried some time ago showed that on the delta land of Samalkota artificials were not so profitable as oilcakes, and for the last three years different oilcakes, viz., safflower, pongam, gingelly, groundnut and castor have been tried against each other. So far as any inference can be drawn from these results as yet it would appear that none of these possesses any peculiar virtue over its competitors, the controlling factor in the nett profits is the price at which these cakes can be obtained at the time of purchase provided about 120 lbs. of nitrogen is given per acre. There is, if anything, a slight advantage in gingelly cake unless the price rises very high.

(b) Paddy.

13. In future most of the work on evolving single strains of better paddies will be undertaken by the Economic Botanist, the work on district farms being more concerned with local cultural and manurial problems. Where a sufficiency of water is obtainable it is the practice in the south of the Presidency for one paddy crop to follow the other without any interval. In Gōdāvari on the other hand the main crop is harvested in November-December and the second crop is not sown till the end of January or more often in February although throughout January there is always ample water. And this persists although there is from time to time a shortage of water at the end of the second crop season. If the successful cultivation of paddy merely depended on the presence of water here was a great opportunity for finding a crop which would repay sowing in late December or early January and so save a month's water-supply. But water is only one factor, albeit a great one, in the growing of paddy. For six years since 1908-09 trials have been made with all sorts of paddies to find one which will stand these conditions in Gōdāvari, but without avail. Only occasionally was a harvest got which was worth recording. This emphasizes the fact that with paddy as with other grains there is a proper seed time for each locality.

14. *Seedlings: Thin Seed-beds*.—In trying economic transplantation of paddy which is so widely advocated by the department the mistake is often made of not reducing the amount of seed sown in the seed-bed. If a healthy stand of plant is required, as it is, it stands to reason that strong healthy seedlings should be grown. It has been shown again and again by experience that seedlings from a thick seed-bed do not do so well when transplanted singly as seedlings from a thinly sown seed-bed, but

there have been no comparative figures. Experiments have been made on this for the last three years at Samalkota and the results are uniform each year. The usual local thick seed-beds are sown at the rate of 700 lbs. of seed to the acre. Seed-beds have been sown at rates of 350 lbs., 280 lbs. and 210 lbs. per acre respectively for the last three years. The average yields of the resultant crops have been 3,513, 3,648, 4,066 lbs. of grain per acre and 6,438, 6,525, 6,493 lbs. of straw per acre. There is thus nothing in it in the yields of straw whilst the yields of grain are definitely and in every case in every year in favour of the thinly sown seed-bed. This experiment will not be continued.

15. *Age of seedlings at transplantation*.—The usual proverb is that seedlings should be in the seed-bed for as many days as the weeks the crop subsequently remains in the field. For six years experiments have been conducted at Samalkota to determine whether the age of the seedling at time of transplantation is of vital importance to the subsequent crop. A crop was taken in which 35 days is the normal age of seedlings at transplantation and each year seedlings aged 25 days, 35 days and 45 days have been transplanted. It is clear that this experiment could be put down in two ways; either the seedlings could be sown at intervals of ten days and all the seedlings transplanted the same day or the seed-beds could all be prepared on the same day and the seedlings be transplanted at intervals of ten days. Both have been done. The figures show that the age of the seedling within these limits is practically unimportant where transplantation takes place on the same day, but where the dates of transplantation differ the advantage rests with the crop transplanted earliest although the seedlings used are youngest. The average figures are:—

		Age of seedlings.			
		25 days.	35 days.	45 days.	
Transplanted the same day	...	3,193	3,192	3,244	} lb. per acre.
Transplanted at intervals of ten days	...	...	...	...	
Seed-bed sown the same day	...	3,841	3,688	3,735	

It is probable that more care was taken with this experiment in the later years and if the figures for 1909-10—which are at variance with all those of subsequent years—be omitted the figures in the last line would read 4,048 3,757 3,674. The inference is that the age of the seedlings is immaterial between 25 and 45 days provided transplantation takes place early. This experiment will be discontinued in this form.

16. *Manurial experiments*.—At Samalkota, Coimbatore and Manganallur experiments are in progress testing the effects of different manures on paddy. On the first two farms this work has been in progress much longer than at Manganallur. Manurial requirements of course, differ with the locality although a long series of experiments in the west have shown that not infrequently one particular manurial constituent, exerts a great effect as a rule on a particular crop. In considering the results of experiments carried out under such different conditions as exist in Coimbatore, Tanjore delta and Gōdāvari delta exact uniformity must not be expected. But there is an increasing mass of evidence that the generally most suitable manure for paddy is green leaf in some form (or bulky organic nitrogenous matter) supplemented by phosphate in some form. Whether the addition of the latter is financially profitable at any particular place depends on local trials there. Evidence is however accumulating from many different sources as to the correctness of the main proposition. Isolated experiments in Kistna Western delta also tend to confirm it. Potash rarely has a beneficial effect. The average of over six years' comparative trials at Samalkota shows 2,585 lbs. per acre on the no manure plot, 2,749 lbs. on that which receives only green leaf, 2,736 on that which gets green leaf plus potash and 3,340 on that which has a small application of superphosphate in addition to green leaf. Corresponding average figures at Coimbatore for a like period give 3,114 lbs., 3,291 lbs., 3,175 lbs. and 3,343 lbs. It is doubtful whether the addition of the phosphate to the green leaf pays at Coimbatore. Figures of cost and profit will be worked out for

Samalkota. At Manganallur, the corresponding figures for this year alone are 1,700 lbs., 1,925 lbs., 2,240 lbs. and 2370 lbs. respectively. The results of more years' work there is however needed before anything definite can be said. The fringe of this work has of course only been touched, though the problem has been greatly cleared by the fact that time need not be spent on trials with potash and many of the mineral combinations in which nitrogen occurs. Experiments have been started at Manganallur to determine the form in which phosphate can be most advantageously applied. So far as they have gone they tend to show that although paddy is grown under swamp conditions phosphate in the form of super is more readily available to the plant than mineral phosphates or bone meal. The time and method of application is also of importance. Mr. Sampson writes in regard to the Manganallur experiments: "It is evident from observation of the growth of the crops especially in the case of superphosphate that these manures have a decidedly stimulating effect; not only do the crops become established sooner but they assume a more healthy and vigorous appearance than is apparent from the difference in crop yield and it is probable that a second application during crop growth would have a greater influence on grain production." This has to be tested.

17. *Increase of straw to increase of grain.*—The complaint is sometimes made that the application of artificial fertilisers causes an undue increase in the quantity of straw at the expense of the grain. This has not been the experience at the farms with the use of superphosphate in moderate quantities. Thus the figures at Manganallur gave as percentages of grain yield to straw yield on the no manure plots 71 per cent. and 64 per cent. and on those on which super had been added 81 per cent. and 64 per cent. Where super was given in addition to leaf the percentages of grain to straw on the plots which received leaf alone were 83 per cent. and 98 per cent. and on those which received leaf *plus* super in moderate quantities (120 lbs. to the acre) 83 per cent. and 105 per cent. When the dose of super was doubled (*i.e.*, 240 lbs. an acre) straw did increase more rapidly than the grain yield. The figures at Coimbatore corroborate this.

(c) *Cotton.*

18. Selection of single plant strains is being continued at Koilpatti, Hagari and Nandyal; and in the former district those which are considered to be the best are grown on 2 acre blocks to provide sufficient lint for spinning tests. We are again indebted to Messrs. Harvey & Co. for doing these and their reports have been most favourable showing that these strains spin up to forty's and are strong and uniform. Another testimony to the value of these strains is shown by the fact that the Sri Chidambara Vinayakar mills at Koilpatti are paying a bonus of Rs. 2 to 3 per 250 lbs. of lint to villagers in order to procure the crop. Two of the strains put out in the villages disappointed expectations. Their quality and ginning percentage were maintained but the yield was only average. When young they carried a profusion of bolls and a very heavy yield was anticipated. But later many of these bolls were shed. It is not clear whether this was due to late rains in the season or not. In the previous year they had yielded very heavily. Both at Hagari and Nandyal a series of single plant selections are being very carefully tested. The seed which is being put out in both these districts is derived from single plants and some of the later selections on the farms promise to do still better. Selection work on Cambodia is in progress at Koilpatti and Coimbatore.

(d) *Dry Grains.*

19. The extent to which work is in progress on dry grains and fodder crops is possibly not realized, but detailed work is in progress on sorghum, the millets, ragi, chillies, and "dry" paddy besides many fodder crops. The profits obtainable per acre from these crops cannot compare with those won from paddy, sugarcane and cotton, etc., and consequently elaborate experiments on manuring for instance are out of place; nor do questions of quality arise in regard to these grains to the extent that they do in cotton lint for instance. The chief lines upon which improvement can be found are therefore necessarily more confined to cultural methods, seed selection and prevention of disease. Under the first head come a

whole series of experiments, e.g., the most profitable rotation of crops in the different tracts, the use of the drill and harrow, the use of light iron ploughs on garden soils, the best method of applying water to ragi, etc. Also work on all dry land crops is not under the same control as that on paddy. The whole year's work may be lost through a vagary of the season. Cases of this will be found below.

20. Under the first of these heads, viz., rotation of crops comes the systematic cultivation of the waste lands of North Malabar. Chillies did especially well this year and some of the varieties yielded at Taliparamba a profit of Rs. 170 to Rs. 200 an acre. The hot weather rains were short and so ragi was caught by the monsoon before it was well established. The depression in the prices of ginger and turmeric also unfortunately continued and neutralized the effect of good yields. At Palur, Nandyal and Hagari rotation experiments are in progress, but of course the heavy fall in the price of groundnut and cotton has affected these series of trials which are to be judged by financial results as well as by the maintenance of the fertility of the soil. At Nandyal the rotation of a mixed crop of horse gram and cotton—a common local practice—followed by sorghum has been tested for six years against the simple rotation of pure cotton, sorghum. The only thing to be said for it is that thereby some horse gram for cattle food is obtained cheaply. The gram has no effect on the following sorghum crop nor apparently much on the cotton crop. This experiment is being discontinued and other rotations tested.

In Palur, the work of testing the best cereal to be grown mixed or in rotation with groundnut was continued.

21. Under the same head of cultural experiments come the deep cultivation before the hot weather of land on which dry paddy is to be sown, and the relative value of sowing ragi in flat beds or on ridges and furrows. The results so far as they go are in favour of deep cultivation for dry paddies early in the season. In the second case the experiments at Hagari which were continued go to show that the ridge and furrow system of planting is neither better nor more economical of water than the ordinary flat system in the case of ragi. This is somewhat at variance with the experience at Coimbatore and it would appear that the yields are about the same in both systems but that the quantity of water used depends on the care with which the land is laid out in the first instance. Also trials show that no economical results of value are to be expected from reducing the seed rate of ragi and chillies. Irrigated or Chitrai Cholam is one of the most important crops grown under wells in Coimbatore district, the profits from which mainly depend on the amount of water which has to be baled to mature the crop. Economy of water is thus most important. Attempts have been made for several years at Coimbatore to see whether this could not be achieved by growing the crop in ridges and furrows instead of on flat beds. This cholam however needs an irrigation to cause it to sprout; and a difficulty has always been found in getting an even start for the crop before it is big enough to earth up.

22. *Seed selection and varieties—Sorghum.*—At Hagari plots were again sown to test the yields of the six single plant selections, but no results were obtained as throughout the whole of that tract of Bellary the sorghum crop failed. It is these kinds of vicissitudes which make work on dry grain crops so much longer than on crops on which conditions are more under control. However one very useful piece of work was completed by Mr. Hilson on this crop. There are two main varieties of very different value from the point of view of fodder, one possessing a pithy stalk and the other a sweet one. Yet when the ryots sow seed which they expect is going to give them sweet stalked fodder, a large number of these pithy stalked ones always appear. Careful experiments at Hagari and Nandyal have shown that cross fertilization of sorghum readily occurs in the field and that this composition of the stalks is a simple Mendelian characteristic in which sweetness is recessive. It is thus simple in future to obtain a pure strain for sweetness of fodder; it is necessary to get a good grain yield on it also.

23. *Ragi, Italian millet and Cynbu.*—The testing of different single strains of ragi was continued at Hagari with good promise, whilst the season there also favoured Italian millet which gave a record yield. It failed completely in the previous year. It has also again done well at Coimbatore. The grain of one of

the foreign varieties of cumba is beginning to find favour in the neighbourhood of Coimbatore. Work is being continued thereon.

(e) *Fodder Crops and Grasses.*

24. *Foreign varieties.*—These fodder crops and grasses are becoming more and more important every year as all improvement of cattle is closely bound up with the provision of good and cheap fodder. The best comparative tests can be made at Coimbatore where there is a herd of cattle. The standard fodder crop of the district is cholam, periamanjai, sown thickly and grown under irrigation. But the recent experience at Coimbatore goes to show that guinea grass would be more profitable to grow for this purpose. The former gives per acre from 25,000 to 33,000 lbs. of green fodder whilst guinea grass gives from 22,000 to 36,000 lbs. and is more economical to grow and has not so much waste. Silver Beet or Swiss chard mentioned last year has again done well on the whole giving 25,000 lbs. in six cuttings between October and April. Teff grass was also again grown and made into hay. It was of good quality but the yield—1 ton an acre—is not very good. At Koilpatti the local irungu cholam usually grown for fodder has been entirely superseded by periamanjai introduced from Coimbatore and there have been considerable sales of it to ryots in the district.

25. *Indigenous grasses.*—There is reason to believe that the natural supply of many of the most valuable indigenous fodder grasses of India has been grievously diminished by the practice of unrestricted grazing. Cattle turned on to a pasture naturally eat the more succulent grasses first, so that in places where cattle in considerable numbers always wander over the grounds as soon as a flush of grass comes year by year, the better grasses have less chance of maturing and spreading. The inferior grasses are encouraged to spread at the expense of the better. The obvious remedy is to devise some scheme for sowing seed of better grasses and for protecting the pasture till growth is established. But no one has ever done any work on Madras grasses from an economical point of view. So this department is not yet in a position to distribute seed. In most of the papers of earlier years, *Pennisetum cenchroides*—the far-famed grass of the Kangayam country—is mentioned as if it would flourish everywhere, which of course is not the case; or the exotic *Paspalum dilatatum* is recommended. This last is growing admirably in the lower portions of Sim's Park, Coonoor, but does not flourish on the dry-arid plains. A start has been made to collect all the local grasses which are held in greatest estimation by the ordinary local herdsmen and they will be tried and tested. A comparative plot of some of these were laid down at Hagari last year. Of a cognate nature is the keeping of correct and careful accounts to find the cost of converting 200 acres of bare sand dunes into useful and profitable pasture. This has been started.

(f) *Groundnut.*

26. *Varieties.*—Tests were continued to compare the value of 13 different kinds of groundnut. West African continues to maintain its place as the best nut on unirrigated land having given an average yield for the last three years of 505 lbs. of oil per acre; but on land irrigated from wells local Mauritius is still ahead with an average of 950 lbs. West African coming third with 827 lbs.

(g) *Pepper.*

27. The year on the West Coast was altogether peculiar. There was practically a seven months' drought from October 1913 to May 1914 as only 1.56" of rain were received instead of the average 8.35". The result was that many of the vines died and all, except those in the most sheltered corners, suffered from lack of shade in the hot weather. On the other hand there was almost an entire absence of the usual disease "pollu," and the final result on the whole was a record yield of pepper from the farm, viz., 4,741 Madras measures of green pepper (practically 4,741 lbs. of dry pepper); but the yields varied so much according as to the amount of shade received in May that for the comparative purposes the results

from the different plots are of little value. Of the varieties Kallavalli continued to improve its position as the heaviest yielder.

(h) *Live Stock.*

28. *Cattle.*—The first attempts to obtain a special officer for cattle failed and the only herd maintained by the department is the one at Coimbatore. It did well throughout the year. There were 34 births, 26 animals were bought, 42 were sold and 3 calves died. At the end of the year the herd, including working bullocks, numbered 205, of which 37 were cows and 6 heifers. Many of the heifers born on the estate are now coming to maturity, but it is slow work. The dairy dealt with 79,300 lbs. of milk as compared with 66,900 last year, and besides sales of fresh milk 1,886 lbs. of butter were sold as compared to 1,358 lbs. last year. Debiting the milk used by the dairy at 1 anna a pound and allowing for depreciation, establishment, etc., there is a small profit on the year's working. The average yield of milk of the whole herd, including the dry cows, only works out to approximately 3½ lbs. of milk a day. This valued at 1 anna a pound comes to Rs. 6½ a month per cow which is certainly more than the cost of its keep. But a much higher average daily yield of milk is required.

29. *Sheep.*—The flock at Hagari continued to do well and at the end of the year had increased from 36 to 58. Unfortunately the shepherd in charge failed to note several of the matings and consequently the male parentage of some of the last born lambs is not known. There are two rams with the flock. The average clip of wool has not improved as much as was hoped being only 1½ lbs. though one animal for the second year in succession gave over 3 lbs. An interesting trial was made to see whether it would pay to buy young lambs and fatten them on some of the fodder crops for the Bellary market. Those purchased were a mixed lot of lambs, none of which had done well from birth and they did not grow as well as was expected, with the result that when the growing of the crop was taken into account the balance on the profit side was only the manure. Mr. Hilson believes that better results ought to be obtainable and is repeating the trial with some of the farm-bred hogs.

B.—CHEMISTRY.

30. The soil survey of the delta portion of Guntur district was completed and it is expected that the final maps will be ready in a short time. Two thousand four hundred and twenty-seven analyses were made of different products of which 53 were for cultivators. Mr. Harrison continued his work on the gases in paddy soil during the growing period of the crop and another memoir on it was accepted by Pusa and published. It appears that the gases mainly given off by the decomposition of organic matter in paddy soils react with the organized film of diatoms on the surface of the water of the field, promoting the oxygenation of the surrounding water and therefore with a slow rate of drainage improving the aeration of the roots. A long series of experiments also goes to show that gaseous nitrogen is evolved from paddy soils especially during the growing period of the crop. The general trend of all this work is that green manure crops have not so much direct manurial value on paddy as has been imagined but have a very important influence on the healthy growth of the crop by improving the aeration of the water and soil, by improving the mechanical texture of the soil and by promoting biological action. The investigation is being pursued. In conjunction with the Government Mycologist some bacterial work was done. This is mentioned in the section on Mycology.

