REPORT

ON THE

OPERATIONS OF THE DEPARTMENT OF AGRICULTURE,

MADRAS PRESIDENCY

FOR THE OFFICIAL YEAR

1907-1908.

MADRAS:
PRINTED BY THE SUPERINTENDENT, GOVERNMENT PRESS.

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REPORT

ON THE

OPERATIONS OF THE DEPARTMENT OF AGRICULTURE

FOR

1907-1908.

I.—STAFF.

There were no changes in the staff of the Department during the year under report. After his return from Pusa in April, the Agricultural Chemist lived at the Saidapet College of Agriculture till his house at Coimbatore was ready. Both he and the Principal occupied their new houses before the end of the year. The headquarters of the Deputy Director of Agriculture, Southern Division, were fixed at Trichinopoly (G.O., No. 1574, Revenue, dated 21st June 1907) and those of the Deputy Director of Agriculture, Northern Division, at Bellary. The charge of the former includes all the Tamil Districts and the West-coast. The latter has all the Telugu Districts. No new Agricultural Stations were opened during the year. The management of the existing stations occupies most of the time of the Deputy Directors of Agriculture at present. It is hoped that when the Managers have acquired more experience they will not require such constant supervision as at present, and that the Deputy Directors of Agriculture will then be able to devote more time to touring in the districts.

2. The Director of Agriculture spent 230 days on tour and visited all the Agricultural Stations. He also attended the Agricultural Conference at Pusa in February. On the appointment of Mr. Sampson as Deputy Director of Agriculture, Southern Division, the Palur station was placed under him and the Samalkota Station was put under the charge of the Deputy Director of Agriculture, Northern Division. The Government Botanist is still on furlough. Rao Bahadur C. K. Subba Rao is acting for him. As this report was being written news was received of Mr. Subba Rao's death while on privilege leave at Coimbatore. His unrivalled knowledge of Madras Agriculture and keen interest in the work of the Department will make his loss heavily felt.

3. Mr. Main, Assistant Inspector-General of Agriculture, made a tour through the planting districts in May 1907 to enquire into the pests affecting the Coffee and Pepper. The Inspector-General of Agriculture visited the Presidency in January, and inspected all the Agricultural Stations and the Central Farm at Coimbatore.

II.—SCIENTIFIC AND NATIONAL ENQUIRY.

A.—Entomology.

4. As stated in last year's report, the Imperial Entomologist is reviewing the monthly reports of the two Entomological Assistants and giving them general instructions for their work. At the end of June Mr. C. W. Mason, Supernumerary Entomologist, was deputed to Madras by the Imperial Entomologist and was put in charge of the Entomological work of the Province till his return to Pusa in September.

5. Mr. Lefroy paid two visits to the Presidency, one in May, to study the "Surul" pest on the ground-nut crop near Villupuram in the South Arcot District, and one in February, when he discussed with Mr. Barry of Cocanada the lines of experiments to reduce the damage caused by the tobacco weevil. He made a thorough inspection of the collections of the Entomological Assistants at head-quarters, and visited the Palur and Koilpatti Agricultural Stations, and the Coimbatore Central Farm. He prepared a detailed list of the insect pests to be dealt with in the course of instruction at the Coimbatore College. The Entomological Assistant who will teach the students is now engaged in preparing his lectures, which are submitted to the Imperial Entomologist for approval.

6. The Entomological Assistants have been engaged in the investigation of the different pests reported from Districts from time to time. The most important work was done on the Surul ground-nut pest, an account of which will be published as a memoir of the Imperial Department of Agriculture. The existence of the potato moth in the Nilgiri district was established; a severe outbreak of the paddy stem borer in the Narasapur taluk of the Kistna district was investigated and remedies suggested to the cultivators. The pest was identified with that reported from Anantapur last year. The simplest recommendation is to plough up the stubble after harvest, to destroy the resting place of the caterpillars. Opportunity was taken of the Agricultural show at Ellore in May to depute the Entomological Assistant T.V. Ramakrishna Aiyar to deliver a lecture in Telugu on the pest, and specimens of its various stages were exhibited and explained. This excited a good deal of interest. Coloured plates illustrating the life history of the pest are being prepared by the Imperial Entomologist, and it is proposed to circulate these, if ready in time, with vernacular instructions, in any localities from which severe outbreaks are reported.

Other minor enquiries included a search for the parasite of the Indian Fruit Fly, and a report on the cotton boll worm on the Caravonica cotton plantation at Yetur.

7. Application has been made for the appointment of a third Entomological Assistant, as the teaching of Entomology at the Coimbatore College, which is to open this month, will take up most of the time of one of the two Assistants.

The best thanks of the department are due to Mr. Lefroy for his valuable help and advice freely given, and his supervision of the work of the Entomological Assistants.

B.—Mycology.

8. The operations for the suppression of the palmyra palm disease in the Gódávari district were vigorously prosecuted throughout the year, under the direction of Mr. A. A. Ferguson, I.C.S., Assistant Collector of Gódávari. His staff consisted of a Mycological Assistant, two Agricultural Inspectors, four Revenue Inspectors, one Assistant on the staff of the Imperial Mycologist, four Assistant Revenue Inspectors, and a plant collector from the Government Botanist's office. As the disease can only be detected when the central shoot of the tree dies and turns white, it is not sufficient to cut down all the trees so affected. A second, third, and even a fourth visit to the village is necessary to search for cases in which the disease may have been latent at the time of the first inspection. The Amalapur taluk, where the disease is worst, has been worked over four, and in parts five times in this way, and Ramachandrapur has been begun. There is a little disease in the Cocanada taluk, and in the Tanuku and Narsapur taluks of the Kistna district. It is estimated that there will be work enough to keep the present staff busy for almost

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another year. The general opinion is that the disease spreads most rapidly during the rains and when the leaves are wet with dew. In the course of the next few months, therefore, it should be possible to judge, from the severity or otherwise of the outbreak, whether the operations promise to be ultimately successful. It can safely be said, however, that if left alone the disease would have spread far more rapidly. Before commencing work, a leaflet was drawn up by Dr. Butler, describing the nature of the disease and the object of the operations, and translated into Telugu. This was widely distributed among the ryots, and it is perhaps partly owing to this that no claims for compensation have been made. Considering that on a rough estimate more than 200,000 trees have been cut, the average value of which may be taken at Rs. 1–8–0 a tree, this also speaks well for the tact displayed by the staff. The most discouraging feature of the work is the apathy displayed by the ryots, who make no attempt to co-operate in the work, though every effort has been made to explain to them its importance. Dr. Butler inspected the operations twice during the year. The total expenditure during the year up to the end of February was Rupees 12,591-2-6.

9. During the year the cocoanut gardens of Travancore were reported to be suffering from an obscure disease. After a preliminary investigation by Agricultural Inspector, Balakrishnamurti, Dr. Butler visited the State, and discovered that the trees were suffering from a fungus which attacks the roots. He suggested some simple precautions to arrest the spread of the disease. A number of copies of his report have been sent to the Resident in Travancore and Cochin, and the Collectors of Malabar, South Canara, Tinnevelly and Coimbatore for distribution among the leading land-owners. Dr. Butler also kindly prepared a short leaflet for translation into the vernacular. This was sent to the Collector of Malabar for publication in the District Gazette. It was also suggested that copies of the pamphlet might be supplied to the leading landowners, and the pamphlet communicated to the Vernacular Press. Though the disease spreads more slowly than the palmyra fungus of Gódávari, much loss has already been caused by it in Travancore. It is hoped that Dr. Butler's timely warning will awaken the owners of gardens to the danger. At present it is not known to exist in British territory. The Department is greatly indebted to Dr. Butler for the valuable help received from him.

10. The important discoveries which he has made during the short flying visits to Madras, which alone the pressure of his other work permits him to make, emphasize the urgent need of an expert European Provincial Mycologist to carry on systematical research in the Province itself. The interests involved by the fungus diseases of the palm are enormous, and there must be many similar diseases awaiting discovery.

C.—Seed and Other Products Supplied to and Received From Other Provinces and Abroad.

11. These transactions are now becoming so numerous that only a few of the more interesting can be noticed. Numerous requisitions were received from the Reporter on Economic Products for varieties of pepper, for fruits, seeds and fat of *Bassia longifolia*, wild fibre plants, seeds of *Eucalyptus globulus*, and samples of commerical varieties of rice. A requisition for a metal tray and lotah was forwarded to Mr. Thurston. Samples of the kinds of fuel usually used in different parts of the Presidency were sent to the Director-General of Commerical Intelligence, who proposes to test their calorific value, with a view to ascertaining how far it would be profitable to substitute oil-stoves for cowdung bratties for cooking purposes.

A packet of lemongrass seed was supplied to the Imperial Department of Agriculture, Barbados, and a collection of Madras paddies and millets to the Ceylon Agricultural Society. A small quantity of Pearl Millet (*Penniseum spicatum*) and Finger Millet (*Eleusine Coracana*) and "Hickory King" maize was kindly furnished by the Director of Agriculture, Transvaal, for trial on the Palur Agricultural Station.

Pennsylvania tobacco seed received from the Director of Agriculture, Eastern Bengal and Assam, arrived too late in the season for sowing.

III.—SCIENTIFIC AND LOCAL ENQUIRY UNDER PROVINCIAL DIRECTION.

A.—Buildings and Laying Out of Farms.

12. The farm buildings at Coimbatore were taken over from the Public Works Department in July. The Principal and the Agricultural Chemist occupied their new bungalows on the farm in December. The Government Botanist's bungalow has also been finished, and is being used as a temporary Laboratory and Lecture room until the College itself is ready. The first batch of 22 students will be admitted this month. The College buildings themselves are well advanced. The roof is on, and the rooms and laboratories are being fitted up. It is hoped that it will be ready for the students to occupy it at the beginning of the next session.

G.O., Endt. No. 1762-A/08-1, Revenue, dated 20th May 1908, sanctioned the construction of ten separate hostels to accommodate six students each, to provide for as many different castes as possible. For the present the students will live in the "C" type quarters.

13. A double avenue has been planted along the Lawley Road. The upkeep of the road where it runs through the College lands has been made over to the Agricultural Department—(G.O., R.D., Mis. No. 1636, dated 27th June 1907). An installation of Mansfield's Oil Gas has been put in and is complete. A sub-artesian supply of good water for drinking purposes has fortunately been struck in a well near the College buildings, at a depth of 75 feet from the surface. The water of the surface wells is very hard and somewhat brackish.

14. The farm buildings at Hagari were taken over by the Deputy Director from the Director of Industrial and Technical Inquiries on the 17th February 1908. The rest-houses at Koilpatti and Samalkota and the Manager's quarters on the latter farm have been completed. The old Public Works Department Inspection shed at Palur is being reconstructed, to afford more room for the accommodation of officers visiting the farm. Quarters for the Manager and Assistant Manager have been sanctioned and five huts provided for the agricultural apprentices who are sometimes sent by District Agricultural Associations and private landowners to study the cultivation of ground-nut. A seed store has been sanctioned for Nandyal, and quarters for Assistant Managers at Hagari and Koilpatti.

Maps of all the farms have been prepared by M.R.Ry. R. V. Subramania Aiyar of the Agricultural College.

B.—Crops.

15. Detailed information regarding the work done on each crop and at each station will be found in the administration reports printed as an appendix to this, and in the separate scientific reports. All that is done here is to give a brief review of the work done on each crop.

Sugar-cane introduction.—The farm canes are now so well distributed throughout the Gódávari delta that ryots are able to obtain seed canes from each other. Manager Balakrishnamurti, who has spent the whole of last year travelling in the delta, told the Director of Agriculture that the farm canes would account for half the cane area, *i.e.*, for over 2,000 acres. A good exhibit of farm canes was sent to the Berhampur agricultural show in February. Many visitors to the show applied for seed canes, and sufficient to plant about 5 acres were sent to Berhampur in March.