C.—ECONOMIC BOTANY.

31. Work on paddy occupied most of the attention of the Economic Botanist and his staff. It was the first year in which they had been able to raise crops from seed of known parentage, and the crops grown on the small plot of land on the Central Farm utilized as a breeding station were a revelation of the extraordinary variations which may occur in paddy. Looked at from the point

of view of an agriculturist, which is the all important one, two facts stood out. One was the extent to which the ordinary varieties in the ryots' fields are not really true to type, and therefore the difficulty of improving the crop by mere single plant selections. Even when these are made as carefully as possible for desirable characteristics from crops which were believed to be pure the odds are practically even that in the next season these selections will split up into plants revealing all sorts of combinations of characteristics instead of coming pure. The other fact was the importance from the point of view of yield of obtaining a pure strain in which all the plants come to maturity uniformly. A field must be harvested at one time, the grain cannot be plucked like cotton and plants which either mature before or after the majority are merely so much loss so far as the harvest of grain is concerned. Considerable attention was naturally given in the first year to the inheritance of morphological characteristics and a paper on some of those was contributed to the Indian Science Congress. Arrangements have been made to provide the Botanist with more uniform land on which to grow his selected seed. The wet land on the Central Farm is notoriously variable and when it comes to testing economic as distinct from purely morphological qualities it is essential that the conditions under which the plots are grown be uniform. Some 600 lots of paddy are being carried on, of which a third are for studying the inheritance of important economic characters. A beginning has been made of an economic survey of the paddies in the most important rice growing tracts of the Presidency. In cotton attention is being concentrated on Cambodia and Cambodia crosses. The Deputy Directors of the Northern and Southern ranges have already done considerable work on the local indigenous cottons and in this they will not be disturbed.

D.—GENERAL BOTANY.

32. Much of the work under this section comes under the head of teaching, but work in connection with the herbarium is always in progress, for which purpose tours were made in various parts of the Presidency. Some 2,000 specimens were collected in the year and 1,586 sheets added to the herbarium. Three thousand six hundred and sixty-four sheets had been sent to Mr. Gamble at Kew for his work on the Madras Flora before he wrote and asked that no more be sent for some little time and until the sea route was safer. In round figures he has received 10,500 sheets for his book on the Madras Flora. One hundred and eighty specimens were identified during the year for various correspondents.

E.—ENTOMOLOGY.

33. Mr. Bainbrigge Fletcher's book which was mentioned in last year's report was issued to the public and has been very favourably reviewed in journals both in India and abroad. I am also informed that there have been many private sales of it. As will be seen from Mr. Ballard's report (Appendix VI) the new Insectary has proved most useful in working out the life histories of several insect pests. In the districts preparations were made to try new methods against the Deccan grasshopper. The ryots do not take at all kindly to bagging the hoppers. Deep ploughing in order to destroy the egg masses is efficacious but it is difficult to get ryots to do this on a large scale, and unless all or the majority of the villagers work together against a pest those who have taken trouble have the mortification of seeing their crops destroyed by the insects which come from their neighbours' fields. Considerable success has attended campaigns against grasshoppers in the United States of America by the use of poisoned bait. The attractive principle for the Deccan grasshopper has however not yet been discovered. Mixtures of Paris green and jaggery flavoured with mango, lime and many other ingredients were all tried alike in vain. Fortunately the season was very unfavourable to this insect and the ryots' crops did not suffer much from its depredations. The use of light traps is often recommended as a remedy against *schoenobius bipunctifer*; the insect which causes the dead white head seen in paddy fields, but a prolonged trial with them showed that this remedy cannot really be relied upon. The most successful district work was done on Mr. Stevenson's mango gardens in Salem against the

mango hopper. The trees were treated periodically with fish oil soap made by the Fisheries Department, which promises to be a very useful and cheap insecticide and the crop was saved. Mr. Stevenson saw that instructions were faithfully carried out and he was fully satisfied with the results.

34. *Sericulture*.—The district work on sericulture is dealt with in a later section of this report. French seed of the univoltine species were obtained from the Salvation Army at Simla but neither at Coimbatore or Kollegal were cocoons successfully reared. At the Salvation Army Settlement at Bethupadi a few did come through and the resultant cocoons were much larger and heavier than those obtained from the ordinary multivoltine species. The partial success obtained at Bethupadi was not due to any special methods and precautions, but is useful in showing that these cocoons may live in Southern India and trials with them will be continued.

F.—MYCOLOGY.

35. In previous reports it has been customary to fill most of this paragraph with an account of the district work against the palmyra, coconut and areca palm diseases. That is really district work and in future will be dealt with in the section devoted thereto. In the West Indies a disease on coconut palms very similar in description to that found on the palmyras in Gōdāvari and the coconuts in Malabar is ascribed to a coliform bacillus. Coliform bacilli have been isolated from the rotting portions of palms in this country affected with budrot, but inoculations with pure cultures thereof on healthy palms have not induced the disease, whilst inoculations of healthy palms with pure cultures of the fungus *Pythium palmivorum* have resulted in all the symptoms of budrot with subsequent death. It is thus established that the cause of the disease known as budrot in Southern India is Dr. Butler's fungus *Pythium palmivorum*. A new disease has been reported on coconuts in Cochin and is under investigation. A fungus on paddy which converts the loose head of grain into a solid black diseased spike was worked out in detail and field operations against it will be tried next year. The cause of black rot in plantains has not so far been discovered. General correspondence is developing; thirty-six bundles of diseased plants were received for investigation and twenty-one applications of investigating diseases on crops were received.

G.—THE SUGARCANE BREEDING STATION.

36. Dr. Barber's report is published as Appendix VIII. The extraordinary differences in habit between the different seedling canes were mentioned in last year's report as well as the fact that the chemical analyses of the different seedlings promised great variations. The complete analysis of last year's seedlings shows that 61 of the Madras seedlings analysed at over 17 per cent. sucrose, 37 over 18 per cent., 8 over 19 per cent. and 2 over 20 per cent. These are all satisfactory figures for this one feature as will be seen by the fact that Red Mauritius, Java 247, Barbados 208, B. 1,529 which are the best of the recently imported canes range between 16 per cent. and 20 per cent. Some 150 packages of cane have been sent to the stations in Northern India. Among these are nine Madras seedlings which have been distributed mainly in order to see how they fare in the north. It would appear that, in 1913-14, the seedlings were if anything treated too well on the station so that vegetative growth increased at the cost of sugar content, for when cuttings from them were planted on field conditions, an improvement in sucrose content took place concurrently with a fall in the general luxuriance of their growth. Hitherto one of the most difficult matters has been the collection of pollen which frequently has had to be brought from scattered and distant villages. However, this year by utilizing part of the wet lands at the Central Farm and at Taliparamba and Samalkota this difficulty has been much reduced. Dr. Coleman in Mysore has kindly helped once more. The North Indian canes which hitherto had never flowered did so this year but unfortunately did not set fertile pollen. Some 23,000 seedlings were successfully raised in the year. Dr. Barber and his staff contributed during the year several papers on their work and on sugarcane to Pusa, and the International Congress of Tropical Agriculture, etc.

H.—PISCICULTURE.

[Sir F. Nicholson, K.C.I.E., writes as follows.]

37. *Fresh water pisciculture.*—As in previous years this was in charge of Mr. H. C. Wilson. The Sunkesula fish farm was maintained, the breeding and distribution of larvicidal fish was developed, the Ipur fish-farm plan was sanctioned and its construction begun, several important tanks were stocked, the Nigiri trout streams were duly conserved and their supplies of fish food replenished, the waters of the Bhavani and Moyar continued under conservation, the acclimatisation of tench in the plains was achieved, and the rivers of Coorg and South Canara were carefully surveyed in view to further operations. There were numerous minor operations in progress, but the large Collair lake scheme is at a standstill by reason of the number of traps and fixed engines in the locality. Certain restrictive measures have been introduced and others were under investigation.

38. *Marine Pisciculture.*—This was confined in actual operation to the Tuticorin lagoon fish-farm of about 160 acres which was duly constructed and began work towards the end of the year, and to the edible oyster farm at Pulicat which continued to work successfully, though with vicissitudes due to floods and droughts. The pearl oyster farm near Pamban received the general sanction of Government in January 1915 and the matter now awaits the submission of detailed plans and estimates by the Public Works Department, and the acquisition of the island.

General.—The staff both for inland and marine pisciculture was considerably strengthened during the year and this will lead to developments hitherto impossible.

IV.—DEMONSTRATION, AID TO THE PUBLIC, SHOWS, AGRICULTURAL ASSOCIATIONS AND GENERAL PROGRESS.

39. The year has been marked by a general development of district work all round. In practically all lines there has been distinct advance.

(a) Operations against disease.

40. *Palmyra disease in Gōdāvari and Kistna.*—It may be thought that this disease is doomed to be ever with us, but mention was made last year of a change in method. Not only were steps taken to cut dead and infected trees as soon as signs of infection were apparent but in one small tract of Kistna the villagers were persuaded to cut all trees within the known infected area searching for hidden signs of disease and where these were present to operate at once. This method has in the course of the year been pushed still further so that all infected tracts in all villages of Kistna have been so examined and a start has been made in Gōdāvari district. When it is remembered that 95 per cent. of the trees operated upon recover and that an infected tree can remain a source of infection to others for years it is clear that if this system of detailed examination can be generally introduced there will be a fair chance of overtaking this disease. The system by which the State supplies the supervision and driving power and the ryots do the work at their own cost is the ideal one for dealing with disease. Great credit is due to M.R.Ry. V. Ramanadhan, the Kistna Tahsildar and his staff for the work they had done there. In all 220,403 trees in the two districts were cut of which 33,553 were dead at the time of operation, 40,286 were trees with external signs of infection and 9,733 were infected trees showing no external symptoms. The remaining ones were healthy trees partially cut in the process of examination. These figures may be contrasted with those of previous years. The increase in the cost of staff has been comparatively small; yet in 1913-14 the figures were 100,741 trees cut (71,341 dead and 29,400 infected) and in the years previous to that about 80,000 a year all dead because no attempt was then made to deal with infection. At the end of the year 27 villages in Kistna were removed from the infected list.

Coconut disease in Malabar.—The same disease *Pythium Palmivertum* attacks coconuts in Malabar, but these palms are not nearly so susceptible to it as are palmyras. The disease is widespread, and not intense or virulent anywhere. 1,497 infected trees were destroyed.

41. *Mahali disease on arecanuts.*—Work was continued in South Malabar and in a remote corner of South Canara to demonstrate the efficacy of spraying arecanuts with Bordeaux mixture as a preventive against mahali (*Phytophthora*). In all more than 29,000 trees were successfully treated as compared with 14,000 in 1913-1914 and 2,100 in 1912-1913 when field work was first started.

42. *Work against smut on cholam.*—In Bellary and Kurnool a definite attempt was made to persuade the ryots to steep their cholam seed in a 2 per cent. solution of copper-sulphate before sowing as a preventive against smut. They did it on seed sufficient to sow 1,300 acres but more work of this nature ought to have been done in Kurnool.

(b) Crops.

43. *Sugarcane.*—Work in connection with this crop is at present of peculiar interest because of the high prices ruling for sugar and jaggery. The current year should see a considerable expansion of this work especially in Vizagapatam district where a beginning was already made (a) by the distribution to the ryots of 45,700 setts of B. 1529, (b) by the sale to them of 16,400 lb. of castor cake for manurial purposes and (c) by getting them to use improved furnaces of which two were erected. In South Canara, Red Mauritius is now established in 150 villages. It is however in very scattered portions. The total area under it is 424 acres as compared with 194 last year and 84 in the one previous to that whilst the use of iron crushing mills continues to spread. Six years ago they were unknown but since then some 130 have been sold. The cultivation of it is also reviving in Malabar under the stimulus of high prices. A start was made in introducing improved furnaces into Chittoor district which it is calculated means an average increased profit of Rs. 15 in converting each acre of cane into jaggery.

44. *Cotton.*—As before, work was confined to the Tinnevely, Bellary, and Kurnool districts and in all progress resulted. In the south a new circle was opened for village work in the Ramnād district. In Tinnevely 400 acres were cultivated in October 1913 on seed farm by 61 contract growers besides another 95 acres sown with different unit strains to provide lint for spinning tests. From the seed farms 120,015 lbs. of good pure seed were obtained. Of this 103,465 lbs. were sold to ryots from seed depôts in the sowing season of 1914 at 20 per cent. above ordinary bazaar prices. This was sufficient for 12,170 acres. The figure for the previous year was 89,500 lbs. seed sold sufficient for 10,500 acres. In 1913-14 three villages took the produce grown from departmental seed direct to the ginning firms without intervention of middlemen and obtained their own seed back pure. In 1914-15 twenty villages so took 132,750 lb. of kappas and obtained 97,500 lbs. of pure seed. Most of this was kept for sowing purposes and was certainly sufficient for another 10,500 acres in October 1914. Therefore in the season of 1914-15 there were from 20,000 to 22,000 acres under departmental seed more than double the area obtained in the previous year. By this joint sale it is calculated that the ryots made an additional Re. 1-2 per acre (or very nearly their assessment) independently of any profits they made by selling their surplus seed for sowing for which there was a good demand. There are obviously very great possibilities in this system of joint-sale both as a means of profit for the cultivator and as a means of spreading new types. But it has not been possible yet to form thoroughly operative co-operative societies as matters of finance have not been arranged. If the smaller producer is to obtain the benefits of this joint sale he must be able to get advances against his growing crop; otherwise he has recourse to the middlemen and all chances of his joining in joint sales after harvest disappear. This has to be arranged because not only have all the firms in the trade now agreed to gin such joint consignments separately from those of any one else but one mill is offering higher prices to obtain the lint from our departmental seed. One of the special strains put out last year in the south of the district did very well, but unfortunately the one around Virudupatti shed many of its bolls late in the season and the yield was affected. In Bellary 693 acres were sown on seed farm conditions and 58,253 lbs. of good seed was obtained. 51,943 lbs. (sufficient for 7,000 acres) were sold at 15 per cent. above

local prices of seed. In Kurnool from 651 acres of seed farm 43,702 lbs. of seed were obtained of which 30,736 lbs. were sold. In Bellary all the seed sown was of unit strain and in Kurnool most of the seed sold was from a single plant selection. This year all will be. The total area under seed farm conditions in October 1914 was 2,250 acres in the three districts, and altogether 186,144 lbs. of seed were sold sufficient for 21,900 acres. If to these two acreages be added the area sown with seed retained by joint sale in Tinnevely, 34,000 acres are this year to our knowledge under seed of selected varieties. In the previous year the area under this known seed was 14,600 acres, so a very considerable development has taken place. The budget allotment was Rs. 46,350, actual payments were Rs. 46,390, and receipts Rs. 41,257. In these figures also come the expense in spreading drill cultivation in Tinnevely (v. below); also at the latter part of the season there was a very heavy fall in the price of cotton due to the outbreak of war. It has on the whole been a very satisfactory year's work.

45. *Drill cultivation in Tinnevely.*—Concurrently with the work on cotton, the use of the drill and harrow is being introduced into Tinnevely. Hitherto coolies were largely trained in the use of these implements on the Koilpatti farm and as a result most of them were drawn from the labouring classes. But as a result of better organization arrangements were made in Tinnevely to give more training in the villages and as a result many of the sons of the more respectable farmers are learning how to use these implements. The area on which they were used by the ryots themselves shows a great increase, viz., 11,329 acres, as compared with 7,117 in 1913-14 and 3,877 in 1912-13. 32 sets of implements were sold as compared with 35 in 1913-14 and 14 in 1912-13. Sales would probably have been greater still but owing to the fall in price in cotton on account of the war about September, October, there is tightness in money. The drill is being more and more used by ryots for the cumbu crop, and it is a mistake to look on this improvement in method of cultivation as one solely for the benefit of cotton. Cleaner and more careful cultivation of the soil benefits every crop grown upon that land. Moreover the figures given above include the area on which cumbu was sown with the drill and the soil was afterwards inter-cultivated. In 1910-11 these implements were only used on 70 acres of cumbu but in 1914-15 they were used by ryots on 1,990 acres.

46. *Paddy—Seed and seed-rate.*—There continues to be a very strong demand in the neighbourhood of all the farms for the surplus seed which is always sold slightly above ordinary market rates. Figures are not ready for the Southern division but in the Northern and Central divisions 63,124 lbs. of seed were sold; and the village associations which in Malabar are doing good work bought up most of that available from Taliparamba. The practice of reducing the seed-rate continues to spread and single seedling transplantation has spread very considerably in the Bhavani valley and has been started under the Amaravati irrigation. A general reduction in the seed rate is in progress around Samalkota and surplus seedlings from the Ankapalli farm were distributed to 48 of the ryots of the neighbourhood to be transplanted singly on their lands for demonstrational purposes. Only from one part of the whole Presidency is any complaint about this system heard and that is from portions of Shiyali and Mayavaram Taluks. Detailed district work was started there on these lines some four or five years ago and then on account of the opening of new farms the man had to be taken away. Had he remained it is doubtful if even this complaint had been heard. Some there say that they had excellent yields from these single seedlings for the first three years and then the fertility of the land appeared to become affected, and they are now transplanting in twos and threes. Even if they find that this system pays them best in the long run (although it is notorious that the Tanjore ryots do not manure their fields to the extent that the Tinnevely or Coimbatore men do, and although Kistna which for years and years has practically used nothing but single seedlings has no such complaint to make) there is still a large reserve of credit due in Shiyali and Mayavaram to the introduction of this system of economic transplantation, for transplanting with twos and threes means that from 50-60 lbs. of seed are being used per acre, whilst in the old original system about 120 lbs.

of seed were commonly used. So that even now there is a saving of at least Rs. 2 an acre. In this connection an interesting fact has occurred. It has been possible this year to post a man once more for district work in these two taluks and he has sold 30,327 lbs. of green manure seed (Kolinji) much more than was anticipated. Thus it is not unreasonable to conclude that had it been possible to keep a man for district work there for the last four years continuously any real difficulty which was being felt by the ryots would have been met. In all this work the importance of preparing the seed bed carefully in the first instance and sowing it thinly must be borne in mind. (v. para. 14 *supra*). Strong healthy well developed seedlings are required and not the puny produce of a congested area.

47. *Manures.*—In the previous year small quantities of fish manure were sold to many ryots in the Southern Division for trial and as a result many more orders were booked for it in the year under report at enhanced rates, but unfortunately it could not be supplied as the catch of fish in the West Coast was a complete failure. Attempts are being made in the current year to get ryots to try small applications of superphosphate to supplement the green manure in accordance with the results on the farms (v. para. 16 *supra*). As a result of the Trade Conference of last December manure depots will probably be established in time. In all these matters of artificials it is above all things important that the ryot only gets the substance he requires and gets it pure.

48. *Green manure.*—The most rapid advance made has possibly been in the Musiri and Perambalur taluks of Trichinopoly district where work was begun (though the staff was very short) at the request of the Collector Mr. Buckley as the rates for leaves from the forest had been raised. Over 1,000 acres were grown with daincha in these two taluks and the growth was so good that often the crop from one acre was cut and distributed over two or three acres. Moreover which is still more satisfactory the ryots made arrangements to keep some of their crop for seed for the next year. In Sholavandan circle equal if not better results were obtained, and one village there estimated the value of the improvement as worth to them Rs. 20 an acre. This is not impossible when it is remembered that in that village daincha only costs them about Rs. 3 to 4 per acre to grow whilst previously they had been getting green leaf from the forests in Ariyalur in Trichinopoly district. The leaf had to be purchased, brought, from the forests to the railway station, trained to Sholavandan and then carted and spread upon the fields. Daincha continues to give much better results on land inclined to salinity than a good sweet land. This is probably due to its effect on the mechanical texture of the soil. In Madura circle work has not progressed so well as in Sholavandan mainly because the area was larger and there was a change of officers. Instances also were not wanting of the disappointments which at times result from working with agents of absentee landlords. There is no doubt about the sympathy and good intentions of the landlords but most of them are busy men, and among agents, there are agents and agents. It is obvious that some will not look with favour on a new fangled system which requires a little care and only costs about Rs. 3 to 4 an acre most of which goes in labour, in place of one which involves direct purchase. Daincha seed is still purchased from Bengal. In Malabar the absence of rain in April-May (1" as compared to an average of 8") affected adversely the cowpeas which are there being introduced for green manure. Daincha is getting a start around Mangalore. In Chingleput and South Arcot the work also developed. Taken as a whole the sales in the year amounted to 150,814 lbs. of seed (Southern Division 82,523 lb., Central 61,458 lbs., and the Northern 6,533 lbs.) as compared with 158,600 lbs. in 1913-14 and 60,800 lbs. in 1912-13).

49. *Indigo.*—As soon as it became probable that the European war would not suddenly collapse it seemed likely that the ryots who cultivated indigo this year would make great profits, and it was also likely that the price of indigo seed would rise rapidly. A special grant was therefore obtained from Government and a stock of good indigo seed was laid in before prices rose very high. Afterwards 24,570 lbs. of good indigo seed were sold in villages in which old vats still existed

in a state of fair repair, but in which latterly the trade in it had decreased. Later in the year prices of seed more than doubled and much adulteration took place. There were no complaints against the seed sold by the department and very many applications had to be rejected because stocks were exhausted.

50. *Intensive dry cultivation in Malabar.*—In spite of the fall in the price of ginger and turmeric which were the two chief commercial crops in the rotation recommended for these lands this system is steadily spreading. Amongst other things the residual effects of the manures applied to these crops have a great effect on the cereal in the rotation so that instead of modan paddy only being a catch crop, it has given to many ryots yields comparable with those of paddy on wet lands. Also over 10,000 chilli seedlings were sold from Taliparamba farm.

51. *Sericulture.*—In 1913-14 the fieldman on sericultural work in Kollegal was mostly occupied in missionary and advisory work. Although his teaching had had some effect, in 1914-15 an effort was made towards more practical work. He was ordered to work in a smaller group of villages, a rearing house was built for him in the taluk office compound and land on which mulberry could be grown was secured. The object was to see if he could rear disease free seed and whether the rearers would pay higher prices. Unfortunately early in the season the shed was burnt down, and the seed sent from Bengal was of very poor quality. The rearing house was then moved into one of the neighbouring villages and although the season was late 14,500 healthy worms were brought through the fourth moult. From these 13,000 good cocoons were sold for seed purposes at Rs. 2-12 a thousand when ordinary Mysore seed was fetching Rs. 2-4 or Rs. 1-8 per 1,000. The seed proved to be absolutely free from Pebrine and Flacherie the two most deadly of silkworm diseases. The work will be continued.

52. *Implements.*—When first attention was paid to agricultural improvements in 1864 a rush was made for the introduction of Western machinery. It often proved unsuitable and during the last eight years much more attention has been paid to local crops and improvements in local practices than to the sale of new ploughs, etc. However a demand for these is growing up, and implements are sold, lent or hired from the farms more extensively than is possibly known. In 1914-15, 32 sets of drills and harrows were sold in Tinnevely district, 27 Scind ploughs from Palur, 26 monsoon ploughs (mostly from Palur), 9 triangular harrows, 6 improved country ploughs; seven power sprayers and at least two improved jaggery furnaces. There were probably more of these latter made and sold as the West Coast has not reported figures. Besides these, ploughs were hired out or lent to four ryots near Anakapalli and to two at Nandyal, whilst at Coimbatore Rs. 150 was received from ryots for the use of heavier ploughs at Rs. 5 an acre. At Koilpatti arrangements have been made to hire to a village association with a view to eventual purchase a two furrow disc plough costing Rs. 220. One of this kind has done excellent work on the Koilpatti farm for two years and has attracted much attention. The country people have humourously dubbed it the "Chatty" plough. It has been very difficult to procure spares and even supplies at times in Madras and the Trade Conference was very useful in bringing this to the notice of all firms, etc. It is unfortunate that the increase in freights and cost of production due to the war has caused the retail price of most of these implements to be increased just when a real demand for them was beginning to appear.

53. *Live stock.*—The Government have decided to appoint an officer especially for cattle breeding but he has not yet arrived. Consequently, the work on cattle is confined to Coimbatore. The failures which have so repeatedly attended the efforts of Government to place breeding bulls at public institutions free for stud purposes have frequently been the cause of sorrowful comment in official reports. In these circumstances, the figures at Coimbatore where bulls have been kept at stud for the cattle of local ryots are interesting. This has been done since the farm was opened seven years ago, and the numbers of ryots' cows covered in each of these years are respectively, 5, 6, 52, 139, 247, 425 and 570 (last year); and this though the fee for service has been steadily raised from nothing to 12 annas a covering. This is a great contrast to past experience in other places. It is merely the result of keeping good bulls,

attending to the ryots promptly when they bring their cows and of gaining their confidence. The local demand exists. Agricultural officers chiefly in the Central Division assisted the ryots in getting their useless male stock castrated by the officers of the Veterinary Department.

54. *Cattle shows and Agricultural lectures, etc.*—Cattle shows were held at Ongole, Tiruppur and Madura. At the two last, agricultural lectures, demonstrations and exhibitions were given as well as at Pudukottai and Ammapet. An exhibit was also sent to the Agri-Horticultural Society's show at Madras. The Tiruppur show is noticeable as being the only one managed by a District Agricultural Association (that of Coimbatore) without any aid whatever from local or provincial funds. This is most creditable. Another feature about it is the increasing interest in it displayed by the smaller breeder. Agricultural lectures have been given at many places in the districts. Two very successful demonstrations were held at Palur; but the most effective demonstrational work is done by meetings on the land of ryots who have successfully tried methods advocated by the department. This was done widely.

55. *Agricultural Associations.*—Of the old district associations Ganjam continues to do good work and also Coimbatore in the Tiruppur show. Madura also is keeping interest alive in its show. The village associations in Malabar, some 25 of them, have also done very good work. Some five co-operative agricultural societies have been formed for the joint purchase of manures, etc., but most of them have not as yet had a full year's work.

56. *Miscellaneous.*—The criminal tribes settlements at Kamnapuram and Bommanigadda were visited by agricultural officers 10 and 9 times respectively and much advice and active assistance was given. In the latter station the utility of this was somewhat impaired by frequent changes of the officers in charge. The stations at Bethupadi and Bapatla were also visited. Reports on the possibilities of five other sites as agricultural settlements were prepared and submitted. General correspondence with literate ryots increases. In the head office at Madras 1,119 applications for advice were received direct from ryots.

57. *General Progress.*—The year has been one of widespread development on many lines. As compared with last year—the busiest then to date—the chief items in the balance stand as follows:—

- (i) Twice the number of students were admitted to Coimbatore.
- (ii) The method of dealing with palmyra disease was much improved and more than twice the number of trees were examined (220,403 against 100,741).
- (iii) More than twice the number of areca palms were sprayed (29,000 against 14,000).
- (iv) There was more than twice the area under pure seed of selected cotton (34,000 acres against 14,600).
- (v) The area drilled by the ryots themselves in Tinnevely district increased by nearly 60 per cent. (11,329 against 7,117).
- (vi) The area economically transplanted continued to increase and the sales of paddy for seed increased.
- (vii) There was more than twice the area under Red Mauritius cane in South Canara (424 acres against 194).
- (viii) The number of ryots' cows served at Coimbatore increased by one-third (570 against 425) although the fee was increased, from 8 As. to 12 As.
- (ix) The number of monsoon ploughs sold increased from 3 or 4 to 26 independently of other implements, and of those which were hired out.
- (x) District work was begun against smut and sufficient seed was treated to sow 1,100 acres. The average annual loss from smut is about 7 per cent. of the crop and is frequently much more.
- (xi) Five more men were definitely allotted for district work in five more centres. Practical work on silk was also started.

But the call is still very general for more and more men in the districts. There are many fields of work untouched. It is a source of great satisfaction that the scheme for reorganization and ordered development has been so quickly sanctioned.

V.—AGRICULTURAL ENGINEERING.

58. In most other provinces all work on machinery required for agricultural purposes and within the purchasing power and capacity of the ryot to attend to is dealt with by this department. In Madras it lies with the Director of Industries and to him and his department belongs the credit of spreading the use of oil engines for well irrigation more widely, I believe, than in any other part of India. That department has so far dealt with the erection of 413 power plants for irrigation. A suggestion was made at the end of the year that this work together with agricultural engineering generally should be entrusted in future to this department. The matter is under examination. Messrs. Parry & Co. worked their steam tackle very successfully at Nellikuppam.

VI.—PUBLICATIONS AND SUPPLY OF INFORMATION.

59. Mr. Wood has almost completed a most useful note-book of agricultural facts and figures modelled on McConnell's book for Western farming, and M.R.B. R. Bahadur K. Rangachariar is at work on an Elementary Botany. It is not realised at what cheap rates these books on agriculture are made available to the public. McConnell's book costs Rs. 6, Mr. Wood's for South Indian conditions, As. 14.

60. The following bulletins and leaflets have been issued during the year:—

Number.	Subject.	Prepared by	Language.	Number of copies printed.
		1914.		
III	Some general methods of controlling attacks by insect-pests—Agricultural methods.	T. Bainbridge Fletcher ..	English ...	5,000
IV	Some general methods of controlling attacks by insect-pests—Mechanical methods.	Do. ...	English ...	5,000
V	The fodder question in Coimbatore	R. Cecil Wood	English ... Tamil ...	2,500 5,000
VI	" " " " " "	" " " " " "	" " " " " "	" " " " " "
VII	The Mahali or Koleroga disease of Arecanuts ...	W. McRae	English ... Canarese ... Malayalam ...	800 400 800
VIII	Possible use for oil engines when not required for pumping.	R. Cecil Wood	English ... Tamil ... Telugu ...	5,000 10,000 10,000
IX	Indigo	G. D. Mehta, Deputy Director of Agriculture, Central Division.	English ... Tamil ... Teluga ...	500 6,000 7,000
		1915.		
I	What the ryot has to say about the advantages of 'Daincha,' etc.	S. Subrahmanya Ayyar ...	English ... Tamil ...	15,000 15,000
II	What the ryot has to say about the advantages of 'Wild Indigo.'	Do. ...	Telugu ... English ... Tamil ...	15,000 15,000 15,000
III	What the ryot has to say about the advantages of 'Triangular Marrow.'	Do. ...	Telugu ... English ... Tamil ... Telugu ...	15,000 15,000 15,000 15,000

Very large numbers of leaflets were sent to Tahsildars and Revenue Inspectors for distribution. Over 73,967 copies of the Agricultural Calendar published in five languages were distributed through Tahsildars, Presidents of Taluk Boards and Assistant Inspectors of Schools.

VII.—STATISTICS.

61. *Crop forecasts and crop cutting experiments.*—Nineteen crop forecasts dealing with the sowings and outturns of paddy, cotton, sugarcane, gingelly, castor and indigo were issued. As a result of correspondence the Board of Revenue issued instructions altering the form in which Tahsildars should send in their returns and also arranged that Collectors should supply this office direct with more complete abstracts of cultivation from the village accounts. In accordance with the request of the International Federation of Master Cotton

Spinners and of the Trade Conference in Madras held in 1914, weekly statements of the quantities of cotton pressed at the various presses and used by the different mills in the Presidency are compiled and issued. Eighty-six crop cutting experiments were made on ryots' lands by officers of the department. These are of doubtful utility and the work always clashes with the time of harvest on the farms.

VIII.—MISCELLANEOUS.

62. *The Agricultural and Trade Conference, 1914.*—A most useful Conference was held in Madras in December between the chief firms interested in Indian produce, some leading agriculturists, representatives of railways, and officers of the Co-operative, Agricultural and Industrial departments which His Excellency the Governor very kindly opened. The Hon'ble Mr. L. E. Buckley attended every day. The Conference was the first of its kind and was especially useful in obtaining criticisms on lines of work and in clearing ideas for future methods of development in the districts. It was also a good advertisement of the nature and class of work in progress of which several firms were ignorant. It generally has promoted more knowledge and understanding and has made future work easier. The notes of the Conference have been published and are available for sale.

63. *Special Reports.*—The outbreak of war naturally produced many enquiries for outlets of produce and for new markets. Eighteen enquiries from firms abroad were received and information was given to them. These enquiries were also passed on to the producing districts. Two special reports were written for Government during the year—one on sugar, and one giving a history of the vicissitudes of the Agricultural Department since its inception in 1864 and especially assaying the work which has been done in the last eight years.

64. *Personal.*—It is a very great pleasure to record once more general good work at Coimbatore and in the districts. Under Mr. Wood the College continues to flourish and expand. The work which Mr. Harrison has done and published in India is deservedly obtaining recognition both in India and abroad. We have just heard that his University of Leeds has awarded him the degree of D Sc. solely on the work which he has published from Coimbatore. The Southern Division has benefited greatly by an uninterrupted year of Mr. Sampson's administration. Among the Farm Managers M.R.Ry. Balakrishnamurti for work at Anakapalli and in Vizagapatam, M.R.Ry. Muttuswami Ayyar for some years' very careful conduct of experimental work at Samalkota, M.R.Ry. Govinda Kidavu for the work on the West Coast, and M.R.Ry. Kolandaswami Pillai for his management of Koilpatti and of the cotton work deserve special mention; whilst all were pleased to welcome to the department M.R.Ry. Rao Sahib A. Rama Rao who has done good work at Sivagiri. All congratulate him on his well earned title. Messrs. Couchman and Iunes have again been of the greatest assistance.

65. Final accounts for the year have not yet been received from the Accountant-General, but according to the departmental accounts the total expenditure in the year was Rs. 4,95,980; receipts Rs. 48,540; net expenditure, Rs. 3,97,440.

The budget allotment was Rs. 5,32,300.

I have the honour to remain,

Sir,

Your most obedient servant,

D. T. SPADWICK,
Director of Agriculture.

APPENDIX I.

ADMINISTRATION REPORT OF THE AGRICULTURAL COLLEGE, RESEARCH
INSTITUTE AND CENTRAL FARM, COIMBATORE, FOR THE
YEAR 1914-15.

I. COLLEGE.

Teaching.—There was no change in the prescribed curriculum for the two senior classes, except that it was possible to give class III rather more instruction in Dairying than usual. They went on the usual tours, one in the northern districts, as far as Anakapalle, and one in the south through Tinnevely to Ambasamudram. Except during these tours, their work was supervised by the Assistant Principal.

Fresh lectures were written for the new classes. The skeleton syllabus was found on the whole very nearly correct, though slight adjustment will be necessary. More use was made of the Implement Museum: when dealing with this subject, one or two lectures were given in the museum itself. A chance question in one of the examinations showed the necessity for the strict maintenance of the students' observation books: owing to the absence of the Chief Assistant, and the extra work necessitated by the new course, it had not been possible to correct them, with the result that, failing the necessary spur, the students had not taken any trouble to prosecute private enquiries out of class hours. Notes by the lecturers in the various subjects are appended.

Chemistry.—Owing to the changes brought about by the new curriculum of studies, no lectures were given in General Chemistry. The old course in Physics given to the first year students has been abandoned, and in its place, sixteen lectures of a popular character were given according to the general scheme. In addition, eleven lectures of a similar type were given in Agricultural Chemistry.

Fifty-nine lectures on Agricultural Chemistry were given to the second-year class who also attended 28 practical classes.

Eighteen students presented themselves for examination at the diploma examination in Agricultural Chemistry and of these eight passed in the first class and ten in second class. There were no failures or third class passes.

Botany.—The new course of studies was introduced in June, and the first-year students received instruction as laid down in the syllabus. They had 23 classes during the year.

The second-year students of the old diploma course attended 57 lectures and 60 practical classes.

The Diploma Examination was held in December and, out of the eighteen students (inclusive of the student of last year) that sat for the examination, seventeen passed (two in first class, six in second and nine in third) and one failed.

Mycology.—The usual course on plant diseases, consisting of 27 lectures and 27 practical classes, was given to the second year students during the last term. In the final examination nine students were placed in the first class, seven in the second and one in the third.

The first year students of the new course had six demonstrations.

Entomology.—Eight lectures in Zoology and six preliminary lectures in Entomology were given to the first year students.