16. In South Arcot it was estimated that about 60 acres were planted last year with the Mauritius canes. The produce of this when crushed in the Nellikuppam factory gave much better results in percentage of jaggery to juice and percentage of cane sugar. Mr. Neilson, the Manager of the factory, reports that this year the Mauritius canes account for 40 per cent. of the Nellikuppam sugar-cane area as against 15 per cent. last year. This shows that the ryots know that they are better than the local canes. Unfortunately there has been a great shrinkage in the cane area in the district on account of difficulties with the water-supply. Seed was also supplied free to the Kumbakónam Agricultural Association last year, and planted on

their farm near the town. The canes grew well, and it is hoped that this demonstration will lend an impetus to the introduction of sugar-cane in Tanjore. A small plot of cane planted at Taliparamba (Malabar) made extraordinary growth. Many applications have been made for seed. At present practically no sugar-cane is grown in Malabar, though the climate and conditions seem very favourable. The nursery at Melrosapuram was given up, as there was no local demand.

17. *Experiments on sugar-cane.*—A severe outbreak of disease on the Samalkota Farm proved that the rotation experiments, under which canes were being grown more frequently than usual, are a failure. A longer rotation will be adopted in future. The canes grown in the new nursery in the uplands were healthy. Among new varieties the Barbados seedling B. 208 gave a very good analysis. The manurial experiments showed that properly conserved cattle manure, a thing unknown in Gódávari, gives splendid results. The addition of about six rupees worth of fine bone dust to the castor cake, practically the only fertilizer used by the ryots, gave a net profit of Rs. 20. It is much to be desired that the bones, which are now exported on such a large scale, to the impoverishment of the country, should be utilized in India. The attention of sugar-cane growers will be drawn to this. Four Agricultural Managers were sent to learn Mr. Hadi's method of sugar-making at Panchli in the United Provinces in January.

18. *Ground-nut introduction.*—Applications for seed continue to be received from all parts of the Presidency. On the Samalkota and Coimbatore Farms, where it was tried for the first time, the crop was satisfactory. Small trial plots in South Canara having given good results, Government have granted a sum of Rs. 500 to encourage the introduction of the crop. Much dry land in that district, at present lying waste, would yield remunerative crops of groundnut. A note on the cultivation of ground-nut on the west coast was prepared by Mr. Sampson, and widely circulated throughout Malabar and South Canara. Trial plots in the former district as well have given good results. Mr. Sampson has prepared another note of more general application, on the cultivation of ground-nut, which will be published shortly as a bulletin of the Department, in view of the increasing interest taken in the crop. Kurnool, Cuddapah, Anantapur, the Kistna uplands, the Pollachi division of Coimbatore, and Tinnevelly are some of the localities in which ground-nut has lately been introduced.

19. *Experiments on ground-nut.*—The experiments with new varieties at Palur show that the local seed continues to give the best results all round, though some of the foreign varieties seem to be improving as they are getting acclimatized.

The manurial experiments, the main object of which is to test the result of applying lime in different forms, will not yield any definite results for some time. In connection with experiments on paddy, however, it has been proved that the leaves and stalks of ground-nut are a cheap and very effective manure for paddy. At present this valuable bye-product of the ground-nut crop is allowed to be eaten by the village cattle and its manurial value is largely wasted.

The cultivation experiments at Palur are designed to reduce the cost of growing the crop, by substituting bullock-power for cooly labour in sowing and cultivating the crop, and by economizing in seed and water. At present the amount of hand-labour employed is so large as to restrict the cultivation of this crop to thickly-populated tracts.

20. *Pepper.*—The scientific report of the Taliparamba Agricultural station for the past year gives a very full account of the system of pepper cultivation and the varieties of pepper. No results can be expected from the experiments for some years. It has been shown, however, that careful preparation of the land and the application of leaf-mould greatly reduces the losses of young plants.

21. *Cotton—Seed distribution.*—The failure of rain in the neighbourhood of the Bellary station diminished the demand for farm seed. Out of a total of 6,707 lbs. of seed from this and the Hagari Agricultural station, only 4,873 lbs. was disposed of for seed purposes. In the Tinnevelly district, seed cotton of pure karunganni was purchased from selected growers, and seed sufficient to sow about 3,000 acres was distributed. There was a good demand, and far more could have been sold, had it been available. It was at first reported that many ryots were dissatisfied with the results of our seed. It has since come to light that where the results were poor, this

was due to the germinating power of the seed being higher than they were accustomed to. In spite of being warned not to sow so much as usual, they sowed the usual amount (12 lbs. per acre instead of 5 lbs., which is enough). They were then advised to thin their crops. They rejected the advice. They now admit their mistakes, and say that they will follow the advice given to them, next year; and are anxious to buy seed from us again. The demand is probably due to the fact that the ryots appreciate the care taken in drying and preparing the seed. Karunganni, however, being a superior variety to uppam, the continual distribution of pure karunganni seed on a large scale cannot fail to have a good effect on the cotton crop as a whole.

22. Whereas the owners of hand-ginneries insist on the kapas being well dried before it is brought to them, cotton is often sent to the power-ginneries in a wet condition. This spoils the germinating power of the seed. Ginning by power costs about half as much as hand-ginning, and the hand-ginneries, which used to be found in all important centres, are therefore disappearing. Ryots consequently find it harder every year to buy good seed. It would seem, therefore, that there is room for a large extension of seed distribution by Government. Competition is too keen among the large buyers, who own the power-ginneries, to permit of their combining to make the ryots deliver their kapas in a dry state. It would be to the great advantage of the industry if this were possible. Arrangements are being made to buy pure karunganni cotton sufficient to sow about 10,000 acres this year.

23. *British Cotton Growing Association grant.*—Rupees 3,000 received from British Cotton Growing Association were spent last year in the purchase of karunganni cotton and some samples of the commercial cotton, as it comes into the market at Virudupatti and Tuticorin, representing the north and south portions of the district. The cotton was ginned and the lint baled and sent to the British Cotton Growing Association for valuation, the seed being kept for distribution. The report was satisfactory, as it confirmed the view already formed here that karunganni is the more valuable variety. Karunganni cotton from the Koilpatti farm was valued at 5½*d*., and the report stated that the samples compared very favourably with machine-ginned Broach. The grant has now been discontinued, but the balance of Rs. 2,484–7–0 (kindly made up to Rs. 3,000 by a special grant from the Inspector-General of Agriculture) is being utilized for the same purpose in the current year. The seed cotton is purchased from ryots who have sown our seed the previous year. Pure karunganni crops only are bought for seed distribution, and efforts are made to get them to thin out their crops and also, as far as possible, to drill them, with a view to improving the strain by good cultivation.

24. *Cultivation.*—In last year's report it was stated (page 6) that the distribution of good seed should be accompanied, if not preceded, by efforts to improve the ryots' methods of cultivation. In pursuance of this policy, five expert coolies from Bellary were brought to Koilpatti last year to teach the use of the country—drill and bullock—hoe. The farm crops had already been sown in rows the previous year. About fifty selected ryots tried drilling their cotton for the first time this year. Implements were supplied free of cost, and expert coolies were sent to help them. Those who tried drilling were satisfied with the results, and it is expected that about 1,000 acres of privately-owned land will be sown with the drill this season. Mr. Sampson's remarks on the subject in the Administration Report of the Koilpatti Farm deserve a careful perusal. The work done at this station during the past year is of the highest value and importance. These results are due, in the first place, to Mr. Sampson's excellent management, and, secondly, to the good work done by Assistant Managers, Tirunaganathan Pillay, in charge of the farm, and S. Ramaswamy Pillay, in charge of the seed distribution. Both officers belong to the agricultural classes, and have succeeded in gaining the confidence of the ryots.

25. *Cotton experiments.*—The permanent manurial experiments at Koilpatti will be given up, as they are not likely to yield results of practical value. The advantage of a moderate application of properly conserved cattle manure has been strikingly demonstrated. The cotton crops on the farm this season were very good; it is expected that over 1,000 lbs. of kapas per acre will be picked from the best plots. The ryots now see for themselves that this is not due to any greater expenditure, or

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other means beyond their power to adopt; but mainly to the thorough cultivation, which is only possible in drilled crops, and the use of good seed. The fields of a ryot adjacent to the farm, who had followed the farm methods, were as good as the crops on the farm itself.

The best plants have been selected in the field by Mr. H. C. Sampson, and their produce is being carefully examined with a view to getting an improved strain. The same plan was followed with regard to the hybrid and crossed cottons, which included some fine plants. Individual trees have been found, the produce of which yields 33 per cent. of lint, against the usual yield of 25 per cent.—26 per cent.

26. On the Nandyal farm the different varieties, Tellapathi or "Northerns", Gadag or "Koomptas", Yerrapatti, and "Cocanadas", which are found in a mixed state in the ryots fields, are being separately studied.

"Northerns" or pure Tellapatti gave a better yield this year, but the statement in the Administration Report that the lint was of better quality is incorrect. A bale of each was sent for test to the Carnatic Mills Company, who report that Gadag or "Koomptas" is slightly better both in colour and strength of staple. Further experiments will be necessary to decide which is the more profitable crop.

A premium of two annas an acre to cultivators who grow practically pure crops was paid in respect of 1,074 acres.

At Hagari, Egyptian cotton was again a failure. Experiments in irrigating country cotton will be continued.

27. *Paddy.*—This, the most valuable and important crop of the Presidency, is now receiving the attention it deserves. Experiments are being made on all the wet land farms to ascertain the best number of seedlings to plant in a bunch, and the best distances for planting. Mr. Sampson was the first to commence these experiments on some of the Home Farms under his management under the Court of Wards. Their object is, firstly, to see whether better crops, *i.e.*, crops yielding more grain of better quality cannot be got by allowing each plant more room for the proper development of its root system; as many as fifty tillers have been observed on a single plant which had full room for development; and, secondly, to save waste of seed. The cost of weeding is reduced, and possibly an economy of water can also be effected. As much as 150 lbs. of seed is sown per acre in parts of the Presidency. In the Southern districts probably the average is not less than 80—100 lbs. per acre. It is believed that 20 lbs. of good seed would be ample. On the Saidapet Farm 3·90 acres planted at the rate of 11·5 lbs. of seed per acre gave a normal crop. If, as seems to be the case, equally good or better crops can be raised without any extra cost, with the smaller seed rate, the saving of 60 lbs. of seed per acre would mean a large addition to the food supply of the country. It is estimated that the area under paddy in the Presidency is about 7,400,000 acres.

28. On the Coimbatore Farm the singly-planted plots gave, on the whole, results equal to those planted on the local system. Mr. Shepperson's interesting account of his experiments, in the Administration Report, is typical of the work being done on all the farms. At Palur singly-planted Banku paddy as a "Kar" crop gave 1101 M.M. per acre against 740 M.M. of local Kar paddy planted in the local way. In the Tinnevelly district, where the seed rate is 150 lbs. per acre, the demonstration of the advantages of single-planting of paddy by the brothers Dharmaranga Raju, Deputy Collector, and Chelvaranga Raju, of the Agricultural College, on their own land at Palamcottah has attracted much attention, and it is estimated that 2,000 acres were planted in this way last year. A similar movement is in progress in the Tanjore and South Arcot districts, where a small landowner near Chidambaram, named Abaranam Pillai, discovered the advantages of the system for himself.

The exact amount of seed necessary, and the exact distance for planting has to be determined separately for each locality.

29. The question of the proper treatment of paddy lands in the dry season is also being studied on all the farms where there is wet land. This includes the subject of green manuring; and ploughing up of fallows. In some parts, *e.g.*, in Kistna and Coimbatore the ryots declare that the latter practice is injurious. In others, as

in Malabar, it is regularly practised on the best lands. Arrangements are being made at Coimbatore and Samalkota for a series of experiments on the amount of water required to produce a full crop of paddy.