The second year students were given lectures on the chief crop-pests and the methods of control which should be used. The students were examined by Dr. Deslie Coleman, Director of Agriculture, Mysore. Four were placed in the first class, ten in the second and three in the third.

2. *Examinations.*—The outside Examiners for the diploma were Mr. Evans, Deputy Director of Agriculture in the Central Provinces, Mr. Aitchison, Principal, Veterinary College, and M.R.Ry. Narayanamurti of the Industries Department. All the students passed: the general standard was however low: it is probable that with the new course, a wider selection of students, and the chances of re-examination (which is not at present permitted), a higher standard will be more strictly adhered to. The second year students, examined in Agricultural Chemistry by Mr. Annett, in Agricultural Botany by Mr. Graham and in Mycology and Entomology by Dr. Coleman, have done very well: all will proceed to their last year. The College Medals were all won by Telugu students: the Ologstoun and the Kees going to Viraraghava Rao, who was very closely run by Viraswami for the latter: while Sitarama Patrudu obtained the Robertson prize.

3. *Students*.—The opening strength of the College shows an increase on previous years, due to the adoption of the new curriculum. In class III, there were fifteen, in class II, seventeen, while the new class contained forty-two. These were selected after a week's probation. There were no withdrawals from the senior classes: the first year class lost four, finishing with a strength of thirty-eight.

Hostel.—The hostel continued under the care of M.R.Ry. Tadulinga Mudaliyar as Warden. The increase in the work of keeping the hostel accounts, and supervising the catering arrangements, made it necessary to employ a wholetime officer, and eventually one M.R.Ry. K. Hanumanta Rao, a retired Taluk Head Accountant, was selected as "Steward." This post carries with it a salary of Rs. 30, the cost of which is met by the hostel funds. The Hostel during the year took over the non-vegetarian section, so that it now caters for every one, 32 Brahman, 20 non-Brahman vegetarian and 14 non-vegetarian: four students messes with relatives on the estate. It was found necessary during the year to raise the fees from Rs. 12 to 13 exclusive of the weekly oil bath: this was partly due to the general rise in the price of foodstuffs, and partly due to an improvement in the standard of the meals.

The auditing of the accounts was very kindly undertaken by Messrs. M. R. Ramaswami Sivan, T. V. Narayana Rao and B. V. Nath. There was an actual loss of Rs. 142 during the year which has been made up from previous savings.

The Students' Club.—The Students' Club finished up the year with a balance on the right side, and an account has been opened with the Bank of Madras. The new tennis court was used regularly and yet another will be needed for the coming year. The hockey team received colours for the first time and had a successful season: cricket and tennis matches were also played. A new ground was laid out in the maidan to serve as a football field. The Tennis championship was won by a first year student Rangaswami Pillai. The sports championship was won by V. T. Venkatajalam Mudaliyar.

4. *Building*.—The library has been improved by the addition of two handsome screens which shut off the passage through one side of the room and thus ensure a greater privacy; in their construction were utilised some doors originally fitted to one of the library cases by mistake; doors of the correct pattern have now been fitted in the place of these. The big lecture room has been done up, and in it are to be found a full set of the college groups. Two Honour Boards, on which are carved the names of the Captain and Secretary of the Students' Club, are also fitted, so that this room will become the repository, so to speak, of college tradition. A handsome bench for the accommodation of visitors has been placed in the Front Hall.

Accommodation is found for the office of the Government Sugarcane Expert in addition to the regular College staff. The change in the curriculum has shorn the Physics Laboratory of much of its usefulness, and proposals will probably be submitted utilising the space in another way. Meanwhile, it was possible to find a separate room for the Assistant Principal.

5. *The Library*.—During the year about one hundred volumes have been added to the Library: 76 were purchased at a cost of Rs. 500 odd, the rest being obtained free, by presentation or exchange. Eight new periodicals were taken in, three of them being exchanges. Two hundred and eighty books were sent for binding during the year to the Government Branch Press at Ootacamund: two hundred more were sent to the Press at Madras. The catalogue of Bulletins, Leaflets, etc., has been sent to the Press and copies are expected shortly.

Certain proposals were discussed during the year for putting the library in charge of one of the sectional officers, and proposals have been submitted to the Director to this end, while changes in the method of circulating periodicals to the members of the college staff have recently been put into effect.

6. *Staff*.—The meetings of the college lecturers which had hitherto been informal were regularised under the name of the College Board. This meets to discuss general college and estate business, and also educational problems, when only those of the staff who are engaged in teaching, are entitled to vote. The minutes are kept by the Assistant Principal who acts as Secretary. The appointment of M.R.Ry. D. Ananda Rao Garu to this post, dates from the 17th July. The Chief Assistant was away from duty from the 2nd July to the beginning of the new year. Both the Veterinary Assistant and the Special (Agricultural) Assistant took a month's privilege leave. The post of Engineering Assistant was held by an acting man throughout.

The note book of Agricultural Facts and Figures was revised for publication during the year and is now in the Press.

7. *Visitors*.—The list of Honorary Visitors has been revised from the 1st January: the new list contains seventeen names as against twenty-five in the old list. Six Honorary Visitors on the old list visited the college during the year. The college was also visited by the Hon'ble Mr. A. G. Cardew and Mr. Coventry, C.I.E., the Agricultural Advisor to the Government of India. The Director of Agriculture paid three visits during the year. During the year, the Rev. Paul Beck of the Basel Mission resided on the Estate, for training in Farm Management and Estate Methods: on the outbreak of hostilities he had to leave.

II. ESTATE.

8. *Estate*.—There has been a great improvement in the water-supply, as additional pumping plant has been put down at well No. 60 in the south-west corner of the Estate. This supply is coupled up with the present pipe system, and serves the whole of the buildings south of the maidan, including all the hostel blocks, and the greater portion of the B and C type quarters, thus saving the college well, which has been able in these conditions to meet all demands. Progress has also been made in planning for future extension on the Estate and on the south-east corner arrangements have been made for the orderly expansion of the Colony: here will be placed the new Provincial officer's quarters, and the removal of the scavengers' quarters, the tidying up of the corner and the provision of a proper gate will materially improve what is at present rather a back entrance, although a popular entrance, to the Estate.

9. *Quarters*.—It is feared that delay will be experienced in the construction of the new quarters needed. Two Provincial officers' quarters, for the Government Lecturing Botanist and the Assistant Principal, nine B type and ten C type have been sanctioned. A certain amount of relief was experienced by the taking over from the department of Public Works of the old contractor's quarters, whereby one C, three Intermediate and eight D type were added to the Estate. Recently sanction has been obtained to the acquisition of the stretch of land between this and the Forest College; the buildings including the Rest house for Indian visitors, dispensary, etc., have not yet been begun.

10. *Sanitation*.—Poudrette was manufactured on the Estate as usual: some two hundred cartloads were produced during the year, which were utilised to manure guinea grass, fodder cholam and paddy. The utilisation of the sullage water from the houses is also under contemplation, by the provision of a drain to run south of the quarters towards the west, where land can be found on which this water can be used. This will improve what is at present an unsightly and odorous drain, and save the waste of water which now occurs. During the year nineteen births and seven deaths were recorded. No serious epidemic appeared. The Sanitary Staff inaugurated an energetic mosquito campaign on the advice of the Entomologist, and this has been most successful. Mosquitos have not been exterminated, though constant search is made to find out where they are breeding, but the numbers have been enormously reduced to the comfort of everyone on the place.

Quarters are to be provided of the standard design for the Estate scavengers, in the south west of the Estate and work has recently begun.

III. FARM.

11. *Farm*.—The season presented surprises all through. Drought marked the opening months, and this following on the short rainfall and small straw crops of the previous year brought about a serious shortage of fodder. It was not until September that proper sowing rains were received, but from then onward the rains were plentiful and well distributed. A fall of 2.4 inches occurred in January, and interfered considerably with the paddy harvest, while on the 28th February, the unprecedented fall of 3.3 inches was received. This has improved the grazing wonderfully, and as last year's crops were above the average, the fodder in reserve at present is more than usual.

Apart from a trial of a motor tractor which took two 2-disc ploughs through the black cotton soil in F. 37, considerable progress was made in improving the methods of tilling of the land. A great fillip was given to hot weather ploughing by the late rains, and quite a business has been done in hiring out ploughs to neighbours. There is considerable scope for work of this kind in the vicinity, could men be spared for it.

12. *Livestock*.—A slight increase in numbers is recorded. More bullocks have been purchased to meet the increasing demands of the students' classes: and the dairy herd is still in need of more cows.

Attention may be called to the popularity of the Farm stud bulls: in spite of a rise in price from 8 As. to 12 As., 570 animals were brought for service, both cows and buffaloes. The figures for the past seven years are interesting: 5, 6, 52, 139, 247, 425, 570. This shows clearly that owners are fully alive to the value of goodstock, and that if treated fairly and promptly by some one in whom they have confidence as they have in the Veterinary Assistant, Mr. D'Silva, they will readily make use of Government bulls. The number of cases treated at the hospital also showed an increase.

Miscellaneous additions to the livestock, included a jutka pony, and some leghorn fowls. The second annual sale was held in February, when fair prices were realised.

13. *The Dairy*.—This Institution was under the immediate control of the Assistant Principal and has shown a gratifying improvement. The greatest business is done in the sale of fresh milk and at present no attempt is made to work out the cost of production, the milk being simply credited to the Farm at a uniform rate of one anna a pound. There is little doubt that it costs less than this to produce, as we can buy plenty of milk in the neighbourhood at this price. The sale of butter has rapidly risen. One thousand and seventy-five pounds were sold in the previous year: the figure for this year is 1,886 lbs. A profit and loss account is given below.

To	By
RS. A. P.	RS. A. P.
Purchase of milk—	Sale of milk 3,090 3 9
Farm 53,357 lbs. 4,956 13 6	Cream 91 4 3
Outside 25,952 lbs.	Butter 1,909 2 0
Depreciation—	Ghee 132 10 10
Buildings at 2 per cent. on 9,000 291 9 7	Separated milk 493 8 4
Plant 12 per cent. on 930	Butter milk 52 1 4
Establishment 395 9 0	Curds 2 12 10
Petty expenditure 63 14 2	Stock in hand 0 10 0
Balance being profit 69 7 1	
Total 5,777 5 4	Total 5,777 5 4

14. *Staff.*—The Farm Manager at the commencement of the year was M.R.Ry. Rajagopala Achari; he was relieved by M.R.Ry. Thiru Muruganathan Pillai in June. In November his place was taken by M.R.Ry. S. Subrahmanya Ayyar. The Assistant Farm Managers during the year were Unnikrishna Menon, S. Narayanayya and K. T. Bhandary. A Veterinary Assistant Farm Manager was posted to the farm in August, and has been placed in charge of the feeding of all farm cattle and calves: he is also in charge of the Leghorn poultry which were obtained towards the end of the year.

15. *Accounts.*—

Profit and loss account for the year ending 31st March 1915.

Dr.	CR.
RS.	RS.
To amount as per valuation, March 31, 1914—	By receipts 19,604
Livestock (a) 15,366	By amount as per valuation, March 31, 1914—
Tillage and standing crops ... 1,421	Livestock (a) 18,101
Produce in store 4,863	Tillage and standing crops ... 2,187
Implements 9,000	Produce in store 10,255
Machinery (b) 16,980	Implements 9,802
Buildings and estate improvements (c) 58,505	Machinery (b) 21,301
	Buildings and estate improvements (c) 60,953
	1,22,599
To charges in the year 43,491	By balance being loss 7,593
	1,49,696

(a) Includes dairy herd and stud bulls.

(b) Includes dairy machinery.

(c) Includes dairy building.

COIMBATORE,
4th May 1915.

R. CECIL WOOD,
Principal.

APPENDIX II.

ADMINISTRATION REPORTS OF THE AGRICULTURAL STATIONS DURING THE YEAR 1914-15.

ADMINISTRATION REPORT OF THE DEPUTY DIRECTOR OF AGRICULTURE, NORTHERN DIVISION, FOR THE YEAR 1914-15.

I have the honour to submit the administration report of my division for the year 1914-15.

1. *Staff.*—I was in charge of the division until the 9th May 1914 and from the 9th November 1914 until the end of the year. During the interval I was on leave and Mr. Roger Thomas, Probationary Deputy Director of Agriculture, acted in my stead. As usual most of the

year was spent in camp, all the farms received frequent visits and tours were made in the district.

The recently formed sub-division remained under the charge of M.R. Ry. D. Ananda Rao Garu, Assistant Director of Agriculture, until 1st July 1914 when M.R. Ry. K. Ramasasthulu Nayudu Garu took over charge from that officer.

2. *District work.*—(a) *A Local cotton.*—Bellary district.—Work was carried on along the usual lines and the same type of cotton Hagari No. 1 continued to be distributed. The year marks a great advance in the expansion of this work. The sowing rains were timely and there was a large demand for our seed but at a lower rate than that asked, namely, 26 lbs. per rupee, which was considered excessive. The price was reduced to 30 lbs. per rupee, i.e., 14 per cent. higher than the rate for local cotton, and 51,943 lbs. were sold. This is sufficient to sow 7,200 acres.

Six hundred and seventy-four acres of seed farm were sown to produce seed for distribution next year.

(b) *Cambodia cotton.*—As was the case last year kappas was bought locally, ginned by the department and the seed distributed. One thousand seven hundred and thirty-two pounds were sold in the Bellary circle and 680 lbs. in the Circars. In the latter area, more particularly in Vizagapatam, the crop did very well and gave very good yields. The quality of the produce is also better than is the case in the Ceded Districts. Expansion of the area under this crop is however likely to be checked by the fall in the price of cotton.

(c) *Sugar-cane.*—Attempts to effect an improvement in the method of cultivation in Gōdāvari district have been given up. The area under this crop in this district is not big enough to warrant further work considering the expansion of work in other directions and the shortness of staff and the yield with the present indifferent cultivation is too good for the ryot to bother about possible means of correcting the defects in his method of cultivation. There is a much better field for work with this crop in Vizagapatam district. The area of the crop is bigger and the cultivator is more alive and readier to consider suggested methods of improvement. Work here will consist in (a) distributing canes of a new variety, B. 1529, to replace B. 203 which has already got a hold in the district but is proving unsuitable as the buds begin to shoot when the canes begin to ripen and the quality and quantity of jaggery are affected; (b) inducing cultivators to plant the crop in rows, (c) advocating the use of oil-cake as manure for this crop and (d) endeavouring to persuade cane-growers to improve their furnaces. A start with this work has already been made and 45,700 setts of B. 1529 have been distributed, 16,400 lbs. of castor-cake distributed for the 1914-15 crop, two improved furnaces erected and arrangements have been made to supply oil-cake to ryots who wish to try this manure for their next season's crop.

(d) *Paddy.*—(1) *Improvement in cultivation.*—In Gōdāvari district where most of this work is being done the work was expanded. One hundred and three acres were sown at the departmental rate and 2,800 acres were transplanted with single seedlings. This however does not by any means represent all the work that has been done in pushing this improvement in this district. While arranging for the sowing and transplanting of these demonstration plots the district officers endeavour to get other ryots to reduce the seed-rate they employ without bothering them about single planting, as it has been found that if they can be induced to do the first, their coolies will automatically do the second for them. Thus many ryots who hesitate to adopt the departmental method in its entirety try a small reduction in the seed-rate one year and make a further reduction the next until they arrive at a rate not very much higher than that advocated by the department. In this way a gradual reduction in the seed-rate is being brought about and in most of the villages in which we have worked the mamool rate is now considerably lower than it used to be—

(2) *Seed distribution.*—Most of this was done from Sannalkota farm, where 21,200 lbs. of seed were distributed. At Anakapalle 920 lbs. of seed was distributed and seedlings from thin sown seed beds sufficient to transplant in all 4 acres were distributed to 48 ryots to demonstrate to them the advantage of planting good healthy seedlings.

(e) *Green manure.*—Three thousand eight hundred pounds of green-manure seeds, chiefly sesbania were distributed. Most of this work was done in Gōdāvari district.

(f) *Treatment of sorghum seed against smut.*—The treatment of sorghum seed with a 2 per cent. solution of copper sulphate has been advocated generally wherever sorghum is grown in those tracts where we have district officers working. In this division the Ceded Districts offer the biggest field for this work and an organised attempt was made there this year to bring about the adoption of this practice. In the Bellary circle 1,100 acres of sorghum were sown with seed treated under the supervision of the district officer in which area no smutted heads were noticed when the fields were inspected.

3. *Implements.*—The gallows plough is now doing duty at Anakapalle and is turning out satisfactory work there, as is the smaller E.T. plough which is being found extremely useful for garden cultivation both there and at Hagari. As regards the disc plough further trials have been made both at Hagari and at Nandyal and the general conclusion arrived at, that for use on the dry land in these districts work will have to begin in September while there is still some moisture in the land as later it becomes too hard and the plough does not work deeply enough nor does it lean furrow.

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Hagari Agricultural Station.

Season.—The rainfall was in defect and was almost wholly confined to the south-west monsoon period. As is usual in such years the early sown crops were good, but there was not enough moisture to ensure a satisfactory yield of cotton and only enough to carry the sorghum crop up to the flowering point but no further.

2. (a) *Cotton.*—The crop was sown in good time but as indicated above gave only a poor return. The average acre-yield amounted to 148 lbs. for the pure and 96 lbs. for the mixed crop. The best yield was 256 lbs. from a plot of Hagari No. 25 sown for seed purposes.

(b) *Sorghum.*—The yields of grain from this crop were miserable and of straw fair. The average acre-yield of grain was 15 lbs. and of straw 1,156 lbs. A better yield of grain was obtained by sowing the crop thinly in the Bengal gram crop though in this case the yield of straw was greatly in defect. The figures were 36 lbs. grain and 320 lbs. straw per acre.

This year a fair area was put down under fodder sorghum which considering the season has done remarkably well and has given an average yield of 3,000 lbs. per acre. The practice might well be taken up by the local cultivator and would, if adopted, relieve him in a few years of anxiety with regard to his fodder supply.

(c) *Bengal gram.*—The crop this year was in every case grown mixed with a small quantity of sorghum to ensure a supply of seed of that crop. The average acre-yield was 80 lbs. and the highest 100 lbs. both of which are distinctly poor.

(d) *Safflower.*—This crop was grown on a small area and gave an average acre-yield of 220 lbs.

3. *Garden crops.*—The crops in the garden this year have in the main done well and the yields of ragi, groundnut and tobacco are about the best we have ever had. This is largely attributed to the manuring the fields received from the folding of sheep upon them.

(a) *Ragi.*—The average acre-yield of this crop this year was 2,823 lbs. grain and 5,087 lbs. of straw, an advance on last year's figures. The best yield was obtained from an area of 62 cents and amounted to 3,334 lbs. grain and 7,750 lbs. straw.

(b) *Sugar-cane.*—The season has again been against this crop and the yield is low, only 3,500 lbs. of jaggery per acre.

(c) *Onions.*—The crop was normal and gave an average acre-yield of 9,846 lbs. of bulbs dried and ready for market.

(d) *Cambodia cotton.*—This crop this year was very free from disease but has not given a very heavy yield though it was good for the year. It was grown on a total area of 1.33 acres and gave an average acre-yield of 486 lbs.

(e) *Tobacco.*—A very good yield of 1,350 lbs. of cured tobacco was obtained. The crop has proved one of the most profitable of the garden crops this year.

(f) *Groundnut.*—This crop was grown both pure and mixed with grain crops. The former did exceedingly well and gave a yield of 1,830 lbs. of dried nuts per acre. The latter suffered from the luxuriant growth of the grain crops and gave only 313 lbs. of dried nuts per acre.

(g) *Chillies.*—The total area under this crop was three-quarters of an acre and an average yield of 2,473 lbs. of green and 345 lbs. of ripe chillies per acre was obtained.

4. *Sheep.*—The flock has again done well and 28 lambs were dropped during the year, three of which died. A few of the ewes were bred from twice in the year and one ewe produced twins. This performance seems to be somewhat of a novelty in this neighbourhood and not a few visitors came to see the lambs.

During the year some store lambs were bought in to be folded on the green-manure crops grown in the garden and fattened. They were fed with crushed cotton seed as concentrated food, but did not make the growth they ought to have done. On this account and because of the heavy cost of producing the green-manure crops the experiment was not a financial success. It has, however, shown that if lambs which had not been robbed of part of their mother's milk could be got there would be a reasonable chance of making a profit, and that this plan of feeding off green crops is an excellent means of manuring the land. The experiment is being repeated with some farm-bred hogs this year, but these are only now coming on for sale. Two of the best were disposed of in Bellary market and realised Rs. 13-12 each. Their live weights were 116 and 120 lbs. respectively. A three-year old ram weighing 125 lbs. was sold at the same time and brought Rs. 17-2-0. Weighments of these fattening hogs are being taken once a month and the results so obtained show that they are making an average increase of 4 oz. per head per day.

The flock as it stood at the end of the official year consisted of 58 individuals; 2 rams, 22 breeding ewes, and 34 lambs.

5. *Staff.*—Farm Manager K. Narayana Ayyangar was in charge of the farm (black-cotton soil area) throughout the year. Farm Manager S. Ramaswami Pillai was in charge of cotton work and district work generally. Assistant Farm Manager G. R. Venkateshachari was in charge of the garden. Assistant Farm Manager V. S. Subrahmanya Sastri did duty in the farm up to 1st November 1914 when he went on combined privilege leave for one month and twenty days and furlough for one year. Assistant Farm Manager Bhairya Siva Rao joined duty at the farm from Anakapalle on the 6th January 1915.

Samalkota Agricultural Station.

Season.—The rainfall during the south-west monsoon period was slightly below the average and the north-east monsoon rains failed altogether. The season was however otherwise favourable.

2. *Crops.*—(a) *Sugar-cane.*—This year this crop was again very satisfactory. Germination was good and there was very little red rot present, only 5 (point 5) of the clumps on an area of 2.94 acres containing canes which were diseased. The average acre-yield of raw-sugar works out at 10,000 lbs. which is one candy less than last year and five candies above the average for the district. The best yield was obtained from B. 3412 which on an experimental plot of 6.7 cents yielded at the rate of 18,574 lbs. of raw-sugar per acre.

(b) *Paddy.*—(1) *Rainfed.*—The season was favourable to this crop inasmuch as the distribution of the rain was such that it was unnecessary to give any irrigation. The yields however are in no way startling, though the average acre-yield of 1,700 lbs. grain and 3,300 lbs. straw over an area of 2.17 acres is good. The two budama varieties, black and white, are the best yielders and the former gave the highest yield of the year 2,980 lbs. grain and 6,560 lbs. straw per acre from an experimental area of 6½ cents.

(2) *Irrigated.*—Satisfactory yields have again been obtained from this crop. The crop was only very slightly affected by smut and lodging was limited to a small area. The average acre-yield for the whole area under this crop for the main crop season was 3,059 lbs. grain and 3,588 lbs. straw.

(c) *Green-manure crops.*—The experiment tried last year of mixing other green-manure crops with sunnhemp, to occupy the land after the removal of that crop for fodder ended in failure. It has been tried again this year, but does not promise any better success. For this purpose sesbania is no good as it does not succeed when sown in the standing crop of paddy even when alone. As regards the other crops indigo and cassia tora, sunnhemp seems too heavy a shade crop.

(d) *Cambodia cotton.*—As a pure crop the yields this year from this crop are a record 1,796 lbs. of kappas per acre from an area of 24 cents. As a mixed crop the yield was miserable, 93 lbs. of kappas per acre from 20 cents.

(3) *Experimental work.*—As a result of the experimental work that has been done at this station the following conclusions have been arrived at with regard to sugar-cane and paddy.

3. *Sugar-cane.*—(a) *Manuring.*—The question of which oil-cake will be the most paying to use for this crop will, provided that the quantity of nitrogen applied in this farm is from 100 to 125 lbs. per acre, be settled by the availability, price and nitrogen content of the cake. For with this proviso one cake is as good as another.

(b) *Varieties.*—Of the two Java varieties, both of which are able to withstand drought and water-logging 36 is a poorer yielder than 247.

Another conclusion that may safely be recorded, though it is hardly an experimental result is that red rot disease can be checked and kept within bounds by a rigorous selection of setts.

4. *Irrigated paddy.*—(a) *Cultivation experiments.*—(1) In this delta the practice of breaking up the land a long time before the planting of this crop is not to be recommended as it results in a lower yield being obtained.

(2) A seed-rate of 210 lbs. for an acre of seed bed is ample and will provide sufficient seedlings to transplant 20 acres of crop with single seedlings.

(3) Provided the crop is planted in good time it is matterless whether the seedlings are 25 or 45 days old at the time of transplanting.

(b) *Manuring.*—(1) An application of five bags (320 lbs.) of castor-cake plus 2 cwts. of superphosphate, gives an increased yield as compared with a similar application of cake with or without potash or no manuring at all. A similar result has to be recorded if green-manure is substituted for castor-cake.

The profitability however of these methods of manuring more particularly the first mentioned will depend on the residual effect of the manures which is being tested.

(2) The application of 5 tons of straw per acre with a complete manuring compared with a complete manuring alone reduces the yield in the second crop season, both of grain and straw and in the main crop season does not materially affect the yield of grain but greatly increases the outturn of straw.

5. *Seed distribution.*—The following qualities of seed have been distributed during the year:—

Paddy—	Lbs.
Konamani	12,365
Rasangi	4,938
Garikasannavari	1,360
Other varieties.	2,542

Green-manure seeds—					LBS.
Sesbania	...	...	...	...	2,022
Sugar-cane	...	...	...	...	1,122 canes mostly outside the Presidency.
Cambodia cotton	...	...	...	...	280

6. *Staff*.—Farm Managers V. Muthuswami Ayyar and N. Sitaramaswami Nayudu were stationed at this farm throughout the year. The former in charge of the farm and the latter in charge of the district work. Assistant Farm Manager S. Subbayya remained at this station until the 2nd August 1914 when he was transferred to the Central division. He was on privilege leave for 2 months from 1st April 1914. Assistant Farm Manager D. Panakala Rao remained at this farm throughout the year except during the period from 7th June 1914 to 11th August 1914 when he was on leave on loss of pay. Assistant Farm Manager K. Ramanuja Achari joined duty from Managanallur on 8th June 1914. He was on privilege leave for 3 weeks from 26th January 1915 to 15th February 1915.

Anapalle Agricultural Station.

During the year under report the necessary preliminary arrangements for bringing this station into working order were completed. The buildings in the station are now quarters for three officers, a seed-store, a cattle shed with manure pits and an implement shed, with a small room for preparing cattle-food attached. Wells have been filled up and the dry land fields levelled. All that now remains to be done is the erection of a pumping plant near one of the wells which work it was expected would have been finished last hot weather. It has now been taken in hand and it is expected to be completed before the break of the next monsoon. The land has been laid out and its final division into dry land, garden land and wet land made. By mutual arrangement with neighbours some awkward bends and corners in the boundary line have been got rid of and the fence line is now as straight as it is possible for it to be. The area of the farm now consists of 9.7 acres dry land, 11.0 acres garden land, 16.0 acres wet land and 4.35 acres taken up by farm-yard buildings, roads and bunds.

Up to present no experimental work has been done except in so far as the testing the suitability of new varieties of sugar-cane and new crops like Cambodia cotton to the climate and land, can be called experimental work. The cropping scheme was arranged with the object of finding the most uniform areas on which to carry out experiments, but owing to heavy rains in September the embankment of the river breached and the farm was flooded. The surface soil was washed from dry land fields into the garden land and both had to be relevelled. Both garden and wet land crops were submerged and sugar-cane lodged. We are therefore no further on than we were and this work will have to be done again.

2. *Season*.—The rainfall recorded for the year amounted to 45.7 inches, 9 inches heavier than last year. Its distribution was however very faulty. Practically all the rain was received in the south-west monsoon period and most of it fell in heavy showers which did more harm than good. The rain received in the north-east monsoon period amounted to 12 inches only, there were therefore no cold weather crops grown on the dry land.

3. *Crops*.—(a) *Dry land*.—Sazza was the only crop grown during the year, and from the seed-bed to the threshing floor it was dogged by unfavourable conditions.

Timely rains for the sowing of seed-beds were received in May but when the seedlings were ready for planting rain held off and they were rather old before this operation could be carried out. Immediately after planting a spell of wet weather set in which retarded the growth of the crop. This was followed by a spell of very dry weather which in moderation would have been useful but was carried on for too long a period. The weather after this was propitious but at the time of harvest when dry weather would have been exceedingly welcome heavy rain set in again and interfered with harvesting operation.

The return from this crop 1,537 lbs. grain per acre was therefore only fair.

The average acre-yield of sazza straw is not available as it was damaged by floods in consequence of which no weighing was made.

The seed-beds of ragi, the crop which should have followed sazza were spoiled by the flood and horsegram which was sown in its place was a failure owing to the lack of rain in the north-east monsoon period.

(b) *Garden land*.—*Cambodia cotton*.—The crop sown in August-September of 1913 was allowed to produce a second picking in April-May of 1914 and gave the handsome yield of 1,400 lbs. per acre from an area of 2½ acres. The first sowing of this year's crop was spoilt by the flood and the second sowing which was a little late has done fairly well. Only one picking has been taken as the field is required for a early crop. But this has given 720 lbs. of kappas per acre which is good considering all conditions. These yields and the quality of the product show that the introduction of this crop in this district will be successful. There is likely to be some initial difficulty in getting the produce ginned and in finding a fair market for the crop but endeavours will be made this year to get round these difficulties.

Other crops grown on the garden lands were fodder sorghum, ragi and korra in the punaa (early) season and ragi in the pairu (cold weather) season.

The first named crop did very well and gave the excellent yield of 25,100 lbs. of green fodder per acre. Early ragi and korra gave fair yields 1,544 lbs. and 1,371 lbs. of grain per acre respectively and pairu ragi was good yielding 2,542 lbs. of grain per acre.

(c) *Wet lands*.—In the punasa season gogu and ragi were grown. The former gave a fair yield of 729 lbs. of fibre of fair quality per acre. The latter was poor and gave an average acre-yield of 1,043 lbs. of grain per acre.

In the main crop season paddy was grown over the whole of this area except that part occupied by sugarcane.

In the beginning the season was favourable to paddy but the damage done by the flood followed by the failure of the north-east monsoon rains has caused the yields of this crop to be considerably lower than they ought to have been.

The following varieties were grown and gave the average acre-yields noted alongside:—

	Grain.	Straw.
Bobbiliganti	871	888
Mypali	2,092	2,483
Azzanum	1,917	2,370
Maharajabogam	2,246	3,209
Balaramabogam	2,209	3,505
Gunapurapu sannalu	2,239	3,029

The low yield of Bobbiliganti is partly due to the bad season but mainly to the fact that it followed the crop of gogu previously mentioned. It is the practice in this district to take three crops from the wet lands, one in the early or punasa season, one in the main season and one in the late or pairu season. The early and late crops are of short term, e.g., ragi, gogu, gingelly, onions, maize, etc., and most of them can be grown in both seasons. The main crop is always paddy. It is a question whether it would not pay better to grow a green-manure crop in the punasa season to be ploughed in and to transplant the paddy crop earlier. The low yields obtained from Bobbiliganti as compared with yields from the three last mentioned varieties favour the proposed change. The question however will be one of the first to be tackled as soon as experimental work can be begun. The yields of azzanum and maharajabogam are lowered by their having followed paddy seedlings on part of the area which they occupied. The average acre-yield for the whole paddy crop this year was 1,897 lbs. grain and 2,557 lbs. straw, and the best yield was 2,565 lbs. of grain and 3,750 lbs. straw given by maharajabogam in field No. 24.

(d) *Sugar-cane*.—The following varieties B. 6450, B. 208, B. 1529 keli and bonta were grown. In common with the other crops of the farm this crop had a series of trials to contend against.

These began early on with the flooding of the fields by a heavy rain shortly after planting. This was followed by a very dry hot period. Later after a period of comparative quiet the crop was laid flat by a cyclone and subjected to a prolonged submersion by the flood. Bonta however was the only variety which seemed to have lost heart and added red rot to its list of troubles. The others did fairly well and B. 1529 particularly seems ominently suitable for this tract. B. 208 on the other hand is proving unsuitable. With the cessation of growth when the cane begins to ripen the buds in this variety begin to develop and form shoots. This is a disadvantage in two ways, the quantity and quality of the jaggery is affected even if all the shoots are cut off before crushing the cane, and when the cane has to stand a short time before planting is done it is impossible to cut it into setts without damaging the young shoots, which of course acts detrimentally on the stand of the succeeding crop. For these reasons the further spread of B. 208 will not be encouraged and B. 1529 will be distributed in its place.

The average acre yields were as follows:—

B. 6450, B. 208, B. 1529, Keli, Bonta.

4. *Seed-distribution*.—This has been confined mainly to green-manure seeds, sugar-cane, paddy and Cambodia cotton. The quantities are as follows:—

	LBS.
Paddy	920
Green-manure seeds	1,600
Cambodia cotton	400
Sugar-cane setts	45,700

Paddy seedlings from thin sown seed-beds sufficient to transplant acres were also distributed to 48 cultivators in the neighbourhood of the farm. During the year an attempt was made to revive the indigo industry in tracts where it had formerly flourished, and a large quantity of indigo seed was purchased for distribution. The extracting plant in the district is however in such bad repair that no owner could be induced to put his in order on the chance of making a profit though the cultivators were willing enough to grow the crop and supply material. The seed is however being distributed and up to the end of the official year 5,576 lbs. had been disposed of.

b. *Implements*.—Light iron ploughs were lent to six ryots two of whom purchased ploughs for themselves, one a Punjab plough and one an E.T. plough. The use of these light iron ploughs was demonstrated in the district and on the farm to visitors and it is expected that a demand for these will arise as soon when cultivators have become better acquainted with their usefulness.

c. *Staff*.—Farm Managers M.R.Ry. D. Balakrishnamurthi and M.R.Ry. L. S. Natesa Ayyar worked on this farm throughout the year. Assistant Farm Manager Bhairya Siva Rao remained until the 4th January 1915 when he left for Hagari. Assistant Farm Manager T. Budhividheya Rao joined duty on 15th May 1914 and remained at this station throughout the year.

G. R. HILSON,

Deputy Director of Agriculture, Northern Division.

14th May 1915.

ADMINISTRATION REPORT OF THE ASSISTANT DIRECTOR OF AGRICULTURE, NORTHERN DIVISION,
FOR THE YEAR 1914-15.

I have the honour to submit the Administration Report of the sub-division for the year 1914-15.

Staff.—During the year under report M.R.Ry. D. Ananda Rao Garu, now Assistant Principal, Agricultural College, Coimbatore, was in charge of the sub-division till the 1st of July. I relieved him on the 2nd and remained in charge of the division till the end of the year. During his three months' period, my predecessor spent 45 days in camp. He visited Nandyal and Sirvel Agricultural stations thrice, inspected the Patimannu substitute experimental plots once, and attended the selection of students for entrance into the Coimbatore Agricultural College in June. A portion of his time was also occupied in making enquiries into the raising of early seed-beds for paddy in some of the villages in the Kistna Western Delta. During my period of nine months in the sub-division, I spent 116 days in camp. I visited Nandyal and Sirvel Agricultural stations eight and seven times respectively, and inspected the patimannu substitute plots twice. In addition I visited Tatapudi Lanka and Ponnalur tank and submitted reports thereon.

At the Nandyal Agricultural Station, Farm Manager M.R.Ry. M. Raghavulu Nayudu was in charge from the beginning till the 5th of May in addition to his district work on cotton improvement. From the 6th of May he was on privilege leave for six weeks while the farm was managed by the Assistant Farm Manager V. S. Ramaswami Ayyar till 13th June on which latter date Farm Manager M.R.Ry. T. V. Rajagopala Achari joined duty and managed the farm till the end of the year. Assistant Farm Manager V. S. Ramaswami Ayyar was transferred to Sirvel where he joined duty on 27th June 1914. Assistant Farm Manager V. Ratnaji Rao was the only Assistant who stayed in the Farm throughout the year helping the managers. In the district work round about Nandyal, there were no changes in the staff. M.R.Ry. M. Raghavulu Nayudu conducted the cotton improvement work single-handed throughout the year.