30. At Hagari the experiments have been hampered by the difficulties about the water-supply. The new well which, it was estimated by the Director of Industrial and Technical Inquiries would yield 2,000 gallons a minute, has actually given only one-tenth of the quantity. Much difficulty has also been experienced with the engines, and the new 7½ horse-power engine has not yet been got to work. The experiments show that, when bringing regada soil under wet cultivation, the chief trouble is to get the soil into a suitable mechanical condition. The seasonal experiments are being conducted in accordance with Board's Proceedings No. 77, dated 11th March 1907.

31. *Fibres.*—The Samalkota jute crops were somewhat disappointing. The Bengal Fibre Expert visited the experimental plots of jute in Tanjore and Malabar, and reported that the comparative failure of the crops was due to late sowing and want of weeding and thinning. He remarked that "the prospects of jute in Madras are decidedly hopeful. It is true that only one plot was really successful, but several others, grown by people entirely unfamiliar with the crop, were on the verge of success." Government has sanctioned a grant of Rs. 1,000 for jute experiments in the Gódávari and Tanjore Deltas. The best prospect of success at present seems to be on the West Coast, where Mr. Sampson found a specimen of Bengal Jute (*Corchorus capsularis*) growing wild, near Shiradi in South Canara. In Malabar about sixty people intend to try jute this season.

32. At Coimbatore an experiment was made in growing *Hibiscus cannabinus*, usually grown under well irrigation, as a partly rain-fed crop. Four waterings were given, and the crop was fairly successful. Results are not available at present, but they point to the conclusion that *Hibiscus cannabinus* would pay at least as well as most of the dry land crops, if there was a steady demand for the fibre. At present little comes into the market, each ryot growing a small patch for his own consumption. The leaves are eaten as a relish, and the fibre extracted afterwards.

33. *Agave.*—Experiments with sisal gave 3 per cent. of fibre, and an estimated acreage yield of 495 lbs. of fibre per acre. A small hand-prepared sample was valued in London at £36-£38 a ton with Mexican sisal at £34. Little weight can be attached to valuations of small samples, but the plantation will be maintained and extended with a view to further experiments in planting, and for supplying public bodies with plants for fences, etc. The justification for this station is that an attempt is being made to find a use for land which has no value for ordinary agricultural purposes, and to create a cottage industry.

34. *Irrigated dry crops.*—The ridge and furrow system of irrigation is being compared with the flat-bed system at Coimbatore, where arrangements have been made for accurately measuring the quantity of water used by each system. On the ridges the cholam is dibbled in by hand, and the cost of this is only a trifle more than that of sowing and ploughing in the seed. The same method has been successfully employed with transplanted ragi, onions, and sweet potatoes at Koilpatti, and at Palur with ground-nut.

35. *Encouragement of the irrigation of dry crops under the Ponnalur tank.*—The Collector reported that the tank breached in December 1906 and there was, therefore, insufficient water in it for the irrigation of the early crops in 1907. In G.O., No. 1269, Revenue of 7th May, Government have sanctioned the continuance for two years more of the concession under which water is supplied without charge for the irrigation of dry crops.

36. *Experiments with saline lands in the Periyár tract.*—Only one ryot qualified for remission of assessment by undertaking the reclamation of saline lands.

The Therkuthéru farm experiments were continued by the Public Works Department. The Deputy Director of Agriculture, Southern Division, and the Agricultural Chemist visited the farm, and took samples of the soil. Proposals will be submitted in due course for a general survey of the saline tracts. The question appears to be mainly one of drainage, and extensive investigations will be necessary

37. *General.*—In pursuance of a suggestion by the late Mr. Beauchamp of the "Madras Mail" an Agricultural Calendar was published for the first time. This contained vernacular proverbs suitable for the seasons, and short popular articles on matters of agricultural interest, such as the care of cattle, the single planting of paddy, seed selection, inoculation for rinderpest, irrigation by oil-engines. Illustrations were furnished by Mr. Cecil Wood. It is hoped that some attention was attracted to the work of the Department by this means. The Calendar will be brought out annually for some time at least.

C.—Agricultural Associations.

38. Cattle and agricultural shows were held at Bobbili, Berhampur, Cocanada, Ongole, Tirupur, Madura and Trichinopoly. A few of the associations are doing useful work, prominent among these being the Ganjám Association, which had a very successful show at Berhampur, and is exerting itself to introduce the Mauritius sugarcanes into Ganjám; the Kumbakónam Association, whose demonstration farm awakened much interest in the single-planting system for paddy, and in the cultivation of sugarcane. It also arranged for experiments with Bengal jute on the lands of some of its members. The Tinnevelly Association has seconded the efforts of the department in the introduction of the drill and bullock-hoe. It has also popularized the single-planting system for paddy, and arranged for the local manufacture of cheap iron ploughs for wet and dry land, of which several hundreds have been sold.

The Coimbatore Association held a successful cattle-show at Tirupur, and is getting a set of boring tools made with a view of searching for artesian supplies of water in existing wells. Similar work has been undertaken by the Madura Association.

In Malabar, mainly through the interest taken in Agriculture by the Collector, Mr. Francis, and his Divisional-officers, Messrs. Wood, Ellis, and Hall, a very useful programme of experiments on the lands of private individuals has been drawn up. The work consists of the introduction of ground-nut and Bengal jute, and the single-planting of paddy. Mention must also be made of the interest shown by Messrs. Karunakara Menon, in the Malapuram Association, and Rao Bahadur Chinnasawmy Pillay of Palghaut.

In South Canara, the Collector, Mr. Aziz-ud-din, and the Coondapur Divisional-officer, Mr. Doig, are using their influence with the Associations to introduce ground-nut. A grant of Rs. 500 has been made by Government for this purpose, and an agricultural apprentice sent for training at Palur.

A small quantity of Mauritius sugar-cane was introduced by the Mangalore Association last year. At Kurnool the Agricultural Association has a small farm on which it is trying different varieties of cotton for comparison. In Government Order, No. 2093, Revenue Department, dated 20th August 1907 the free supply to Agricultural Associations of the Forest Sheet of District Gazettes was sanctioned.

39. Every effort made to get useful work out of the numerous Associations which exist, most of them in a state of susponded animation, brings out more and more clearly the general ignorance of practical agriculture which prevails among the educated classes, which include in their number many of the largest land-owners. It was reported that a certain land-owner in one of the wealthiest districts was looked upon by his neighbours as weak in the head, on account of the active interest which he took in practical agriculture. The Associations are to some extent making it fashionable among these classes to know something of agriculture. They still contain few genuine cultivators, the mass of whom have no belief in or wish for change. The unseasonable downpour of rain which occurred last year near Koilpatti was attributed by some ryots to the introduction of the seed-drill, displeasing to the local divinities.

IV.—BOTANY.

40. The Government Botanist was on furlough during the year under report. Rao Bahadur C. K. Subba Rão was acting for him. He has been engaged in the preparation of bulletins on fig and sunn-hemp cultivation. His report is printed as an appendix.

V.—AGRICULTURAL APPRENTICES.

41. Two farm coolies were sent for training by private individuals to the Koilpatti station, and three from South Canara, Madura and Malabar to Palur. These were reported to be genuine agriculturists. One sent by the Gódávari Agricultural Association to Samalkota was unsuitable, and after frequently absenting himself he was withdrawn by the association. The Ganjám apprentice completed his year's course, and is now employed by the Ganjám Agricultural Association. Two other apprentices had a short course of training at Saidapet.

VI.—AGRICULTURAL EDUCATION AND RESEARCH.

42. The Saidapet College was closed at the end of the Calendar year, and the buildings have been made over to the Public Works Department. The Vice-Principal reports that numerous applications for admission were received, and the demand for the services of trained candidates was greater than in previous years. Ten students in all obtained the diploma. A syllabus and rules have been drawn up for the new College at Coimbatore. No scholarships will be offered, but no charge will be made for tuition and lodgings. Candidates for admission are required to have passed the Matriculation Examination, but members of the agricultural classes, who possess a sufficient knowledge of English, may be exempted from this rule. The usual course of study will be three years; a short course of one year is also provided for students who do not wish to go through the full course. The College will open in June 1908. A large number of applications have been received. The Agricultural Chemist has been engaged in routine analytical work during the year and in preparing the lectures and laboratory work for the students. He has commenced to investigate the mechanical and chemical changes which occur in the soil when dry land is converted into wet, and this, together with several minor investigations, will be further studied when the permanent laboratories are fitted up. The present temporary laboratories are unfitted for anything but routine analytical work. The Principal has had eighteen months, while waiting for the opening of the College, in which to familiarize himself with practical Indian Agriculture. He has visited most of the Government Agricultural Stations, and he also accompanied the Director of Agriculture on a tour in the Tanjore district. The Coimbatore farm has been brought into very good condition, and some important lines of experiment have been taken up. Mr. Shepperson writes: "The crops grown were those usually found in the locality, and very few attempts were made to grow a crop foreign to the district. Attention was paid to methods of cultivation rather than to obtaining results with a liberal application of manure." These lines of work may be expected to yield results of practical value to ordinary ryots.

43. *Publications.*—A bulletin on fig and grape cultivation was prepared by the Acting Government Botanist, and translated into Telugu and Tamil. A Tamil leaflet on jute cultivation was also published. Mr. C. K. Subba Rao also prepared a bulletin on sunn-hemp cultivation, and Mr. Sampson one on the cultivation of ground-nut. The number of publications received from and sent to other Provincial Departments and countries was as follows:—

	Indian.	Foreign.
Journals received	18	62
Bulletins do.	61	409
Reports do.	390	85
Total ...	469	556

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APPENDIX I.

ADMINISTRATIVE REPORTS OF THE AGRICULTURAL STATIONS AND THE MISCELLANEOUS WORK DONE BY THE DIRECTOR OF INDUSTRIAL AND TECHNICAL INQUIRIES DURING THE YEAR 1907-1908.

ADMINISTRATIVE REPORT OF THE AGRICULTURAL STATIONS, NORTHERN DIVISION.

The division of the Presidency occurred at the beginning of the year under report and on the 20th of April I handed over charge of the farms included in the Southern division to Mr. Sampson. My head-quarters continued until September to be at Coimbatore when I was transferred to Bellary. I was on duty the whole year with the exception of nine days' casual leave; 242 days were spent in camp involving journeys of 11,959 miles by rail, 521 by road and 28 by boat.

2. *Staff.*—The Sub-Assistant Director was relieved on the 30th of April to take up the post of acting Government Botanist.

The staff at present available consists of three Farm Managers and four Assistant Farm Managers. Some trouble has been experienced in getting suitable men to take up farm clerks' posts. The Hagari station was without one for some time. The work of my office has also been carried on under difficulties. I was without a second clerk for some time, and the transfer in September made it harder for the two clerks left to keep up with their work. No office building is yet available.

3. *Work.*—This is of a varied nature. During the year a new classification of accounts and a new system for maintaining farm records was worked out in consultation with the Deputy Director of Agriculture, Southern Division: it is now in use. The management of the farms still takes up the greater portion of my time partly owing to the inefficiency of the staff generally. District tours were made whenever possible and I spent some time in the Anantapur, Bellary, Kurnool, Cuddapah, Gódávari and Ganjám districts. A good deal of time was occupied in assisting Agricultural Associations in organizing exhibitions and replying to queries from them and private individuals. Requisitions for seeds were in most cases complied with. Several private gardens and estates were visited and advice given about crops and cultivation.

The Bellary Agricultural Station.

The year under report has at this station been one of failure owing to the failure of the rains; only one field of cotton gave anything like a crop and consequently the experiments in which this crop should have been grown this year have yielded no results. Main crop (hingari) jonna gave a small yield of withered fodder in the tillage plots; the mungari varieties of sorghum though severely tested gave more satisfactory results. Of experimental work there is accordingly little to report. The work of plantwar selection of cotton taken up last season for the first time is being continued. The examination of the second year's selection is now proceeding. The results appear to be extremely satisfactory. The piece of waste referred to in last year's report has been taken over, cleared and the whole southern and western boundary fenced. The well in No. 6 B has been enlarged with somewhat disappointing results. Some necessary drainage works were carried out in No. 7 while the spoil from the well has been utilised in making a cart road along the boundary between this field and No. 6 C.