At Sirvel, Farm Manager M.R.Ry. V. G. Dhanakoti Razu was in charge of the farm almost single handed from the beginning to the end, save for a short period of three months and fifteen days, from 27th June to 10th October, when he was helped by the Assistant Farm Manager V. S. Ramaswami Ayyar. The latter was on privilege leave for one month and fifteen days from 9th October to 24th November, after the expiry of which, in about a week, he was deputed to Nandyal to help the staff in the selling of cotton selections, where he remained on duty till the end of the year. There were changes in the farm clerks of this station and on more than one occasion the Farm Manager had to get along without either an Assistant or a clerk.

DISTRICT WORK.

(a) *Cotton Improvement*.—As in previous years, cotton improvement work consisted of the establishment of seed-farms and the distribution of good seed amongst ryots. Seed for the seed-farms was given free and land assessment was paid. Good kappas from the seed-farms of 1913-14 were purchased at the highest market rates, ginned on the farm and good seed was distributed both to the seed-farms of 1914-15 and to the ryots in general. Of the 43,899 lbs. of good seed of plant No. 2 obtained from the seed-farm kappas of 1913-14, 37,774 lbs. were sold. Of this 9,480 lbs. was given to the seed-farms, 21,868 lbs. amongst ryots in the Nandyal taluk and nearly 6,476 lbs. in Koilkuntla, Sirvel, Atmakur and Nandikotkur taluks. In addition 7,415 lbs. of seed from the ordinary sircar cotton belonging to the Polur seed-farms of 1913-14 was sent to Proddatur, Jammalamadugu and Dhona taluks, where, for want of proper agencies only 2,392 lbs. were sold for sowing purposes and the rest disposed of as cattle-food. The total quantity then of cotton seed distributed for sowing this year is 40,166 lbs. (37,774 and 2,392) which should be sufficient to sow nearly 4,463 acres taking 9 lbs. as seed-rate. This area includes seed-farms. During the year under report, seed-farms were concentrated at Gundupapala, Gospad and Pasarapad. The area under these amounted to 1,050 acres where plant No. 2 was sown. The cotton crop in the seed-farm areas

as well as outside suffered more from the drought in the north-east monsoon period than the cottons on the farm, for want of repeated interculturations and deep ploughing.

(b) *Cambodia Cotton*.—Work with this crop consisted chiefly in distributing good seed amongst the ryots. For this 7,539 lbs. of good kappas were purchased, ginned and good seed was kept for distribution. Out of 4,031 lbs. of good seed obtained 3,089 lbs. were sold. Demand for this seed seems to be gradually decreasing; the chief reason being that Cambodia cotton cultivation has extended far and wide in the district and that the ryot can get his seed supply almost anywhere.

(c) *Green Manures General*.—For want of sufficient hands, the work in this direction could not be pushed ahead.

Dhaincha seed farm areas.—Last year when attempts to grow Dhaincha for seed as a mixed crop on land taken in lease for the purpose failed, some hope of solving this problem was discovered when the department was able to buy nearly 2,032 lbs. of seed from ryots amongst whom 41 lbs. of this seed had been distributed for sowing with the promise that the department would buy all the seed they produced for sale. Accordingly this year both at Nandyal and Sirvel nearly 103 lbs. of Bengal dhaincha was distributed to 22 ryots, who brought 1,865 lb. of seed for sale. This seed was bought at the rate of 5 Madras measures a rupee equal to roughly 17½ lbs. At the beginning of the year Nandyal farm had a stock of 2,065 lbs. Thus the total quantity of seed kept in stock during the year amounted to 3,930 lbs. of which 2,507 lbs. has been sold up to date.

Wild indigo.—During the year in November enquiries were made regarding the supply of wild indigo from Devarapalli and its vicinity in the Kistna district. Wild indigo grows in these parts and since the people are not accustomed to its collection and are more in the habit of collecting Cassia tora for which they get 3 to 4 rupees a bag of 50 Madras measures, it was not possible to obtain large supplies of wild indigo. The Karnam of Devarapalli was, however, kind enough to procure for the department 505 lb. of this seed for Rs. 19-13-0. This is a very cheap rate and cheaper than the consignments we had before from Bethamcherla in Kurnool district.

(d) *Indigo*.—For want of imports in artificial indigo from Europe, a fresh impetus has been created amongst the ryots to cultivate indigo with the hope that the once lost trade in this dye would revive and better profits for its cultivation be realized. The demand for this seed at Nandyal rose to such a height that the supply was hardly able to keep pace with it. A grant of Rs. 500 was allotted to Nandyal farm to lay in seed for distribution. 15,992 lbs. of seed were distributed.

(e) *Paddy demonstration plot*.—The paddy demonstration plot at Nandyal continued as usual demonstrating single transplanting of paddy. The demonstration was a success in as much as we were able to get as good a crop as ryots do, using 18 lbs. of seed per acre against 70 or 80 lbs. in vogue.

(f) *Treatment of sorghum seed for smut*.—An attempt to expand this branch of demonstration work was made this year. A two-per cent. copper sulphate solution was prepared in the presence of several ryots and sorghum seed of both varieties (early and main) was steeped in the solution for about 15 minutes before it was sown on the field. Farm Manager M.R.Ry. M. Raghavulu Nayudu, conducted the campaign. Nine villages in Nandyal, Sirvel, Nandikotkur and Dhona taluks were tackled and seed for 179 acres of crop was treated. The Farm Manager personally conducted the steeping of seed in all cases.

(g) *Patimannu substitute Experiments*.—These experiments are now being conducted in the deltaic portion of the Guntur district in about seven different stations. As usual a green manure crop of indigo was sown mixed with sunn-hemp, but owing to the failure of the former for the second year artificial manure was again resorted to. Castor cake at the rate of 330 lbs. per acre and Superphosphate at 112 lbs. per acre were applied. At Zampani in Tenali taluk the experimental plot was washed away during the floods. Out of the remaining six experimental plots the results in four of them seem to be encouraging. As these have passed through their second year and are now in their third year course, it is yet too early to say anything definitely about these results.

Nandyal Agricultural Station.

Season.—Unlike the three years preceding, the annual rainfall was heavy, being 29.09 inches which is only about 3 inches less than 40 years' average. Though this amount was sufficient and satisfactory, yet its distribution was very irregular and unfavourable to most crops except cotton. During the south-west monsoon months, between June and September, a total fall of 21.61 inches was received and this was distributed over 64 days with several heavy down-pours in the interval. Both cotton and sorghum were however sown in good time. Owing to this heavy and continuous fall during this period, indigo which was sown in July suffered and in the case of a single plot it had to be resown. Rains of the north-east monsoon were different in character. They amounted to 2.02 inches for the whole period, of which 1.20 inches was received on a single day and the rest distributed over six days. Dry weather prevailed during this period to a great extent. Consequently sorghum suffered heavily. The

farm land cracked deep, creating a necessity for repeated inter-culturings especially in the case of cotton.

Cotton.—The total area under the crop is 37.58 acres an increase over that of last year. It is, however, not possible to record the average yield of this crop as pickings is still being done. The average yield as estimated will approximate to about 260 lbs. per acre.

Sorghum.—This is second in importance on the farm occupying about 21.81 acres. This crop fared very badly on account of bad weather during the north-east monsoon period and its yield excluding single plant selections has been recorded to be only 299 lbs. per acre. This is less than half the average yield of the district, under normal conditions.

Bengal-grass.—The area under this crop amounted to 26.85 acres. This was put in at the right time. It started vigorously at the outset and promised to give good results. But owing to want of sufficient dew in the cold season, its growth was checked and an average yield of only 91 lbs. per acre was obtained.

Seed distribution.—The following quantities of seed were distributed from Nandyal Farm:—

Seed.	Lbs.	Quantity.
Cotton Plant No. 2	37,774	
" Ordinary Sircar	2,392	
" Cambodia	3,089	from the farm and 279 lbs. by the Farm Manager, Samalkota, credited to this farm account.
Dhaincha	2,507	
Wild indigo	580	
Cultivated indigo	15,992	

Implements.—Two applicants were supplied with cotton seed ploughs for a short period. Their lands were broken open to minimise the loss of seed from weeds. In both the cases they were satisfied with the work of the plough. One ryot loaned Sampson's Harrow from the farm and used it on his fields.

The distribution of cotton seed on the farm attracted several people to visit the farm during the cotton sowing period.

New works and improvements.—To provide more accommodation, the office room was extended at a cost of Rs. 473-9-4. Repairs to Farm Manager's and Assistant Farm Manager's quarters were undertaken and completed. The big forest rest-house situated east of the farm was handed over to the Agricultural Station on 28th May 1914 and the second rest-house near the farm will be taken over shortly. This new acquisition will provide accommodation for one of the officers of the farm staff which is badly wanted.

Sirvel Agricultural Station.

Season.—The south-west monsoon started late this year. Neither arika nor drill-paddy was sown till the end of July. A great portion of the rainfall fell continuously during the months of August and September; checked the growth of the crops, and prevented after cultivation to a serious extent. In addition, the drought that prevailed during October, November and December coupled with the failure of water-supply, caused great anxiety amongst the ryots of the locality who suffered great losses at the failure of crops. On the farm no experimental work was done this year. Attempts to raise crops to test the initial fertility of the soils ended in failure owing to reasons stated above. One point, however, is worth putting on record in connection with this Agricultural Station and that is the success of the green manure crop (sunn-hemp) on the wet land. With the help of irrigation water from the canal, sunn-hemp at the rate of 28 lbs. per acre was broadcasted towards the end of July in about 15 acres of the wet land. Germination was satisfactory. The crop grew luxuriantly and the quantity of green stuff obtained when it was cut and trampled at the beginning of September amounted to 11,500 lbs. per acre. This was more than sufficient for the area on which it grew, while the total cost of production was only Rs. 6-3-2 per acre.

New works and improvements.—A third block (dry land block No. 2) of about 9.52 acres was taken over in June and fenced during the year. The construction of a manure pit, a cattle shed, an office, the sinking of a well and the erection of the rain-gauge were all completed during the year. The building of a seed-store was commenced, but the work is not yet finished.

K. RAMASASTRULU NAYUDU,

Assistant Director of Agriculture, Northern Division.

4th May 1915.

ADMINISTRATION REPORT OF THE DEPUTY DIRECTOR OF AGRICULTURE, SOUTHERN DIVISION, FOR THE YEAR 1914-15.

I have the honour to submit the administration reports of the Agricultural Stations under my charge.

I was in charge of the Southern Division for the whole period under report except for 20 days on privilege leave from 3rd June 1914 and for 17 days when I was on special duty in connection with the Madras Agricultural and Trade Conference which was held in December last. Mr. K. Ramasastrulu Nayudu was my assistant until 2nd June 1914 and acted as Deputy Director during my absence on privilege leave till 23rd June 1914, when he was transferred to the Northern Division; after that I was without an assistant until 4th December 1914 when Mr. R. Thomas, Probationary Deputy Director of Agriculture, was posted to this division to assist me.

With the exception of the following changes and transfers in my subordinate staff the work in this division has been uninterrupted and it has been possible to develop this along the lines already laid down.

Farm Manager M.R.Ry. K. Sankara Ayyar, on return from leave on 3rd June 1914, was posted to Madara district for the introduction of green manure crops on lands under the Periyar irrigation. He relieved Assistant Farm Manager, T. A. Krishna Ayyar, who was transferred to the Manganallur Agricultural Station taking the place of Assistant Farm Manager, K. Ramanuja Achari, who was transferred to the Northern Division.

Assistant Farm Manager, M. Raman, was transferred from the Koilpatti Agricultural Station to district work under Cotton Improvement on 9th August 1914 and has been working in the north of the Tinnevely cotton tract where up till then the department had not done any organised work. His place was taken by the Assistant Farm Manager, Rajagopal, G. Mal, newly appointed. Assistant Farm Manager, K. Raghava Achari, was transferred from the Koilpatti Agricultural Station on 5th January 1915 to work under the Government Lecturing Botanist at the Agricultural College, Coimbatore, his place being taken by the Assistant Farm Manager, K. Gopalakishna Raju, who was transferred from the Central Division. Second-grade Farm Manager, M.R.Ry. K. Unni Krishna Menon, was transferred from the Taliparamba Agricultural Station to the Central Agricultural Station, Coimbatore, on 6th June 1914 and his place was taken by Assistant Farm Manager, M. K. Nambiar, from the Central Agricultural Station, Coimbatore. Rao Sahib M.R.Ry. A. Rama Rao was newly appointed as Farm Manager and was posted in charge of the Manganallur Agricultural Station. Most of these changes have meant putting officers of greater experience on to the more responsible duties of district work and filling vacancies of the Agricultural Stations with newly appointed and inexperienced officers. The development of district work in the neighbourhood of the Agricultural Stations has also greatly assisted in the training of newly appointed officers who have much to learn not only of the conduct of district work, but in their bearing and friendly relationship to actual agriculturists. They soon realise that what the ryot has learned by actual experience is not to be treated lightly and that their own knowledge of theoretical and practical agriculture can be greatly extended by a closer acquaintance with those who have been trained only in the school of experience.

It has this year been possible to again carry on district work in the Tanjore district, so far this has been mainly confined to the Mayavaram and Shiyali taluks. It will be remembered that great effort was made in the past in this and other taluks to introduce the practice of single seedling planting. This appears to have become fairly general for the time being, but has now been modified into what might be termed economic planting, i.e., two to three seedlings planted together. The reason given for this shows in what a degraded position the agriculture of these taluks stand. It is stated that single planting although it gives increased yields for one or two years reduces the fertility of the land, which without manure cannot stand this increased drain; and that subsequent yields are less. It is difficult to understand how any farmer can take up such a standpoint, for, it must be abundantly evident that the increased outturn of grain much more than pays for the cost of manuring. At the same time it opens up a large field of work in the introduction of green manuring and better methods of manuring generally. Already in consequence of this years touring work by an officer of this department there has been a marked increase in the sale of green manure seeds. These sales, which amounted to 13,327 lbs. of Kalinga (*Tephrosia purpurea*), considerably exceeded our estimates and would have been still greater if further quantities of seed had been available.

On the West Coast, the district work is still conducted by the staff attached to the Taliparamba Agricultural Station. The area under Mauritius canes in the South Canara district again shows a marked increase and steps have been taken to introduce this into the Uppinangadi and Kasaragode taluks. The following figures, kindly obtained by Mr. Couchman, the Collector of the district, show that the area of improved canes has more than doubled in one year. Previous years' figures have been included for purposes of comparison.

Taluk.	Area of canes in		
	1913.	1914.	1915.
Oondapoor	29.67	67.21	92.87 representing 68 villages.
Udipi	34.40	89.50	228.58 " 57 "
Karkal	1.75	0.00	2.50 " 2 "
Mangalore	17.85	31.00	97.02 " 18 "
Uppinangadi	...	...	2.23 " 4 "
Kasaragode	...	...	.10 " 1 "
Total	83.67	198.80	424.50 150

Mr. Couchman writes that beyond the extension of cane to Uppinangadi and Kasaragode taluks there is not much more that need be done to assist this crop.

With reference to the figures given above he adds that the largest area under these canes is in the village of Bangra-Kniur, Mangalore taluk, where there are forty acres. The next largest area is in Uppur village near Udipi with 37.60 acres. Of this total area all is red Mauritius except twelve acres of Barbados 208. This latter is a promising variety and is likely to increase on the islands where there are fewer jackals. Much of the credit of this work is due to Mr. Couchman, who keenly interests himself in the work of this department and in the improvements of the Agriculture of this district.

At the request of the Collector, steps were taken to introduce the bullock mhoite in place of the South Canara picotta. This latter water-lift makes a great demand on human labour, which owing to the rise in price of such labour, renders the cultivation of paddy in the dry season very speculative. Moreover, the increased area under cane in many places renders the introduction of more efficient means of lifting water imperative. Nine such mhoites have been fitted up for farmers this season. All the parts of the mhoite have been made in the district itself and buffaloes and cattle have been trained to the work.

Trials of daincha as a green manure crop last year in the South Canara district were fairly successful in spite of the failure of the April-May rains; and a considerable extension of the practice has followed the season. A small quantity of seed was, last season, collected by the owners of these crops and additional requirements were supplied and sold by the department. These crops are chiefly in the neighbourhood of Mangalore. This work is of the first importance, as the coast tracts are hard put to, to obtain green leaves for manuring the wet lands.

A certain amount of progress has been made in the improvement of paddy cultivation in Malabar. Trials made with cowgram as a green manure were disappointing this season owing to the failure of the April-May rains on which the crops were dependent for water and only one or two demonstrations proved successful. Such failure is the exception, however, and not the rule. Further trials will again be made this sowing season. For the same reason the germination of paddy seed-beds which are also dependent on these rains was everywhere sparse and thus more economic planting had perforce to be adopted throughout the district. In spite of this many members of the village societies, started the previous year, testify to the advantages of economic planting. This success must very largely be attributed to the better preparation and manuring of the seed-bed which is insisted on by the department as one of the essentials to success. There was abundant testimony this year to the benefit derived from using selected seed, which was the produce of the crops grown on the Taliparamba Agricultural Station and, for this coming season, most of the seed available on the Agricultural Station has been sold to members of these village societies. This is in spite of the fact that the price for the seed has been fixed above the market rate in order that those who purchase it will better appreciate its value.

Cane cultivation in Malabar has received a considerable impetus owing to the rise in price of the jaggery and is being cultivated in 13 different centres in the district.

The extension of intensive dry land cultivation is slowly spreading, though as mentioned last year it has received a considerable check on account of the fall in the price of ginger. Chillies, however, are still a profitable crop and the cultivation of this is extending. Over 10,000 seedlings besides 2½ lbs. of seed were sold from the Agricultural Station last year. The residual effects of the manures applied to Chillies, Ginger and Turmeric have proved to be very considerable and the subsequent cereal crops have been known to yield as heavily as good wet lands.

The officers attached to the station have, between them, been 365 days on tour.

Work in the neighbourhood of the Koilpatti Agricultural Station has continued on the lines mentioned last year. The scope of the work has been enlarged and a new circle has been opened which includes the cotton tract between Sivakasi, Virudupatti and Satur. For the proper control of the work, the black soil tracts have been divided into four circles one of which is worked by the officers attached to the Koilpatti Agricultural Station and the other three are each under the charge of an Assistant Farm Manager. Owing to the rapidity with which the work of introducing drill cultivation was expanding, it was felt to be necessary to further divide the work; and each circle was this year divided into four or five divisions. Each division contains from about 8 to 12 villages where work was contemplated or already in

progress. A temporary head cooly was appointed to each of these divisions, these being selected from the best coolies trained in previous years. Each division was allotted coolies, implements, etc., and the Head cooly was responsible to the Assistant Farm Manager for their proper distribution to wherever these were wanted. This has always been a difficulty as sowing can only be done when the soil is fit after rain and the unequal distribution of the rain will often allow of work in one village while it will be impossible in another. Except in the new circle all coolies employed were drawn from the villages in the division in which they were to work. Those who required training were trained on the spot and it was thus possible to get a much better class of cooly, many of them being sons of respectable farmers. The results of this organisation have been entirely satisfactory.

It is necessary to again plead the excuse of unfavourable weather conditions hampering the work. The season everywhere was late and the soil seldom got a chance to dry sufficiently to sow. This was especially unfortunate in the new circle around Satur. Here usually sowing is over by the beginning of October, but this year it was continued right into November. In the south the rains were extremely heavy and so wet were the soil conditions that the cotton crop had in some places to be sown three times before a stand was obtained. The last sowings were not completed till the beginning of January. In spite of this the area under drill cultivation increased from 7,117 to 11,329 acres. Work extended to many new villages as well as in villages where improved methods of cultivation had already been introduced. It is very encouraging to see how ryots adapt these implements to suit the season. In one village implements for inter-cultivation and even the country plough were used to open up and dry the land instead of being used to merely loosen the surface in order to conserve soil moisture. In other villages ryots were most thorough in their after-cultivation and when questioned as to the reason of their zeal stated that previously many had noticed that this after-cultivation greatly improved the land for the succeeding cereal crop.

The crops raised from unit strains have not in all cases given results as good as were expected. The seed distributed in the new circle around Virudupatti has been especially disappointing. In the previous season Mr. Steal had given this cotton a trial and he writes that this yielded at the rate of 452 lbs. per acre over an area of 13.89 acres. This year, however, the yields of crops raised from seed of the same strain will not, it is estimated, yield more than if as much as 250 lbs. per acre. In the initial stages, this crop was very promising, but many of the flower buds and young bolls shed before they matured. It is very probable that the heavy rains in this year caused the plants to develop a surface root system which would prevent them withstanding the effects of dry weather when this set in. The superior germination of the seed also was a drawback. The plants were much too close and it was noticed that whenever the plants had sufficient space to develop shedding of buds and young bolls was not so severe. Another unit strain (Company No. 3) grown in this tract is promising although it has not done as well as was expected. Here again the season was against it. It is unfortunate that this has happened in the first year of our extension of work to this area. From Koilpatti southward the unit strain (Company No. 2) grown on seed farms as well as by private growers is doing well and has given great satisfaction. Even here, however, in a few villages the crop has shown a tendency to run to vegetative rather than reproductive growth on account of the very wet season. It is estimated, however, that this will yield 25 per cent. more than the ordinary karunganni. The ordinary karunganni cotton of which a bulk selection is each year made on the Koilpatti Agricultural Station has also done very well this season and is cropping heavily. There has been a very considerable extension in the area under karunganni. Twenty-five different villages arranged for co-operative ginning of kappas for seed purposes and over 600 pothies of seed were stored by them for sale. Most of this was sold for seed, though some appears to have been used for cattle food. Besides this many villages had not sold their cotton when the war commenced and they therefore had to arrange to hand gin their kappas. Much of the seed thus obtained was available for seed. Four hundred and seventy-five pothies or about 117,400 lbs. of seed were sold by the department or issued for growing on seed farms. All the officers responsible for this cotton improvement work have shown great enthusiasm and energy, and to them is due the credit of what success has been achieved this year.

In the Periyar irrigation tract two full-time officers have been employed; one with headquarters at Sholavandan and the other at Madurai. Their work has been confined chiefly to the introduction of green manure crops, but, besides this they have endeavoured to improve the cultivation of the paddy crop generally. The work around Sholavandan has developed very satisfactorily and considerable areas of both Daincha (*Sesbania aculeata*) and Kolingi (*Tephrosia purpurea*) were grown, the former on old wet lands and heavy soils and the latter on the lighter new wet lands. Speaking generally, Daincha has given marvellous results on lands which are saline while on sweet lands its effect is not very marked. One case was reported where the yields from saline land was five times as much as the land had ever been known to yield before. Such results are gratifying but at the same time they do not always help on the work. Ryots who own sweet land very naturally think that if a green manure crop gives such results on saline land it ought to do much better on good sweet land, but they do not realise that very often salt lands are abundantly supplied with plant food which as long as their mechanical texture is so poor and drainage practically non-existent,

the paddy crop cannot make use of. These results therefore seem to point to the fact that the value of green manure crops is very largely mechanical.

Trials are being made with superphosphate applied in small quantities as a supplementary manure to green manures on sweet lands. Trials also are being made with manuring the green manure crop with superphosphate by which means it is thought that the green manure crop might grow more vigorously and at the same time take up the phosphate which, when the green manure crop was ploughed in, would be liberated for the use of the succeeding paddy crop. Work in the Sholavanam circle is much more advanced than in the Madura circle. This is very largely due to the fact that work was concentrated within a small area. This circle is the apex of the triangle forming the Periyar tract and at first very little progress was made here owing to the proximity of hilly tracts where green leaf was procurable. It was decided therefore that it was necessary to make this circle much similar to the Madura circle so that more detailed work could be done, and the results of this have been eminently satisfactory. It also points to the necessity there is for a large increase in subordinate staff if definite results are to be achieved. Recent sales of green manure seeds in the Madura circle show that the work here is getting a hold and it is expected that considerable progress will be made if the work is undisturbed. Much depends on the officer in charge getting to know the circle and being on friendly terms with the villagers. Early work in this circle was much handicapped by the zeal, which was often genuine enough, of absentee landlords who wished their agents to work with the department in the trial of green manure crops; but, as the success of green manuring is adverse to the immediate interests of the agent, such trials are in most cases bound to end in failure. During the latter part of the period under review this work in the Periyar has been under the charge of Mr. R. Thomas.

District work in the Coimbatore district continues to expand. The introduction of single planting of paddy in the Bhavani valley has been very successful and large areas under this system may be expected next year. There are still some reaches under the Kodiveri anicut where this system has yet to be introduced, but where tried last year the spread of this system should now be largely automatic. Some progress has also been made in the Cauvery valley, while similar work has been continued in the Noyil valley near Coimbatore and has been started in the Amravati valley both in the Udumalpet and Dhārāpuram taluks. Trials with green manure crops are also being made in all these places and it should be possible next year to report on this success.

Trials with fish manure had to be restricted owing to the supply of this commodity from the West Coast being again a total failure. Many ryots who had applied for manure could not be supplied, while the supplies reached others when it was too late to use the manures for the crops for which they were required. From the fact that ryots were willing to pay considerably more than the current rate for this manure, it shows that they realised its value from previous trials. Evidence seems to show that this manure is of much greater value when applied to heavier types of soil.

The officer in charge of the work in this district has also had charge of the green manure work in the Trichinopoly district. This was started at the instance of the Collector who asked, in the interests of both the people themselves and of the reserved forests, that attempts should be made to introduce green manure crops in those parts of the Musiri and Perambalur taluks adjoining the Pachamalai hills. In the Musiri taluk, daincha as a green manure crop seems now to be firmly established. Here the green manure crop is raised mixed with cumbu and irrigated when necessary from wells. Although the daincha, which in some cases grows as high as 12 to 15 feet, considerably decreases the yield of cumbu, the value of the green manure crop greatly outweighs the loss of grain. It enables the wet lands to be manured expeditiously as soon as water is received and thus the paddy planting is soon completed in good season. It saves the expense of carting from the forests which is often no small item, even when only the damage done to carts and the cost of maintaining expensive cart bullocks is taken into consideration. Last year over 1,000 acres were grown with daincha in these two taluks and very often the growth was so great that the crop from one acre was ample to manure two or three acres. In Musiri taluk the ryots now make their own arrangements to collect seeds and are thus independent of the department's help. In fact, this year the department have been able to buy up their surplus stock for distribution elsewhere. In Perambalur taluk no seed was collected and the department has again to render assistance by selling seed there. As, however, the conditions under which the crop is grown are similar to those in Musiri, this tract should be able to supply itself with seed from next year forwards.

Trials with superphosphate as a supplementary manure to the green manure crop are being tried in the coming season.

In addition to this organised work, a certain amount of success is acknowledged by correspondents who have acted on the written advice of the department. Wherever such response is met with endeavour is made to send an officer of the department there to follow up any work started, and it is thus possible to establish what might be termed a clientele which will pave the way for the time when organised work throughout this division will be possible.

During the year under report 1,298 letters have been received from private individuals asking for advice, etc.

Koilkatti Agricultural Station.

Season.—The hot weather rains were favourable and resulted in a good summer on second season picking of cotton. The main season, however, was again late. Except for an unusual rain of 1½ inches in August which was of no value for agricultural purposes, there was no fall of rain sufficient to be of use till the end of September and with the aid of this the red soil crops were sown. The black soil crops were practically all sown in October, but the season was very unfavourable: there were 29 rainy days between October 2nd to November 10th and continual cloudy weather. Anyone who has experience of black cotton soils will realise the difficulties to be contended with. A few of the crops had to be resown, while others such as several of the pulses could not be sown at all. It was not until the middle of November therefore that any weeding or essential operations in the after-cultivation of the crops could be done. Weeds had a free field in which to develop and these combined with the wet soil conditions greatly checked the growth of the tender crops. The fine weather in the later part of November was, however, fully utilised, and the crops were just recovering from the excessive rain when another spell of wet weather occurred in the beginning of December, which again stopped all field work. Cumbu especially suffered from the lack of inter-cultivation while a heavy fall of rain at Christmas time just caught the crop when in full flower and as a result the grain yield was still further reduced, and an average of only 100 Madras measures (about 300 lbs.) of grain was obtained. In many other parts of the district the yields were relatively much less. The cotton crops also had suffered severely from the weather conditions, but as this improved they made rapid development; with abundant moisture in the soil, this development was too luxuriant and the crops were unable to maintain this standard as the soil became drier. Fortunately a heavy rain in the end of February saved the situation for the time being; but the crops had never really made a deep root system and thus could not stand the dry weather conditions which were bound to follow. This was shown by the heavy shedding of buds, flowers and young bolls, which occurred as soon as the hot weather commenced. On the Agricultural Station this was not so severe as might have been expected but outside, especially north of Koilkatti the crops have suffered severely. Crops which looked as if they would give 500 lbs. of kappas have, in some cases, not given more than a quarter of this amount. On the red soil the rains were much too copious. The soil for weeks on end was thoroughly water-logged and as the land is situated on the foreshore of a tank it was impossible to remedy matters. Weeding was impossible and these soon gained the mastery of many of the crops. Nothing could be done to save them as it was impossible to get on to the land. When fine weather did prevail in the land had set hard and weeding proved a very costly matter. The Cambodia cotton and Cow peas were the only crops which really recovered to any extent.

Black cotton soil work.—The introduction of a double furrow disc plough has added much to the efficiency of the cultivation and the consequent cleanness of the land. This has entirely replaced the "cotton soil" plough. It is of lighter draught and does nearly twice the amount of work. The adjustments make it possible to accurately set the implement to various depths of ploughing. As already mentioned in one of the annual reports of this station, it has been found quite possible to keep "hariali" grass in check by surface manuring the fodder cholam crop and by deep ploughing immediately after the harvest. This method has been adopted on all land on which fodder cholam had been grown and these lands are now practically free from this weed. It was necessary here and there to dig out isolated plants which were found not to have died but this was accomplished without any difficulty as the soil had been pulverised by the ploughing. The same plough set at 6 inches has been used for fallow ploughing after the removal of the recent cumbu crop. Thus it has been possible to get much of the fallow ploughing done before the soil was moist enough to allow the country plough to do the work. This implement, known locally, as the "Chatti" plough, has attracted considerable attention in the neighbourhood and an additional one has been purchased by the department which will be hired out, with a view to subsequent purchase, to the Avalattam Co-operative Agricultural Association.

Considerable progress has been made in the protection of the fields from wash. Most of the field drains as well as the main drain have now been revetted. Washes do still occur, but not to the same extent as formerly since the revetment has greatly improved the levels of the fields.

The introduction of Periamanjil Cholam from Coimbatore has meant a large increase in the fodder supply. This variety has now entirely replaced the local Irangu cholam on the farm as a fodder crop. It not only gives a considerably heavier yield, but is a much more leafy fodder and therefore more palatable. Several ryots obtained seed from the department last season and all speak well of it and there has been an increased demand for seed for sowing in the next season. The only objection to this is that seed has to be imported from Coimbatore as this variety does not set seed properly in Tinnevely.

The work of cotton selection continues on the lines already laid down.

Company No. 1 which was put out last season in the district has not proved a success. It gives a very fine lint and reports on its spinning value compare it very favourably with

imported American. The acre yield, however, has proved disappointing and only averaged 250 lbs. per acre on the seed farms. At Virudupatti, however, the yield averaged 450 lbs. This strain was therefore issued in that tract this year. But though very promising when young; it has proved most disappointing. The season was very much against it as the rains were much too heavy to enable the crop to develop a deep root system.

Two other strains were put out in the year under report. One named Company No. 2 was issued in the south of the tract and being an uneven ripening cotton, has responded very well to this wet season. Spinning reports say that this cotton is as good as the preceding one in all respects, except that the colour is not quite so good. The other strain put out this year and named Company No. 3 is also promising and in a normal season should do very well. So far, however, its cultivation has been confined to seed farms. It is too soon yet to say so what the acre yields will be. The largest seed farm of this is near Koilpatti and the yield is estimated at 500 lbs. per acre of which 375 lbs. per acre has already been picked. This is an even ripening cotton with a ginning percentage of over 33 per cent. and it is hoped that this will prove useful in supplanting the jari or pulichai cotton, an inferior variety which is now largely grown in the Rāmnād District. Spinning reports say that this is not quite so good as Company No. 1, but it can be used for spinning 40s. The bulk selection karunganni has done remarkably well this year throughout the district and promises to yield a heavy crop.

New works.—Quarters for an Assistant Farm Manager have been built during the year under report and a kappas shed has also been put up. This latter was necessary as all seeds farm kappas is now ginned on the Agricultural station during the year. 780 pothies (1 pothie = 246 lbs.) of seed-farm kappas, inclusive of the crops grown on the Agricultural station itself, were ginned.

The work this year has been exceptionally heavy on account of the increasing district work in the neighbourhood of the Agricultural station, all of which has to be attended to by the officers stationed here. Farm Manager M.R.Ry. N. S. Kulandaiswami Pillai deserves special mention for his work which has meant detailed supervision and constant touring. The Assistant Farm Managers though only recently appointed have also done good work and have spared no pains to learn the work and to assist the Farm Manager in his duties.

Manganallur Agricultural Station.

Season.—There was a certain amount of delay in planting the first crop paddy, i.e., the kuruwai and "udu" * crops owing to water not being received in the channels till the first week in July. The result of this late receipt of water was that the kuruwai was not ready for harvest until the heavy rains of the north-east monsoon were received and the ottadam (the late crop of udu) which was only cut during these heavy rains, could not benefit by them for its second growth. Thus there was a considerable loss in yield from the kuruwai both from shedding and sprouting in the field, while the quality of the grain stored was lessened owing to the very wet weather conditions at the time of harvest, and the difficulty of drying threshed grain. The ottadam subsequently recovered somewhat in condition as good rain was received early in December.

A heavy fall of rain in August did serious damage to recently sown samba seed beds. As a result of this, the supply of seedlings was found insufficient for the whole samba area to be transplanted and seedlings from outside had to be purchased. This proved a useful demonstration which showed the great superiority of our seedlings raised from selected seed and those grown by ryots outside from their own seed. The difference in yield amounted about 18 per cent. in favour of our own seedlings when compared with yields of adjoining fields under otherwise similar treatment and manuring; except for this the season was very favourable to the samba crops.

Crops.—Owing to the uncertainty of the water supply both at the beginning and end of the season the greater part of the double crop area was planted with "udu" instead of with two crops. The "udu" has been much the more profitable system of cultivation for besides saving the cost of second crop cultivation, the yield from a block of over seven acres has this year been 1,231 Madras measures (799 kuruwai and 432 ottadam) against an yield of 997 Madras measures (681 kuruwai and 316 samba) obtained last year. This does not mean to say that "udu" is always the more profitable system but under local conditions with the uncertainty of water supply at either or both ends of the season it certainly is.

The quality of the crops throughout the farm and of the sample of grain obtained this season was a marked advance on that obtained the previous year. By a bulk selection all varieties of paddy now grown are true to type and this year the crop has been stored and is being issued for sale to the public as seed grain. Several unit selections are under observation and some of these appear quite promising. The examination of these, however, entails a considerable amount of work on the staff. Of varieties introduced none of them appear to be superior to local ones. This is probably due to some extent to the soil conditions under which the crop is grown. A change from ordinary wet land to a heavy delta

* A mixture of a three and a eight month crop.

soil which lacks free drainage seems a probable cause for this. For example this year's sadai samba crop was not only inferior to that grown last year from seed imported from the adjoining district, but also took considerably longer to mature. If this conclusion is correct it seems clear that any attempt at improving existing varieties either by selection of plant breeding should be done on the spot and arrangements to this end are being made in co-operation with the Government Economic Botanist.

The manurial experiments started last season and continued this year on more carefully selected plots, have not given any definite results as shown by crop yields; but from observation of the growth of the crop it is evident that as regards manuring the main question apart from improving the mechanical texture of the soil, is the supply of phosphatic manures, and further experiments to determine what quantities can be most profitably applied will be commenced this coming season.

The difficulty of growing green manure crops on these heavy delta soils has not yet been solved. It is possible to get a good germination of these by sowing in the moist ground before the paddy harvest, but without subsequent rain it is impossible to raise these crops owing to the deep cracks which form immediately after harvest and which rapidly deplete the soil of its moisture besides tearing asunder the roots of the green manure crop.