2. The dry weather interfered with the distribution of the farm selected cotton seed, farmers in this district being accustomed to purchase their seed only at the last moment when the land is actually ready to sow. Out of a total of 6,707 lbs. from this and the Hagari Agricultural Station, 905 lbs. were utilised for sowing the two farms and for distribution free to the Anantapur Agricultural Association. Of the remainder 2,661 lbs. was sold at 15 per cent. above the ordinary market price to 117 individuals. It was originally intended to let no one have more than eight annas worth but later in the season this was abandoned. In order to push the sales a shop was rented in the bazaar and a conspicuous notice in the vernacular displayed. The total amount distributed in all ways was 4,873 lbs. leaving 1,834 lbs. which was utilised for cattle food. The stock of seed available this season is much smaller though *per contra* the demand is likely to be greater. Seven sets of Ceded districts implements were distributed during the year; four of these were for the use of the Home Farms in estates under the Court of Wards. An exhibit was prepared for the Mysore Dasarah exhibition which secured a bronze medal and some money prizes.

3. Three of the farm cattle were sold during the year and one pair was transferred from the Hagari station.

4. The farm is not visited so much as it should be by local cultivators. The Farm Manager o the messenger has been told to visit the market regularly on market days with samples of cotto and persuade the ryots to visit the farm. This has been to a certain extent successful : th excellence of the farm cultivation is generally admitted but its expense objected to. It may b noted that the crop in No. 7 was this year the only cotton crop near Bellary.

The Hagari Agricultural Station.

The year's record at this station was one of steady progress.

2. *Paddy experiments.—Irrigated cotton.*—Nine acres in field No. 2, the field intended fo irrigation experiments were levelled and laid out into plots and paddy sown in August and September. The yields from the first crop were naturally low but were higher than had been expected. A further area of nine acres was laid out for second crop but owing to shortage of water only three acres could be taken up. The paddy plots in Nos. 21 and 10 were devoted to experiments to discover the effect of season on paddy : two plots in each field are being sown each month throughout the year.

The water-supply has been very much lowered. It is not yet possible to say how much land can eventually be brought under permanent wet cultivation since secondary station has not been able to cope with the supply received from the big engine. A new engine is being established and next season 18 acres of wet land should be readily double cropped.

The experimental irrigation of country cotton was successful from a financial point of view. The cost of applying the water, excluding the cost of the water itself, was about Rs. 1–8–0, while the increase in cotton due to the single irrigation was valued at Rs. 8 per acre. The experimental cultivation of Egyptian cotton was again a failure. The establishment of this cotton under irrigation on lands commanded by the Tungabhadra project would make its financial aspect so much more certain that further trial is desirable. Sown early in the basins it should be more successful. A crop of country cotton raised in one of the basins yielded over 300 lbs. of kappas to the acre. This may be attributed as much to the moisture in the soil as to the fertility of the silt deposited.

3. With regard to dry crops experiments were carried out with regard to the discovery of the best method of spacing cotton. These were unsuccessful owing to the drought, though it may be noted that the basin crop mentioned above was spaced out 2 feet each way, that is, there were not more than $\frac{1}{10}$ of the number of plants usually sown per acre.

The season for all dry crops has been very severe : both korra and main crop jonna have almost completely failed. The farm is unfortunately overstocked with bullocks and the shortage of fodder will affect the balance sheet severely. It is not possible to sell them as there is now no demand. Two pairs have been supplied to the Nandyal Agricultural Station and three bullocks were sent to Bellary. One bullock died during the year. All the farm cattle were inoculated against rinderpest in June last.

4. The farm paddy cultivation is an object of interest to those farmers who own wet land along the Hagari river, while the engine and pump at the secondary station near the Kuggal Road attracts the notice of passers-by. Probably due to the demonstration at this station is the fact that two engines and pumps have recently been set up at Palthoor. The objects of the experimental work at this station are not capable of easy explanation though the selected cotton seed obtained from Bellary is getting known : a neighbouring Reddi grew 100 acres under an agreement but the crop was unfortunately lost. Avenue trees were planted along the farm roads during the year. Some wattle acacias obtained from Australia show signs of being useful trees for the sand dunes. Their growth is at present very satisfactory and as their bark possesses value as tanning material they may prove to be worth introducing. Casuarinas have been planted out along the river bank with moderate success. The season was all against the work.

5. Farm Manager M. Mangesha Rao deserves credit for his work during the year.

The Nandyal Agricultural Station.

This station is now in full working order. It has been properly fenced ; quarters for the Manager, cooly lines, an implement and cattle-shed and an office have been erected whil quarters for a farm clerk and a seed-store are nearing completion. During the year a well wa sunk, and the proper drainage of the farm was attended to.

2. Definite progress on the three lines of investigation pursued at this station may b recorded. The comparative trial of northern cotton and Gadag cotton have in a dry year proved the superiority of the former ; it produced better quality of [illegible] slightly lower percentage was more than counterbalanced by the higher yield of kappas. The general farm cotton crop was undoubtedly superior to the surrounding crops ; this may be put down to the use of better seed and the greater attention given to details of cultivation such as thinning and topping. The Farm Manager was moreover lucky in sowing early in August, most of the neighbouring farmers decided to wait for more rain and could not get their seed in until the latter half of September.

3. Efforts were made to attract visitors to the station and the local presses were of much help in sending their clients to see the farm cottons ; since it is hopeless to suppose that the department can ever supply seed to the whole district, the simple methods by which each farmer may select his own seed supply have been frequently explained. A small amount of seed was distributed with results partly encouraging—since the crop was reported by the growers to have yielded much more than local seed ; and partly disappointing—since, in spite of careful and continuous instruction in the matter, the recipients did not take the trouble to pick the strains separately. Offers have already been received from one or two influential reddies of the district to place their land at the disposal of the department for growing seed and to carefully follow the department's instructions in growing and harvesting the crop.

4. Investigations on the jonna crop have not yet definitely indicated a variety to be recommended for early sowing. Red No. 1, a strain selected at Bellary, did well the first year ; the seed is sweet and is much appreciated as a luxury ; but it was declared by some Odders who were at the time engaged in digging the farm well to be not sufficiently nourishing for men doing hard work. This season all the early sown varieties did poorly. The farm soil is locally known as one which will not stand much wetting and the heavy rain soon after mungari sowing gave the jonna a bad start.

Plots to compare three rotations introducing indigo, with the local two-year rotation of cotton and jonna, have been laid out and the first crop obtained. Careful valuation of the outturn will indicate definitely the profit or loss to be expected from growing this crop.

5. Interest in the farm cotton soil plough (Massey No. 1) is being aroused, and to meet the requests for its loan, two more ploughs have recently been ordered and will be lent free to any farmer who applies for them.

6. Two pairs of bullocks were received from Hagari in May 1907. One has been lame ever since it arrived and has never been able to do more than light work. A Veterinary Assistant has recently been treating it without at present any improvement.

7. The farm has been in charge of Farm Manager, Raghunatha Rao, assisted from 23rd October 1907 by a farm clerk. The Manager has, besides his work on the farm, toured in the district in connection with the grant of premia for the growth of pure cotton in this district.

success. One plot yielded at the rate of 866 lbs. It would appear that the best chance of introducing this paying crop is to sow it in April or May on ordinary wet lands and take a crop of paddy after it. It requires however a fine seed-bed and it is somewhat difficult to obtain this. Cultivation should be started a couple of months before. The fibre was fairly well reported on but should have been better: the differences in value between first and second quality jute are very marked. Two qualities of jute grown on the farm were valued at Calcutta at Rs. 6 and Rs. 4–11–0 per Bengal maund (82 lbs.): Gogu fibre was valued at Rs. 6–8–0 per maund.

2. Of miscellaneous crops on the farm, ground-nut is the most important. It was introduced for the first time during the present year and yielded over 1,280 lbs. per acre. It is being continued this year.

3. The land taken up in the "uplands" was cropped with canes and jute. The former grew fairly well and were quite free from disease. The latter was sown in April, May and June: the April plot gave 850 lbs. per acre, but the other two plots were failures. The land is being rented again this year.

4. Two innovations in the management of the farm are the introduction of permanent coolies for whom quarters on the farm are being found, and the trial of the share system of cultivation, under which one field will be cultivated entirely by farm coolies to whom money will be from time to time advanced, one-half the yield of jaggery being ultimately taken. A scheme for improving the water-supply is also under consideration.

5. The rest-house and Manager's quarters have been completed during the year under report: the old office has been converted into quarters for the clerk and the yard and the threshing floor and the implement-shed have been transferred to the high ground between the store and the Manager's quarters. The farm cattle have, with the exception of minor ailments, been generally in good health. The two stud bulls have been sold for their original price to the Ellore Agricultural Association as the demand for their services was not sufficiently great to warrant their retention.

6. The farm has been visited throughout the year by parties of cultivators to whom the objects and scope of the experiments have been explained.

The Hindupur Station.

Samples of fibre extracted from Agave rigida (Var: sisalana), Averacruz (American aloe) and Furcroea sp: at the beginning of the present year were forwarded to the Imperial Institute for report and valuation. It is satisfactory to note that the fibre was valued higher than Mexican "sisal", the relative prices being £36–£38 per ton and £34 per ton. The value was reduced owing to the colour being a little uneven. The A. Americana was valued at only £27–£28 per ton under the same conditions: Furcroca fibre was valued at £26–£27 per ton (with Mauritius hemp at £24–£30): it was described as superior to many specimens of this fibre recently received. Its extremely low precentage of fibre, ·34 per cent. of the weight of the leaf makes it quite impracticable to grow. Sisal or veracruz gave 3 per cent. and 1–4 per cent. respectively.

2. Experiments were also carried out to endeavour to ascertain the yield of leaf per acre. A cutting in May gave at the rate of 16,517 lbs. per acre: a further cutting off the same plants yielded in October 3,532 lbs. At three per cent. on the weight of the leaf this is 495 lbs. and 105 lbs. of fibre per acre, respectively.

3. It has been decided to extend the plantation for the twofold purpose of carrying out further experiments in method of planting and also to keep a stock of this variety for supplying outside demands. There seems little reason why on the drier and rockier soils it should not largely replace agave veracrus—the common American or blue aloe.

BELLARY,
4th May 1908.

R. CECIL WOOD,
Deputy Director of Agriculture, Northern Division.

ADMINISTRATIVE REPORT OF THE AGRICULTURAL STATIONS, SOUTHERN DIVISION.

The Taliparamba Agricultural Station.

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that showers were experienced till the end of December and ·13 inch of rain were recorded in February. The severity of the monsoon, attended by strong winds caused much of the pepper to shed, and the continuous rains prevented the late flowering pepper from setting. Newly planted pepper cuttings as well as standards also suffered.

3. *The pepper crop.*—A fair yield of pepper was obtained—nearly 2½ times last season's yield. Early-planted pepper cuttings have struck remarkably well and this is attributed to the careful preparation of the soil by digging and applying leaf-mould before planting. This seemingly obvious and necessary operation is quite contrary to the local practice, which is to plant first and dig afterwards and never to manure or apply leaf-mould. The effect of small quantities of lime with leaf-mould has been included among the manurial plots, but in all other respects the work is a continuation of that started three years ago. It is too soon yet to draw any conclusions from the various experiments. Improvements are noticeable but until the shade has been properly regulated and until the young vines have started to bear, it is impossible to say whether these are due to shade, aspect, cultivation, manuring or variety.

4. *Other crops.*—This agricultural station has been of use in other directions however. A series of paddy-spacing experiments successfully demonstrated that better crops of paddy could be grown with a lower seed rate and not such close planting. The experiment was watched with interest by visitors to the farm. Sugarcane was grown on 5 cents of land and attracted so much attention that 79 applications for cane sets were received from people who wished to grow these Mauritius canes. Jute, gogu (*Hibiscus cannabinus*) and sunn-hemp were sown in April as fibre crops and it was successfully demonstrated that good fibre could be grown on the west coast. Samples of the fibre sent to the Fibre Expert of Bengal were valued in Calcutta at Rs. 9–4–0 per maund for jute, Rs. 9 for gogu and Rs. 4 for sunn-hemp, the price of jute being at the time from Rs. 8–8 to about Rs. 9. More than sixty people intend to grow jute experimentally during this coming season. The cultivation of cholam (*Andropogon sorghum*) as a fodder crop was again a failure, but a more promising field for investigation lies in the study of the better indigenous grass under cultivation. Several of the best fodder grasses were collected and planted and two—Ambanpullu (*Andropogon contortus*) and Injikanapullu (*Panicum repens*)—of them have been found to grow right through the hot weather.

5. *Staff and touring.*—The staff consists of a Manager and an Assistant Manager. The Manager has spent a considerable time in touring. Besides giving advice and instructions regarding pepper and other cultivation in the adjoining taluks, he has toured in the Wynaad to see the methods of pepper cultivation adopted on several estates there. Twice he has made extensive tours in the South of Malabar, on one occasion to instruct members of local Agricultural Associations who had grown experimental crops of jute in the process of retting and on the other to ascertain the area likely to be planted with jute this coming season, so that arrangements for seed could be made in advance.

6. *Miscellaneous.*—The boundary fence enclosing the farm has been completed by the Department of Public Works during the year, and several other improvements have been effected departmentally—notably the construction of a storeroom, a cattle-shed, covered manure pits, a road leading up to the inspection bungalow and the lining with cut laterite stone of the two wells dug last year. Lantana which was spreading very rapidly on the wooded hill sides was completely cleared, and can now be kept in check with little trouble. Some two acres of jungle on good hill soil was uprooted and this will enable several crops, likely to be of value in the district to be tested. A pair of local working cattle have been purchased for the cultivation of the wet lands.

The Palur Agricultural Station.

Charge, objects with which the station was started and area.—The Palur Agricultural station has been under my charge since May 1st, 1907, when it was handed over to me by the Director of Agriculture. The primary objects of the farm were two—firstly, to study all the aspects of ground-nut cultivation and secondly, to introduce improved varieties of sugarcane into the district. To carry out this work 51·69 acres of land had been acquired, about 32 of which are dry and 20 wet land. The whole cultivated area has this year been brought under direct cultivation.

2. *The season.*—The season has on the whole been favourable. As one would expect, the first three months were very hot and dry, only 1·27 inches of rain being recorded, but after that seasonable rains fell at regular intervals until the end of December. During the first fortnight of November 21·00 inches of rain were recorded and twice during that time the whole farm was submerged under water causing some damage to rainfed groundnut crops. The delay in clearing the channel from the Tiruvadi anicut prevented many of the wet land operations being done in due season; thus the sugarcane planting was not completed until the middle of May and the jute was not sown until June. The channels were again choked up by the heavy rains in November and the paddy crop suffered from want of water at the most critical period of its growth.

3. *Dry land crops.*—Groundnut was grown under well irrigation on 7·60 acres of land. This was sown in February and March 1907 and harvested in July and August 1907. A series of manurial experiments were started then and the cultivation of varieties continued. This

area has again been planted in February 1908 and an additional area of one acre has been put under irrigated groundnuts on which different methods of cultivation and irrigation are being tested. *Rainfed groundnuts* were sown on 11·8 acres in August and September. Varieties were again tested and the local practices and mixed cropping were investigated and compared with other and newer methods of cultivation. On the remaining dry land areas the following rotation crops were grown :—cholam (*Andropogon sorghum*) mixed with pulse as a fodder crop for the farm bullocks, indigo varieties, fibre crops. Besides these, several irregular pieces of ground near the farm boundaries were utilised for growing guinea grass for fodder; and varieties of cotton, as well as two varieties of cowpeas received from the Inspector-General of Agriculture were tried. Both these last have proved to be much superior to the local varieties and will be grown on a larger scale next year.

4. *Wet land crops—Sugarcane.*—The whole of the 1906–1907 crop of improved canes as well as most of those grown at the Melrosapuram cane nursery were distributed to cultivators in this district and more than 60 acres were cultivated with these varieties. These have been greatly appreciated by all who cultivated them except where they were grown on low-lying badly drained land. The 1907–1908 crop is again being distributed free, but since the superiority, both in yield of cane and in the quantity of sugar over the local cane, is now fully realised only a limited quantity of 250 canes is given to each applicant, provided he was not supplied the previous season. Many ryots are now applying for these and several applications have also been received from other districts, notably Tinnevelly, Tanjore and Malabar. The department is greatly indebted to Mr. Neilson, the Manager of Messrs. Parry & Co.'s factory at Nellikuppam, for the assistance which he has rendered in introducing these canes and also for the following information regarding the superiority of the Mauritius over the local cane :—

Description of canes.	Brix.	Pounds of juggery per 10 gallons of juice.	Co-efficient of purity.
		lb. oz.	
Mauritius average of 31 results	18·66	21 8	85·36
Local average of 1,159 results	17·00	19 5	79·50

Now that the object of introducing these improved canes has been accomplished the area under sugarcane on the agricultural station will be reduced to 2 acres. This will render more land available for experimenting with the paddy crop which until this year was grown merely as a rotation crop for sugarcane. Several experiments were started this year with *paddy* cultivation. These include the following :—Methods of sowing and planting, manuring, green-manuring and varieties. These already show prospects of giving much valuable information of a kind which can be readily disseminated and they at the same time indicate the lines on which the experiments can be extended.

5. *Diseases and insect pests.*—The groundnut crops were not badly affected with "tikka" this season but the rainfed crop suffered severely from the "surul" caterpillar. One of the Entomological Assistants spent six weeks at this station and as a result the life history, habits and natural parasites of this pest have been fully worked out. Several remedial and preventive measures were exhaustively tried including "light traps", "spraying" and "bagging". Mr. Lefroy, the Imperial Entomologist, now considers that, after the "bagging" has been given a further trial, the results of this investigation can be published.

6. *Implements.*—Two bullock power waterlifts were tested on the station. These were erected by M.R.Ry. Rao Bahadur C. K. Subba Rao Avargal, Acting Government Botanist and one of them was considered sufficiently promising to have a properly constructed lift of that type erected. This is now nearly completed and will be erected in a few days. Attempts were made to secure a waterlift from the Deputy Director of Agriculture, Sindh, which is reported to work well, but owing to scarcity of skilled labour there, this could not be procured before the end of the year. Improvements in the shape of the country plough and the introduction of a harrow for after-cultivation have been appreciated. Demonstrations have been held and samples of these have been lent to several villages around the station and left in charge of the monigar. Both of these implements should prove extremely useful for the local dry land cultivation.

7. *Staff and touring.*—The staff of this station consists of a Manager, two Assistant Managers and 4 clerks. The agricultural officers have all had an opportunity of touring. The Manager besides attending to the Melrosapuram nursery while it was still being worked by the department has toured in the Tanjore district on three occasions and given advice and instructions to members of the local Agricultural Associations on the cultivation of trial plots of sugarcane and jute. He was also sent by the United Provinces to learn Mr. Hadi's method of making sugar. The Assistant Managers have each toured in the South Arcot district making enquiries regarding onion and plant-hemp cultivation and the general practices of dry land cultivation with mixed cereals and pulses in the Chidambaram, Kallakurichi, Villupuram and Tindivanam taluks.

8. *Miscellaneous.*—An additional area of 64 cents was acquired during the year, as a site for officers' quarters. The work of building these was put in hand as soon as possible and they will now soon be completed. Two apprentices were trained on the station and quarters were built to accommodate five apprentices. The cattleshed was extended to accommodate two extra pairs of bullocks obtained from the Saidapet Agricultural College Farm. Besides this an implement shed and a maistry's house are under construction. One of the wells which fell in was rebuilt and all the farm buildings were put into good order. Applications are frequently being received from all parts of the Presidency for groundnut seeds and 8,057½ Madras measures have this year been distributed. Many ryots and others visit the station and for their convenience all the plots have this year been labelled both in the Vernacular and in English. Many of them say that they will try on their own lands the new methods adopted on the farm which they see to give good results.

The Koilpatti Agricultural Station.

The Koilpatti agricultural station has been under my charge since April 20th, 1907, when it was handed over to me by the Deputy Director of Agriculture, Northern Division. The station is really two farms, a block of 25 acres on the red soil where most of the farm buildings are situated and another block a mile distant of 115 acres situated on the black cotton soil. There appears to have been no object in taking up the red soil block except that it was suitable for the erection of the farm buildings. The soil is naturally a thin coarse red gravelly loam, very unequal in quality and very shallow in places. It lies near the foreshore of a tank and the lower fields are often submerged or waterlogged when the tank is full. A small area has been considerably improved during the last few years by heavy applications of tank silt, but, much of it is so shallow or so badly drained that it would only be a waste of time and money to attempt to improve it. The black soil block was considerably extended in 1906 with a view to growing pure seed for distribution but in G.O., Mis. No. 1056 of 6th May 1907 orders were passed that the whole area should be devoted to the experimental cultivation of cotton. This, of course, cannot be brought about in a moment, nor would it be advisable as fresh problems constantly arise for which land will be necessary, besides which the ordinary rotation crops have to be considered.

2. *The season.*—This has been exceptionally favourable. Very good rains fell in April and May which meant an excellent summer picking of cotton—nearly 10 per cent. of the whole crop—good sowing rains fell with the north-east monsoon and the majority of the crops were thus sown in good time. The monsoon ended suddenly on November 10th when 7½ inches of rain fell. This caused considerable damage. Tanks were breached all over the country, and none of the rivers or drains could cope with this volume of water. The stream which flows through the farm overflowed its banks and swept through the crops washing away the soil and levelling the fence to the ground. Small rivers were flowing in all directions. From this time on till the end of February very little rain was experienced, but owing to the system of after-cultivation adopted on the farm the crops continued to grow well and record cotton crops are expected.

3. *Crops on the black cotton soil.*—Under cotton the following experiments were continued—Permanent manurial experiments with cotton every year. These have given some interesting results from a purely scientific point of view but are of no practical value. The cultivation of cotton year after year without any rotation is absolutely unsound and this course could never be advocated to the ryot. The outlay on manures is prohibitive for dry crops which have to depend on rainfall only. The percentage of lint is decreased in some cases as much as 5 per cent. It seems therefore that such an experiment is out of place on a District Agricultural station and if necessary at all, it should be carried out on the farm attached to the Research Institute at Coimbatore. Full details of this experiment will be found in the appendix to the Scientific report of this station. The manurial experiments with cotton grown in rotation with a cereal, are of much more value and many of the manures used here are within the reach of the dry land cultivator. It is here that the relative merits of the different system of collecting cattle manure are tested, and the cotton crop of this season shows these to be infinitely more valuable than any of the expensive artificial manures applied. One plot where cattle manure collected in a loose box was applied at the rate of about 7 tons per acre has yielded up to the end of the official year as much as 739 lbs. of kappas per acre and it is expected that the total yield will be well over 1,000 lbs. per acre or more than 250 lbs. of lint. A series of rotation experiments in which the effects of deep and shallow tillage are also being tested was started this year. The system of cultivation and the effects of selection have so improved the characters and habits of the local cottons that a series of spacing experiments is to be started, and preliminary trials to define the lines on which these should be conducted have been made during the last two years. Next season will see these properly started. The artificially fertilised cottons have this year been grown on a more extensive scale and the best plants have been tentatively selected. The kappas, lint and seed of each plant is now being weighed separately and several plants have been found to give as much as 33—34 per cent. of lint. If this character can be perpetuated it means that 1,500 lbs. of kappas instead of 1,900 lbs. will be required to make one bale of 500 lbs. of lint and it will also mean that the ryot who now usually sells his kappas will give this in his own village and sell the lint. In this way the supply of seed will be greatly improved.