The difficulties attending the harvesting operations have not diminished with the increase in the number of experimental plots, which have all to be harvested separately; although a considerable area was cut, bundled and stacked for subsequent threshing.

The disease known as "surai" and reported to be due to a mite caused a certain amount of damage. This was specially noticeable in the sadai samba crops. The caterpillar, which attacked the ripening crops last season and which caused so much loss, did very little damage this year. Steps were taken to keep the field bunds cut as it was noticed in the previous year that these caterpillars fed freely on the flower heads of natural grasses and it was thought that, if these were prevented from flowering, the caterpillar would be deprived of its food on which it and previous generations could exist till the paddy crop ripened. Whether this was contributory to the lessened damage, it is difficult to say.

Tuliparamba Agricultural Station.

Season.—This has been peculiar, but on the whole favourable to crop production. The hot weather showers of April-May failed entirely, but fortunately the early part of the monsoon was irregular and instead of continuous rains and cloudy weather, there were heavy showers with intervening bright weather. In July the rainfall was much above the average and so also in August there being really no break till the third week in September. The September rains were exceptionally good while showers continue on into November and December. The whole season therefore was as if it had been a month late. The rainfall for the year was 147.57 inches and more than 30 inches of rain fell on 121 days. This compares very favourably with an average of 139 inches and 84 rainy days.

Wet lands.—The failure of the hot weather showers necessitated irrigation of sugarcane right on until June and for the same reason the paddy seed beds, which are rain fed, suffered severely, nor was the germination as good as usual. The bright weather in June, however, gave the newly-planted crops a good start and the yields were considerably better than last year. The grain has all been sold for seed at an enhanced rate and those who have grown it in the past speak highly of its superiority over local seed. Of the canes grown, B. 147 continues to do well and sets of this have been distributed to selected cultivators both in Malabar and South Canara for further trial. Another cane, a sport of Red Mauritius which was found in Malabar, is also promising. Except for these two and Red Mauritius, B. 208 and a few varieties grown for the sugar-cane expert, all other varieties tried have been discarded as unsuitable for West Coast conditions.

Pepper gardens.—These suffered very severely from the seven month drought from November till May. The last two months, when only 1 inch instead of about 8 inches of rain fell, were especially trying owing to the high temperature of the air and soil. The lack of rain at this time not only checked the pepper vines, but also delayed the fresh growth of the shade trees and thus the vines felt the dry hot weather all the more severely. When the monsoon commenced, the vines had lost all their leaves, a condition which has never occurred before since the Agricultural station was opened. Thus the vines had not only to form new leaves but had to form its fruit in the monsoon. Fortunately the bright weather in June enabled them to do so and this coupled with the good rainfall of the north-east monsoon which continued until December, resulted in a record crop. Two points specially noticed which presumably were due to the season were:—

(1) That "pollu" (a disease caused by the larva of a flea beetle boring into the berry) which usually causes much damage was hardly seen this season.

(2) All vines which received heavy manuring with concentrated manures except in the case of a few moist low-lying plots gave reduced yields. This would have been expected as naturally such plots would develop more of a surface root system and would therefore feel the effects more of, and take longer to recover from, the prolonged dry weather. The fact that

the pepper harvest did not commence until six weeks later than usual shows how severely the vines had suffered.

It is fortunate that, at a time such as the present when most West Coast produce is suffering from low prices, the pepper should have yielded so well and the price also should be satisfactory.

Dry land crops.—It was not possible this year to get these crops established before the monsoon commenced. It was impossible to time the sowing of ragi seed beds properly. Sowings were made at the usual time, but as rain held off fresh sowings were made. Planting could not be done till well into June and the former seedlings were by that time too old while the later sown seed beds were still too young. The result was that the yields were only a little more than half those obtained in the previous year. Both ginger and turmeric should have been well established by the commencement of the monsoon, but neither of these crops showed above ground when this commenced. Fortunately the subsequent weather conditions favoured the crop and it made a fairly good recovery although many sets failed entirely and there was not a full stand. Ginger is still being grown although there is no sign of the market improving. At present prices it does not pay to grow and this must have been the cause of considerable hardship in the Ernad taluk which is the home of the West Coast ginger crop. Chillies have again proved a valuable crop and have done well in spite of late planting. Having now proved the value of intensive dry cultivation in Malabar, trials with concentrated manures have been arranged for this coming season in order to see how far it will pay to supplement the local manure supply.

The district work which is conducted by the staff of this Agricultural Station has already been referred to. This is continually on the increase. Interest in agricultural matters seems to be awakening in Malabar and many requests are received asking for local advice on agricultural matters. The Collectors of the West Coast districts have continued to interest themselves in the work of this department and their help is gratefully acknowledged.

His Excellency the Governor's visit to the Agricultural Station has left a deep impression in Malabar and has aroused considerable interest among the agricultural classes in this Agricultural Station. People naturally infer that if His Excellency took so much trouble to visit an out of the way place such as this is, there really must be something worth seeing and learning there.

H. C. SAMPSON,

Deputy Director of Agriculture, Southern Division.

6th May 1915.

ADMINISTRATION REPORT OF THE DEPUTY DIRECTOR OF AGRICULTURE, CENTRAL DIVISION, FOR THE YEAR 1914-15.

Mr. G. D. Mehta, Extra Deputy Director of Agriculture, continued to be in charge of the division throughout the year with the exception of some ten days in March 1915 when he availed of casual leave. He was then relieved by Mr. R. Thomas, Probationary Deputy Director of Agriculture. The Divisional head-quarters were transferred from Cuddalore to St. Thomas Mount, Madras, on July 5, 1914.

2. In regard to district work a Farm Manager who devotes all his attention to district work has been stationed at Chittoor for the past three years; another at Chingleput since August 1914; and a third at Palur since February 1915. In previous years the district work has been largely confined to—

- (1) Economic transplanting of paddy;
- (2) Distribution of seeds for greenmanuring crops on paddy land.

But during the year under report a number of subsidiary lines of work have been taken up, the most important being—

- (a) Improvement of sugarcane cultivation and jaggery making;
- (b) Distribution of indigo seeds;
- (c) Organization of cattle breeding associations;
- (d) Extension of area under Cambodia cotton;
- (e) Assisting in management of Criminal Settlements and other lands;

In addition cropcutting experiments have been conducted as usual. The green manuring work had reached a scale where it would be practically impossible for one man to deal with it satisfactorily and at the same time continue extending the work in fresh tracts.

3. The work done at Palur, the only agricultural station in the division, is dealt with separately in this report.

4. The season has varied considerably within the division. Rains were excessive in the southern tracts (72 inches being recorded at Palur) while the average for the year for the Chittoor district works out to about 80 inches. The unfavourable season in the northern part of the division has very appreciably affected the progress of work there. The absence of timely rains curtailed the area which might have been transplanted with single seedlings.

and a fairly extended period of drought coupled with a very late south-west monsoon did much damage to those of the greenmanure plots that had succeeded in germinating.

5. But what has affected the cultivation of crops considerably more than this year's climatic conditions is the unprecedented state of the market caused by the European war. Thus the groundnut trade has received a terrible check (the market at the time of writing continues to be very dull and shows no immediate signs of recovery); the indigo dye industry is endeavouring to come into its own again; cereal grains are quoted at very low rates—paddy being 80 per cent. below pre-war prices; sugar is sold at enhanced rates, the jaggery market adjusts itself accordingly and the area under sugarcane in consequence shows prospects of considerable increase.

6. It is impossible to ascertain the actual area where economic transplanting of paddy has been conducted. The practice is very common in South Arcot district and it is estimated that some 10,000 acres have been transplanted with single seedlings in that district alone.

7. The appended table gives the quantity of greenmanure seeds distributed within this division in the course of the year. The total amounts to 19,886 Madras measures, sufficient to sow 4,262 acres:—

Variety.	Depot.						Total.	
	Palur.		Chinglepnt.		Chittoor.			
	M.M.	LBS.	M.M.	LBS.	M.M.	LBS.	M.M.	LBS.
Sannhemp	1,768	5,525	146	456	1,509	4,716	3,423	10,697
Wild indigo	8,882	29,617	1,750	5,833	919	3,330	11,631	38,770
Daincha	1,971	6,888	441	1,543	1,934	3,619	3,416	12,060
Indigo					336	1,092	336	1,092

It is a significant fact that practically all this seed has to be imported into the division from outside sources. Thus Bengal daincha seed is obtained from that Presidency. Wild indigo from Tinnevely and Rāmūd, and sannhemp from Gōdāvari.

With an ever increasing demand for greenmanure seeds it rests with this department to prove that growing these crops for seed purposes to supply the local market is a paying concern. With this object in view the various green manures have been experimented with on the farm. To date but little success has attended our efforts. The experiments are being continued.

8. (a) Though enterprising individual ryots in this division have in past years hired trained men from the Central Farm at Coimbatore to make furnaces for jaggery manufacture, it is only in the present year that the construction of improved furnaces for demonstration purposes has been made a definite part of the programme of a district officer. During the year five furnaces were constructed after the improved method. Of these, three were constructed to fit the local pan which is round bottomed and very heavy and which can make one and a half maunds of jaggery at a boiling; and two constructed to fit the improved, light weight, Coimbatore pan which can turn out at least three maunds of jaggery at a boiling. By using the improved furnace the fuel necessary for the boiling may be reduced by one-half if the Coimbatore pan is used and by one-fourth if the local pan is used. One bandy load of fuel is commonly used locally to produce one pothie (= 1/2 candy) of jaggery. Calculating the outturn of jaggery at ten candies per acre there is a saving of five loads of fuel which at Rs. 3 per load indicates a gross profit of Rs. 15 or Rs. 30 by using the local and Coimbatore pans respectively. From this should be deducted the wages of one additional cooly at Rs. 3 per acre of cane crushed, thus leaving a net profit of Rs. 12 and Rs. 27 respectively. A trained jaggery maker from Coimbatore was engaged for about two months to attend to this work.

(b) Another equally important improvement in regard to sugarcane cultivation which is receiving attention is the substitution of the ridge and furrow system of planting for the local haphazard system of planting on the flat. Figures for the area cultivated according to the improved method are not available. Around Palur and Nellikuppam where sugarcane is extensively cultivated this practice is commonly adopted.

(c) Sugarcane cultivation in South Arcot district has received a considerable impetus through the agency of the East Indian Distilleries Company at Nellikuppam a few miles from Palur. Their agent Mr. Neilson, reports concerning the area under cane in the Nellikuppam locality that "over an area of nearly 600 acres under cultivation for the present season (1914-15) I estimate about 20 tons of cane per acre which should yield approximately 1,500 tons of jaggery. The local area under planting for this season is about 1,800 acres." This is of interest in denoting the considerable increase in sugarcane cultivation which may be expected if present prices of jaggery rule for an extended period. Jaggery is now selling at Rs. 40 to Rs. 45 per candy (500 lb.) as compared with Rs. 25—Rs. 30 last July; and even at pre-war rates a minimum profit of Rs. 150 per acre could be normally expected by the cultivator.

Palur Agricultural Station.

(c) *Paddy varieties—first crop.*—The local varieties grown in the first crop season are generally very coarse grained. To determine if these may be supplanted by superior paddies a number of varieties have been introduced from the Central Provinces. Almost without exception the time these take to mature is too long to allow of their being grown as first crop paddies, for by so doing it is feared that the second crop paddies would be so displaced from their normal period of transplantation as to affect the yield. This year the season was favourable and high yields were obtained. *Parewa* has done best (3,898 lbs. per acre) which with *Chitrakali* have surpassed the popular local *Suvarnavari* variety in point of yield.

16. *Distribution of seeds, &c.*—The appended list gives the extent of distribution of seeds and implements, &c., from Palur:—

Greenmanure seeds		9,555
Paddy		7,385
Indigo seed		1,663
Groundnut		191
Miscellaneous seeds		Number
Scind ploughs		27
Monsoon ploughs		22
Triangular harrows		9
Improved country ploughs		6

20. *Buildings*.—The necessary repairs were executed.

21. *Staff*.—M.R.Ry. S. Subramania Ayyar was in charge of the farm until 28th October 1914, when he was temporarily relieved by Assistant Farm Manager, C. V. Seshachari pending the arrival of Farm Manager M.R.Ry. A. V. Tirunuruganatham Pillai from the Central Farm, Coimbatore, on 12th November. Assistant Farm Manager C. V. Seshachari assisted in the management of the farm until 30th June 1914 when he was posted to District work in South Arcot with Palur as head-quarters. Two newly appointed Assistant Farm Managers K. Ramayya and K. Gopalakrishna Raju joined duty at Palur on 29th May and 1st June, respectively. K. Ramayya availed of leave on loss of pay from 17th July 1914 to 14th August 1914 when he was transferred to the establishment of the Government Economic Botanist. Gopalakrishna Raju who was relieved by Assistant Farm Manager N. V. Visvanatha Ayyar was transferred to Koilpatti farm on 31st October 1914.

B. THOMAS.

ST. THOMAS' MOUNT.
26th May 1915.

R. THOMAS,
Dy. Director of Agr., Central Division.

APPENDIX III.

ADMINISTRATION REPORT OF THE GOVERNMENT AGRICULTURAL CHEMIST FOR 1914-15.

I have the honour to submit herewith my report for the year ending March 31st, 1915.

2. I was in charge of the office during the whole of the year but the following members of the staff were granted privilege leave :—

Name.	Designation.	Period.
M.R.Ry. M. R. Ramaswami Sivan ...	Chief Assistant ...	1 month.
" P. A. Subrahmanya Ayyar...	Assistant...	1 month and 16 days.
" P. A. Raghunathaswami Ayyangar.	Assistant...	1 month.
" K. S. Subrahmanya Ayyar...	Head clerk ...	2 months.
" C. V. Iswara Ayyar...	Second clerk ...	3 months.

3. There are no changes to report in the personnel of the staff with the exception of that of the second clerk C. V. Iswara Ayyar who was deputed to act as second clerk for a period of six months in the office of the Deputy Director of Agriculture, Southern Division, Trichinopoly. During the interim a substitute was appointed to take his place.

4. The changes introduced by the revised curriculum of studies have had the effect of reducing the work in the Teaching section, and this will continue until the new third and fourth year classes are formed. No lectures were given in General Chemistry during the past year and as a consequence the Chief Assistant M.R.Ry. Ramaswami Sivan was deputed to give the lectures in Agricultural Chemistry which have hitherto been given by myself. At the Diploma Examination in Agricultural Chemistry held in March 1915, eighteen students presented themselves, and out of these eight passed in the first class and ten in the second class, and there were no failures or third-class passes. The tuition given by this assistant is excellent in character and great credit is due to him for the way in which he has carried out his duties during the year.

In conformity with the general scheme of lectures drawn up for the first year students I gave eleven lectures of a popular type on Agricultural Chemistry and sixteen lectures on Physics and Meteorology were given by the second assistant M.R.Ry. P. A. Subrahmanya Ayyar.

5. During the year under review the following samples were analysed and reported upon :—

Soils ...	147
Manures ...	26
Foodstuffs and fodders ...	30
Sugar-cane and cane products ...	1,631
Dairy products ...	
Oil-seeds ...	
Water ...	
Miscellaneous ...	
Total ...	2,427

This is decrease of 326 on the previous year's total but is accounted for by the fact that it was necessary, for over four months of the year, to take two assistants from routine analytical work and to allocate to them the work of the sugar-cane breeding station and the Guntur survey. In these circumstances it was only found possible to carry out a comparatively small amount of dairy work. Of the samples analysed only 115 were from ex-departmental sources but of these 53 were done on behalf of cultivators. A large proportion of the samples of water were received from the Kistna Delta in connection with an enquiry relating to the suitability of the water in certain drains for irrigation purposes.

6. The soil survey of the Guntur Delta is progressing rapidly and as only a very small number of samples await completion the final report will be available about the end of June 1915. Soil maps based on the analyses of the alternate samples were prepared for the Agricultural and Industrial Conference held in Madras in December last and those of the finished survey will not differ materially from them.

7. During the year a memoir was published dealing with the relationship between the gases present in paddy soil with the organized film found on the surface of the soil. It has been shown that the latter utilized the former in such a way as to lead to an increased amount of oxygen being available for root aeration, and as the gas mainly concerned is produced by

expected, proved to be too small for anything other than a definite restricted field of work as noted below.

Paddy.—Last season provided a mass of extremely interesting material the examination of which the whole staff at work continuously for about four months. The former surmise that extensive crossing takes place proved to be correct. Of the plants selected as varieties from the type, 79 lots out of 171 were crosses and showed splitting for various characters. A formula specially designed to show the amount of natural crossing at Coimbatore gave the following results which will be seen to vary with the variety:—

	Per cent.
Sadai Samba	8.7
Swarnavari	.9
Dodda Birru Bhatta	.1

A line of Raskadam growing as a border to plots of other varieties showed crossing to the extent of 1.3 per cent, 2 per cent, and 1.5 per cent, for three different varieties respectively. Further material has been taken to show the amount of crossing at Samalkota and Palur.

In the crosses which, as above mentioned, gave splitting families the characters were examined with regard to their method of inheritance. Altogether a very large number of characters was involved of which many were simple and well marked. A preliminary account of some of these characters was given in a paper to the Indian Science Congress on "Some Mendelian characters of the paddy plant." Definite simple Mendelian ratios were obtained for thirteen well marked characters and considerable information recorded regarding more complex characters. A large amount of material has been taken for throwing further light on the latter next season.

The harvesting of small lots for the determination of the probable error in estimating yield was continued and the results were about the same as last year.

The total number of lots to be carried forward next year are 610. Of these about 200 are for studying the inheritance of specially important economic characters, 200 for complex morphological characters, and 134 pure lines.

Last year mention was made of the desirability of taking up a new piece of land for paddy. This year proposals were submitted and Government sanction obtained for the purchase of about 17 acres of land for a paddy breeding station. As the full amount of money provided in next year's budget, modified proposals, providing for an area of 10 acres, were submitted.

The amount of time available for cotton work it was found was not sufficient for the selections.

The cottons grew well and in addition to the selections for next year's work.