A similar method of selection has been adopted with the crops raised from specially selected seed, and even here plants are found which give more than 32 per cent. of lint. All the available pulse crops have this year been under observation as a black cotton soil crop, as it is considered that there is a great need of a suitable pulse crop in the local rotation. Cumbu (*Pennisetum spicatum*) fodder cholam (*Andropogon sorghum Iringuwar*) have been grown as rotation crops for cotton. Paspalum dilatatum has been removed from the red soil block to the black soil where it has been planted on an irregular piece of lowlying land. Though this, in sub-tropical climates grows well on black cotton soil, it is very doubtful, if it will ever hold its own at low elevations in the drier regions of the tropics.

4. *Crops on the red soil.*—The ridge and furrow system of irrigation has again been demonstrated on the well irrigated lands. Ragi (*Eleusine coracana*) has again given an increase of more than 200 lbs. per acre under this system of irrigation. Ground-nuts were tried as a monsoon dry crop, but proved a failure, the season not being long enough to properly mature the crop. The fruit trees have been greatly improved by altering the system of irrigation. Guavas have done exceptionally well and as this promises to be a profitable cultivation on this class of land, it is proposed to plant up a larger area of land and treat this as an orchard under suitable cultivation. Several of the dry cereal crops commonly grown on this class of land were grown on the poorest portions of this area, while onions and sweet potatoes, and maize were cultivated on land commanded by wells.

5. *Diseases and insect pests.*—The following insect pests were noticed on cotton. The grey weevil which attacks the plant when in the seed leaf devastated one field of 5·7 acres. The same pest was reported to be doing considerable damage in Satur and Viruduppatti, but by the time an Entomological Assistant arrived, a rain had fallen, and the weevil had disappeared. The cotton aphis appeared in February and many of the ryots' crops suffered severely from this. The farm crops owing to their vigorous condition were however only slightly affected. The "Ver-puchi" was noticed in large numbers on the groundnut crop and specimens were collected by the Imperial Entomologist who visited the farm and who states that this is a species of Sphenoptera. Specimens of three fungoid diseases were forwarded to the Imperial Mycologist; one, a disease which does not appear to have been investigated before and which attacks the young cholam grain causing great loss through the whole of my division; another, the tobacco mildew, and a third, an obscure disease which attacks cotton.

6. *Agricultural operations outside the Agricultural Station.*—Though not actually a part of the operations on the agricultural station, the whole of the work carried out with the grant for cotton improvement is an outcome of the farm operations. Karunganni cotton, which now that it has been grown pure in a sufficiently large area to determine its value compared with Uppam was purchased and the seed sold to ryots. Agreements were taken out with ryots who grow the crop pure to sell kappas to the department. This was carefully dried, sorted, ginned and screened and the lint was sent to the British Cotton Growers Association for report. Their valuations will be found in the scientific report of the station. One hundred and fifteen pothies of seed of 250 lbs. were thus sold. The resultant crops were not as satisfactory as could be wished, the seed was too good and at the ordinary seed rate the crop came up much too thickly. The ryots were advised to sow a lesser seed rate, but they were unwilling to do so. They were advised to thin their crops when they were found to be too crowded but only the few who did this were more than satisfied with their crop, though many of them now realize that had they taken the advice given they would have had much better yields. As reported last year the methods adopted on the agricultural station for the cultivation of cotton attracted much attention and 50 persons, chiefly good black soil cultivators, agreed to try this system on their own lands. Thirty sets of implements, each consisting of a blade cultivator, seed drill, and three bullock-hoes, were made on the farm. Coolies, used to the working of these, were brought down from the Bellary district, and with their aid and that of the farm coolies, two hundred acres were thus sown and cultivated. Everywhere, where this has been tried the ryots speak well of the system. The crops are more vigorous and can withstand drought much better than the broad casted crops besides which the cultivation expenses are less. Many have asked for assistance this year to sow and cultivate their crops in this way and many of those who were assisted last year have already made arrangements with their own carpenters and blacksmiths to make these implements. It is expected that next season over 1,000 acres will be sown in this way. These experiments, conducted by ryots themselves, have done far more to spread the usefulness of the station than any amount of demonstrations conducted on the farm itself. Advantage has also been taken of fairs and local festivals to demonstrate these implements, but it is difficult to say whether work in this direction has borne much fruit.

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8. *Miscellaneous.*—An inspection bungalow has been completed by the Department of Public Works but has not yet been handed over. An Assistant Manager's quarters have been built on the black soil and several improvements are being carried out; such as the repairs of drainage channels on the black soil and the carting of silt on to the red soil. The cattle are in good condition though early in the year there was a serious outbreak of foot and mouth disease.

The Attur Agricultural Station.

This agricultural station has been under my charge since 18th April 1907 when it was handed over to me by the Deputy Director of Agriculture, Northern Division. The reasons why this land were handed over to the Agricultural Department are stated in paragraph 4 of B.P., No. 7532 of 24th December 1905, and the following were laid down as the main lines of experiment:—the thorough trial of perennial and exotic cottons under irrigation and the growth of fodder crops. The cultivation of fruit trees was also recommended as of secondary importance; while object lessons in the conservation and application of cattle manure should be demonstrated. The fact that practically the whole of the farm is covered to a considerable depth with drift sand from the Pálár river seemed to have been overlooked; hence the efforts of the department, while being of little use to the district, have mainly been directed in planting wind breaks to check the drift of the sand and in trying to improve the surface by application of clay and silt and by heavy manuring.

2. Under the present condition of the farm, however, a thorough trial has been made during the past three years with exotic and perennial cottons but only one has up to the present given a heavier yield than can be expected from a dry crop of indigenous cotton on good cotton soil. Seed has been selected from the best plants of several varieties to try again this coming season, but little hope can be held out of any ultimate success especially when these have to be cultivated on drift sand. Several fodder crops also have been tried. Lucerne grown under irrigation in 1906–1907 soon died when the hot weather set in. Maize under irrigation was sown on 1·40 acres of land and manured with 15 loads per acre of cattle manure, but this only produced a total of 2,282 lbs. of *green* fodder. Fodder cholam was grown as a dry crop in 1906–1907 on 13¼ acres of land, but this did not even produce sufficient straw to feed the three pairs of farm bullocks for the year. This year the straw crops have yielded even less. Guinea grass was accordingly planted on the land from which the maize had been harvested, after manuring with cattle manure at the rate of 28 cart-loads per acre and this is now being cut daily and fed to the farm cattle. Up to the end of the year 12,660 lbs. of green fodder had been cut. It was with the greatest difficulty that this was properly established as the surface sand dried out very rapidly after irrigation and the water at the time of irrigation washed the sand away from the forming roots. The yield of green fodder can now only be maintained by heavy manuring with cattle manure at frequent intervals. Fodder cholam under irrigation and heavy manuring is being grown this hot season to supplement the fodder supply for the farm cattle, which have been increased to four pairs. It is evident that this costly system of cultivation merely to feed four pairs of cattle is not one which would appeal to the ordinary dry land cultivator who has to maintain himself as well as his cattle, and that, as the manure produced by four pairs of cattle is but a small fraction of that required to grow ordinary crops on such poor land, it is impossible to demonstrate satisfactorily its preservation and application. The cultivation of fruit trees holds out a little hope of success as these are deeper rooted than ordinary crops. Two and a half acres of cocoanuts have been planted near the river bank and three acres of a wind break of mangoes, besides several lines of cashewnuts for the same purpose, have been planted, while six thousand casuarinas have been planted on the river banks and on the eastern boundary. Only the cocoanuts, however, require watering by direct flow, so that, even if the area of fruit trees is extended, the pump—the object and origin of the farm—will not be required for their irrigation, except for hand-watering.

3. It is therefore apparent that, as none of the original lines of work can be properly investigated and that, even if results had been obtained, they would be of no value to the district, some other line of work had to be developed in order to try and justify the existence of the expensive machinery and outlay on the station. Accordingly, intensive garden cultivation, which was tried on a tentative scale last year, has been considerably developed during the latter part of the year and it has been found that, with very heavy manuring, copious irrigation, constant hand-weeding and attention, a few of these garden crops can be profitably grown. Even these results, however, have little or no actual value. Much of the success is due to very local facilities. Manure (of which some 1,400 loads have been purchased) can be obtained from the Chingleput Municipality. Markets for fresh produce are at hand both in Chingleput and, by means of the railway, in Madras, while the water-supply of the farm is quite beyond the reach of the ordinary cultivator of the poor dry land of the district.

4. The staff of the station consists of a Manager and an Assistant Manager. Very little touring has been done as it is not possible to test improvements on the farm lands. Much of the officers' time is occupied in maintaining the engine and irrigation records, which however can be of little value when far more water than is actually required by the crop has to be poured on to the sand before the irrigation of a field is completed.

5. *Miscellaneous.*—Brick and chunam water channels have been constructed to carry the irrigation water over the drift sand and under the road to the east block. The fencing has been extended on the northern boundary to the river bank. An extra pair of bullocks have been purchased to cope with the carting of manure from the town.

TRICHINOPOLY,
1st *May* 1908.

H. C. SAMPSON,
Deputy Director of Agriculture, Southern Divn.

THE ADMINISTRATIVE REPORT OF THE CENTRAL FARM AT COIMBATORE.

The land selected for the Agricultural College and Research Institute and Central Farm is situated mainly in the village of Thelungapalayam, three miles to the west of the town of Coimbatore, and was acquired in February 1906. The total area of the estate is 450·66 acres, of which 45·50 acres is wet land irrigated from the Krishnambuthi tank, which is itself supplied from the Noyil river by the Chitrachavadi channel. On the dry land, both red and black soils are represented and the characteristics of both varieties vary very considerably in different parts. One hundred and twenty-six acres of black land and 161 acres of red land are under cultivation, the remainder of the estate being occupied by buildings, compounds, etc., and works in connection with the building operations. In the south-west corner of the Farm, there is a patch of distinctly alkaline soil. On the western half of the farm, there are eleven wells for irrigation; the water from these is however highly charged with salts.

2. The Farm is at an elevation of about 1,350 feet above sea level and is approximately flat, there being a difference of 37 feet between the highest and the lowest points, which are 1,650 yards apart. The difference of level between contiguous fields on the red block is just sufficient for efficient irrigation.

3. *Climate.*—The south-west monsoon sets in about June 1st, causing a considerable drop in temperature but bringing little rain; what does come is in the form of drizzle and, owing to the high wind, irrigation has to go on practically the same as in the hot weather. The south-west wind begins to slacken about the middle of August and the north-east wind sets in about the beginning of October, bringing with it the greater part of the annual rainfall. In December, there are occasional rains but January, February and sometimes March are dry months. In April and May, thunder-storms are expected, which enable ploughing to be commenced. The climate is decidedly dry and, without irrigation, only one crop is possible during the year. There are two main seasons for sowing; April, for an irrigated crop of cholam which is reaped at the end of July; and August, for the main crop of cholam reaped in December or early January. On the wet lands, water is received about the middle of July and the paddy harvest is in January. Cottons are sown at the beginning of October and picking commences in March and last into May. The thunder-storms experienced in April and May give the cotton plants a fresh start and a second picking of somewhat inferior cotton is sometimes obtained.

The last year was characterised by an excess of rainfall, amounting to about ¼ of the total; hence, the seasons were, on the whole, favourable. The Kar rains, *i.e.*, those of April, were particularly heavy. The following table gives particulars of the rainfall, compared with the records of Coimbatore town, three miles away:—

RAINFALL during 1907–1908.

Locality.		April.	May.	June.	July.	August.	September.	October.
1		2	3	4	5	6	7	8
Agricultural College.	Rainfall .. In.	3·66	1·74	2·60	0·84	1·89	1·28	5·37
	Number of days upon which rain fell.	8	10	10	7	11	6	13
Coimbatore Town.	Rainfall .. In.	3·86	2·11	3·35	0·83	1·80	0·92	4·87
	Number of days upon which rain fell.	7	7	7	4	6	4	9
Average for Coimbatore ..		1·69	2·51	1·77	1·36	1·03	1·56	6·13

Locality.		November.	December.	January.	February.	March.	Total.
		9	10	11	12	13	14
Agricultural College.	Rainfall .. In.	3·48	2·49	0·46	0·52	0·61	25·54
	Number of days upon which rain fell.	9	6	2	4	2	87
Coimbatore Town.	Rainfall .. In.	3·34	2·66	2·34	0·65	1·24	27·68
	Number of days upon which rain fell.	7	6	3	3	2	64
Average for Coimbatore ..		3·50	1·02	0·41	0·38	0·46	21·87

At a station situated as this is, only six miles from the foot of the hills, the rainfall is very erratic; numerous instances have occurred of heavy rain on one side of the farm with very little on the other.

Buildings.—The farm buildings were taken over from the Public Works Department at the end of July. They consist of two ranges of cattle-stalls having hard floors and drains and one range of cattle-boxes, in which the cattle stand upon the accumulated bedding refuse. These cattlesheds are protected from the south-west wind by an L-shaped range of grain-stores, godowns and implement-shed. To the east of the cattle-byres, there is a range of buildings suitable for machinery, such as cotton-gins, oil-mills, etc. Carpenter's and Blacksmith's shops are also provided.

Covered manure-pits are provided to receive the solid and liquid excreta and litter from the two byres.

Implements.—It has been found that, upon the greater part of the soils of the farm and, especially, upon those which have been improved by "silting", a wooden plough is more useful than an iron one for the reason that the soil, when in an excellent condition for working into a tilth with the country plough, is sufficiently moist to stick together and to clog on the mould board and share of the iron plough in such a manner as to render the mould board almost inoperative. Iron ploughs, however, if strong, are particularly useful in entering and breaking up the land from which a crop has just been harvested or which has become dry. Attempts are made to have all the fields on the Farm which are of sufficient size ploughed deeply with an iron plough at least once a year. The working down of the rough-ploughed field will then be done by country ploughs after a rain.

Two Martin's cultivators have been received from the Director of Agriculture and have been found to do good work in stirring a field deeply after it has been ploughed. The land bakes too hard for this tool to be used in the hot weather for breaking up the surface. When working under suitable conditions, however, they have excited considerable interest among ryots who have visited the Farm.

The winnowing machines are found extremely useful and are the cause of much comment from passers-by. A trial was made of the method of threshing by means of a stone roller drawn in a circle by means of a pair of bullocks. For varieties of grain, such as white cholam, which readily separate from the glumes, it is particularly useful as one pair of bullocks do the work instead of four. The roller used was found to be somewhat too heavy and further experiments will be made with a lighter one.

A portable combined oil engine and 3" centrifugal pump have been received and will be put into work as soon as possible.

As far as possible, all crops are sown with the gorru and interculture done with dhanthalu.

Cattle.—The working bullocks are chiefly of the Kangayam breed, with a few of the Alambadi hill breed. There are five cows of a mixed Nellore breed which have been transferred from the old College of Agriculture at Saidapet. These cows are good milkers but, for working cattle, it was thought more desirable to attempt to breed a few pure Kangayam cattle as this breed is the best in the district. To this end, four cows and a young bull have been purchased from one of the chief breeders in the Kangayam country.

Crops.—The crops grown were those usually found in the locality and very few attempts have been made to grow a crop foreign to the district. Attention was paid to methods of cultivation rather than to obtaining results with a liberal application of manure. With the exception of nitrate of soda, no artificial or rather concentrated manures have been used. It is considered that more useful impression will be made upon the minds of the ryot-visitors if good results are obtained with ordinary manures than if these results are obtained with substances so costly as to be practically beyond their means.

Paddy.—Experiments upon this crop were made to ascertain the effect of transplanting seedlings singly instead of the more usual practice of transplanting them 10 to 20 at one time. The question of the economical supply of green leaves as manure also received attention.

Spacing and transplanting experiment.—The piece of land selected was so situated that each experimental plot took water directly from a field irrigation channel and discharged into a drain independently of the rest. This would tend to eliminate the differences which might be due to the richer, *i.e.*, more silt-laden, water received by the upper field of a series irrigated from field to field. The plots, with the exception of the unmanured plots, were all given a dressing of five cartloads of Kolinji (*Tephrosia purpurea*) leaves and stems per acre. An unmanured plot was arranged at the top and at the bottom of the series. No especial attention was given to the irrigation and general cultivation of these fields, local practice being followed. The variety employed was chinna samba, a rather fine-grained paddy and one with a considerable local reputation. Before giving the results, it may be as well to give an account of the local system of transplantation and seed-rate. Seed is sown at the rate of 250 measures of 288 tolas weight per acre of seed-bed. One acre of seed-bed is considered sufficient to transplant 16⅔ acres. When about 40 days old, the young plants are transplanted, 20 women being required to plant one acre a day. The seedlings are rapidly pressed into the puddled soil, approximately in rows and about five inches apart in the row; sometimes one, sometimes two or three, sometimes up to six or eight at a time, according to the size of the seedlings. The planter apparently determines the quantity by the feel of the seedlings as she picks them out of the bundle in her left hand; consequently, if they are well developed, she only takes two or three but, if poorly developed, any number up to about ten, depending upon the thickness of the young plants. It will be thus seen that the local custom is not particularly wasteful of seedlings and therefore "single-planting" does not show to the advantage it would do in some other districts. In our experiments, the seedlings were all transplanted on the same day and were 30 days old. In spacing, it was considered useless to expect a woman to measure the distance between seedlings with a piece of stick cut to a definite length; therefore, two natural measures of distance were adopted—(*a*) the width of the hand with the fingers closed, (*b*) the full span with fingers spread open. Of course, this distance will vary somewhat with individual planters but its practical convenience far outweighs any advantages obtained with pieces of stick cut to dead length. It was found that twelve women were required to transplant one acre per day on account of the time taken in getting either single or a definite number of seedlings and in spacing them out.

The results for this year are somewhat erratic owing possibly to differences in the condition of the plots. The experiments will be repeated next year on the same piece of land with the same manure, but the order of the plots altered so that a plot planted closely this year will be planted widely next year.

FINAL results of method plots—Variety tried—Chinna samba.

Number of series of plots.	Method adopted in transplanting.	Area in cents.	Weight of grain in lbs.	Weight of straw in lbs.	Acre average in lbs.		Remarks.
					Grain.	Straw.	
1	2	3	4	5	6	7	8
A–1 ..	Local method ..	18	502	630	3,869	4,769	Series A-2 and A-18 are no-manure plots.
A–2 ..	Do. ..	9	274	408	3,044	4,533	
A–3 ..	Do. ..	15	509	728	3,393	4,853	The rest were manured with Kolingi leaves at the rate of 3,000 lbs. per acre.
A–4 ..	Do. ..	16	511	728	3,406	4,853	
A–5 ..	Local single ..	16	486	608	3,037	3,800	
A–6 ..	Do. ..	16	234	373	3,340	3,730	
A–7 ..	Local twos ..	16	526	760	3,350	4,750	Local method— Number of seedling 4 to 10. Spacing 4" to 7".
A–8 ..	Singles, 3" apart ..	12	266	444	3,050	3,700	
A–9 ..	Singles, 9" apart ..	17	553	636	3,253	3,741	
A–10 ..	Do. ..	13	335	388	2,577	2,985	For the local method plots, seedlings were raised with 30 local measures per acre; for the other plots at 4 measures per acre.
A–11 ..	Do. ..	21	752	912	3,581	4,343	
A–12 ..	Do. ..	11	349	420	3,173	3,818	
A–13 ..	Twos, 9" apart ..	19	720	816	3,789	4,289	
A–14 ..	Do. ..	17	512	504	3,012	2,965	
A–15 ..	Threes, 9" apart ..	22	772	815	3,509	3,705	
A–16 ..	Local method ..	20	557	548	2,785	2,740	
A–17 ..	Do. ..	25	695	716	2,780	2,864	
A–18 ..	Do. ..	16	334	448	1,856	2,489	

A striking feature is the exceedingly high yield of field No. A–1, local method. This can be however explained by the fact that this field is at the top of the series and is the one which in former years had received water directly from the channel. In the no-manure plots, plot A-2 was likewise at the top of the plot and A-18 is at the bottom. Considerable difference will be observed in the yield of these two plots, and part at least of this difference may be set down to the effect of previous years' silting from channel water.

Green manuring.—Since green leaves and twigs of plants are used in large quantities for manuring paddy lands and are often brought from great distance at considerable expense, experiments were made to ascertain whether it was possible to utilise the bare paddy lands themselves during the dry season to grow leguminous crops which could be ploughed in at the beginning of the cultivation season. Two acres of land were sown broadcast with horsegram, as soon as the land was moderately dry after harvest. A ploughing was given to break up the crust and another cross ploughing to cover the seed. The growth was slow during February and March, but with the advent of the kar-rains, the plants recovered, and an excellent crop of green stuff was obtained so much so that sufficient was obtained to manure a third acre. The crop was trodden in in puddle after ploughing also in puddle.

Comparison is made with fields manured with Erukkum (*Calotropis gigantea*).

Yields in lbs. per acre—

——	A.		B.		C.	
Variety.	Horsegram grown on spot.		Horsegram brought from A.		Ordinary leaves.	
	GRAIN.	STRAW.	GRAIN.	STRAW.	GRAIN.	STRAW.
Sadai samba	3,060	3,005	3,230	3,624	2,466	2,380

It will thus be seen that the result was quite satisfactory, especially from the economic point of view: because the expense of bringing the ordinary green leaves from a great distance was avoided. Although it appears more advantageous to grow the horsegram elsewhere than to grow it on the spot, this result may possibly be due to certain peculiarities in the soil. The advantage of the horsegram over the non-leguminous erukkum leaves is most marked in both cases.

Cholam. (*Andropogon sorghum*).—An attempt was made to grow irrigated summer cholam in rows and to irrigate the crop by means of furrows between the rows, instead of the usual method of making small flat beds, since it seemed that considerable waste of water from evaporation occurred in the latter case, owing to the large area of moist soil exposed to the sun. It was, however, found very difficult to get the land into a sufficiently fine tilth for sowing with a gorru (country drill) and also the men were not able to drill with sufficient accuracy. The results therefore are not satisfactory as far as yields are concerned: but it was found that less water was required when the crop was irrigated in furrows and experiments are about to be undertaken to test this point quantitatively.

Cotton.—A portion of the land was ploughed during the hot weather with Massey's cotton soil plough, which breaks up the land to a depth of 9 or 10 inches and leaves it in such a rough condition that it will readily hold any rain water falling upon it. In March the effect of this could be readily seen in the more green appearance of the crop, compared with that on land worked with the country plough only. Most of the cotton was sown with the gorru (country drill) and hoed with the dantha (bullock-hoe); but a stretch, one chain wide, across the field was sown and worked in the local manner for comparative purposes. Little difference could be discovered in the appearance of the growing crops, and any superiority in the drilled crop for this soil must be manifested in improved yield.

Mixtures of cotton and thenai and cotton and horsegram were grown as well as pure cotton.

At the time of writing, the cotton harvest is just beginning and results must be deferred to the next report.

Ragi. (*Eleusine coracana*.)—This was grown under irrigation upon the ridge system and, owing to the fact that the ragi is transplanted, the method is perfectly satisfactory. Unfortunately, however, the field set apart for a comparative test of the two methods was badly attacked by a stem borer and the crop practically destroyed. Hence, no comparative results can be given. The same economy of water was noticed as in the case of cholam.

Sugarcane.—A series of six plots was set out as a variety test and for the purpose of affording material for distribution, if cultivators desired to test any of the Mauritius canes. The varieties were Puvan, white Namam (striped), Red Mauritius, Striped Mauritius and Ashy Mauritius. The three Mauritius canes were received from Samalkota and Palur and the other three were local. The land selected turned out to be somewhat alkaline and the well commanding the field gave water decidedly rich in salts; thus the conditions were not very suitable for the production of a heavy crop of cane. The Namam cane occupied the plot nearest the more alkaline portion of the field and was a total failure; its growth was insignificant from the very beginning. Ashy Mauritius gave promise of being the best of the lot; it tillered remarkably well and, although planted very thinly, looked like giving a good yield. When eight months old, however, it began to flower and from that time was surpassed by others. Red Mauritius tillered more freely than the others; and provided the canes grow to a good length as would probably be the case in wet land, the seed rate of 7,500 per acre would be quite sufficient for a good crop. No flowers were observed on this variety.

Striped Mauritius cane was not remarkable in any way during its growth. Several "sports" were observed, the products being ashy coloured and white with faint reddish markings (ivory).

The area of each plot was 30 cents, the manure applied was neem cake 1,600 lbs. per acre in two applications. The canes were planted at the rate of 7,500 per acre in trenches arranged perfectly level so as to hold irrigation water. As soon as the canes were about one foot high, the ridges between the rows were split and a trench formed between each two rows of canes. This arrangement was found to afford an ample means of irrigation. Harvest operations were about to commence at the date of this report and statistics regarding yield must be deferred to next season.

Ground-nut.—This crop was grown on the most sandy piece of land on the farm, which for six months had been allowed to be waste. When the land became softened by the kar rains, it was thoroughly well ploughed and cleaned and was sown with horsegram which was ploughed in, before the sowing of the ground-nuts. The idea was to ascertain whether ground-nuts would grow without irrigation with the conditions as to rainfall, which prevail at Coimbatore during October and November, and at the same time to have the crop under observation. The varieties sown were received from Palur Agricultural Station and were "Local" Mauritius and small Japanese, only a very small quantity of the latter being sown. They were sown on 12th August in rows about one foot apart by women who dropped them into the furrow made by a country plough. A second plough then came along and covered them up. The ploughmen were able to go perfectly straight and the distance between the rows was quite uniform. A small portion was sown in rows 18 inches apart and another portion was ridged up and the seeds dibbled on the tops of the ridges. The results of these modifications were unsatisfactory. If the seed is sown as much as 18 inches apart it is too long before the land is covered by the plant, and weeds become troublesome, and that sown on ridges has no support for the spreading branches. After the seed was sown, a period of dry weather set in, but the water in the soil was sufficient to cause good germination and early growth. Later on, however, the plants came to a standstill and the leaves wilted every day when the sun became powerful, recovering themselves in the night. As soon as the north-east rains set in, the crop made excellent growth and was harvested at the end of December.

The Japanese ground-nut is a variety whose branches have an ascending habit, instead of creeping along the ground. A large number of stalks of nuts were observed descending from the upper portion of the branches to the ground. Some were quite six inches long. It appears therefore that this variety might be tried at the *bottom* of a trench, the sides of which would afford a refuge for these developing nuts with a corresponding increase in the yield of the crop. Experiments upon this point will be undertaken next season.

The harvesting of ground-nut is an expensive operation if performed by crow-barring up the land. It was therefore decided to try the effect of drawing a broad share underneath the crop and so loosening the soil from which the nuts would then readily separate without being torn off the plants. The plants then being gathered into heaps are readily picked over by women. Such a share is provided with Martin's cultivators, one pair of bullocks being found quite sufficient to pull the implement.

Pulimanji or Gogu (*Hibiscus cannabinus*).—This crop was grown again as a field crop in the north-east monsoon, in order to ascertain whether the rainfall would be sufficient for the growth of a fair crop. The seed was sown on 16th October and harvest took place on 6th, 7th and 8th March. Four waterings were necessary—one in December, two in January and one in February; but in the earlier stages the rainfall was sufficient. Where the land was in good condition, one side of the field being inclined to be alkaline, the plants grew to a height of 6 to 9 feet. The plants were retted in small quantities at a time to economise water. Four retting pits were dug, each about 10 feet long and 6 feet wide. When sufficiently retted the separated fibre was washed in the water flowing along an irrigation channel leading from a well. This method ensures a continuous supply of clean water without waste or extra expense for lifting.

Figures for the yield of fibre cannot be given as the whole of the crop is not yet retted.

Jute.—A portion of the same field which was under gogu was sown with jute at the same time and treated as far as possible similarly; but the crop, as far as fibre was concerned, was a failure—the plants only grew to a height of about 4 feet.

For growing in places where there is not abundant water or rain, gogu seems to be the more satisfactory fibre plant of the two.

Manurial experiments.—With one exception, no experiments with concentrated manures were made, as attention was paid more to methods of cultivation. It having been suggested that nitrate of soda should be tried as a manure, a quantity was obtained. As locally the unirrigated black soil never receives manure, it was thought that the results of a top dressing of nitrate would be well shown on such soil. With this idea, therefore, a stretch of land, one chain wide, was marked off on the cotton fields at right angles to the general line of cultivation and dressed with one cwt. of nitrate per acre on 16th November. The conditions were very favourable, as the land was moist and rain fell slightly two days after it was sown. The result was negative—not the slightest difference in the appearance of the cottons treated and untreated could be detected. Part of the land included mixed cotton and thenai. Here again, there was no effect. This result is of considerable interest, in view of the fact that on chemical analysis these soils are found to contain very little nitrogen.

The cottons of the treated portion are being collected separately in order to ascertain whether the yield is affected.

Ensilage.—In November 1906, two plain earth silos were excavated and filled with fodder cholam and cumbu chopped by hand into pieces about six inches long. The silos were circular and were 21 feet in diameter by 10 feet deep and 27 feet in diameter by 10 feet deep, respectively. They were opened for use in May 1907. A small quantity at the top was rejected, but the main quantity was quite good and sweet; and after a day or so readily eaten by the farm bullocks.

Number of bullocks fed per day	60
Total number of days the fodder lasted	49
Total weight of ensilage removed	64 tons.

It was given mixed with dry cholam straw. The value of the ensilage was not so apparent last season as it might have been, because of the exceptionally heavy kar rains causing a plentiful supply of grass, which can be obtained for two annas a headload. This year the experiments have been repeated; the silos, however, have been made rectangular, each 30 feet long, 12 feet wide and 6 feet deep. They were filled with fodder cholam; in one case cut into small pieces and in the other case the cholam was put in without cutting, as the time occupied in cutting was too great.

The results of the experiment will be inserted in the next report as the pits have not yet been opened.

COIMBATORE,
6th *May* 1908.

C. J. W. SHEPPERSON,
Principal of the Agricultural College and Research Institute and Superintendent of the Central Farm, Coimbatore.

MISCELLANEOUS WORK DONE BY THE DIRECTOR OF INDUSTRIAL AND TECHNICAL INQUIRIES.

IRRIGATION PUMPING DEPARTMENT.

At the beginning of the year the total number of oil-engines and pumps at work or in course of erection was 54 and, during the year, I have received information regarding the installation of 40 new engines, nearly all of them having been put down in accordance with plans drawn up in this office. This makes the total number of engines on our list which are, or will shortly be, pumping water for irrigation 94, aggregating 640 B.H.P. and driving pumps, the combined discharge of which is 2½ million gallons per hour. The duty of water under these pumps is not less than 150 acres per cubic foot per second and, assuming that the pumps work on an average 8 hours a day, the area under irrigation will amount to about 5,000 acres. The whole of this area is either double cropped or devoted to garden crops and without doubt will yield a gross return of more than Rs. 100 per acre per annum. At this low figure the annual value of the produce due to irrigation by pumping by private installations amounts to 5 lakhs of rupees. This is only a rough estimate and does not pretend to any great degree of accuracy and is only put forward to give some idea of the gradually growing importance of this method of irrigation. The following list gives the names of the owners and details regarding the new installations:—

1. A 9-h.p. engine and 4" pump for M.R.Ry. S. Panduranga Mudaliar, Cuddalore, South Arcot district.
2. A 6-h.p. engine and 4" pump at Koliyanur, South Arcot district, for M.R.Ry. Rama Reddi.
3. A 7½-h.p. engine and 4" pump at Kalinjikuppam, South Arcot district, for M.R.Ry. V. Desikacharriar.
4. A 7½-h.p. engine and 4" pump at Karumampakam, South Arcot district, for M.R.Ry. Ranga Reddi.
5. A 7½-h.p. engine and 4" pump at Nellikuppam, South Arcot district, for M.R.Ry. Appavoo Padaiachy.
6. A 6-h.p. engine and 4" pump at Anichampaliem, South Arcot district, for M.R.Ry. Nallambala Chetty.
7. A 7½-h.p. engine and 5" pump at Ariyalur, South Arcot district, for M.R.Ry. V. Rangacharriar.

8. A 7½-h.p. engine and 5″ pump at Melrajankuppam, South Arcot district, for M.R.Ry. N. Raghavachari.

9. A 9-h.p. engine and 4″ pump at Anathur, South Arcot district, for M.R.Ry. Sabapathi Pillai.

10. A 10½-h.p. engine and 6″ pump at Malligrampattu, South Arcot, for M.R.Ry. J. Doraiswami Reddiar.

11. A 6½-h.p. engine and 3″ pump at Siruvanur, South Arcot, for M.R.Ry. Dorai Raja Mudaliar.

12. A 10½-h.p. engine and 5″ pump at Kavanipakam, South Arcot, for M.R.Ry. Seetharam Reddiar.

13. A 7½-h.p. engine and 4″ pump at Arigilavadi, North Arcot, for M.R.Ry. Venkatasubba Reddiar.

14. A 12-h.p. engine and 5″ pump at Gudiyáttam, North Arcot district, for M.R.Ry. M. Govindasawmi Nayudu.

15. A 7½-h.p. and 4″ pump at Mangaducherri, North Arcot district, for M.R.Ry. N. Krishna Rao.

16. A 7½-h.p. engine and 4″ pump at Walajah, North Arcot district, for M.R.Ry. M. Muniswami Reddiar.

17. A 7½-h.p. engine and 3″ pump at Kálahasti, North Arcot district, for Raja P. Rama Rayaningar, M.A.

18. A 10½-h.p. engine at Arni, North Arcot district, for the Jagirdar of Arni.

19. A 5-h.p. engine and 3″ pump at Nallur (near Wandiwash), North Arcot district, for M.R.Ry. N. Govinda Reddi.

20. A 7½-h.p. engine at Ramaiyapatnam, Nellore district, for Mr. Dastagiri Sahib.

21. A 9-h.p. engine and 6″ pump at Achialpuram, Trichinopoly district, for M.R.Ry. Subbaroya Pillai.

22. A 10½-h.p. engine and 4″ pump at Palathur, Anantapur district, for M.R.Ry. Venkataramanappa.

23. A 10½-h.p. engine and 3″ pump at Palathur, Anantapur district, for M.R.Ry. P. Kurugodappa.

24. A 6-h.p. engine and 3″ pump at Anamalai, Coimbatore district, for M.R.Ry. V. Chikka Naicker.

25. A 7½-h.p. engine and 4″ pump at Ravanasamudram, Tinnevelly district, for M.R.Ry. R. Sivarama Aiyar.

26 & 27. Two 12-h.p. engines and two 10″ pumps at Mangalagiri, Kistna district, for the Atmakur Lift Irrigation Company, Limited.

28. A 16-h.p. engine at Gudiváda, Kistna district, for M.R.Ry. V. Seshayya.

29. A 5-h.p. engine and 3″ pump at Alinjivakam, Chingleput district, for the Zamindarni of Alinjivakam.

30. A 6-h.p. engine and 4″ pump at Orakkadu, Chingleput district, for the Zamindar of Orakkadu.

31. A 6-h.p. engine and 4″ pump at Punjetti, Chingleput district, for M.R.Ry. Appavoo Mudaliar.

32. A 7½-h.p. engine and 4″ pump at Kaliyanur, Tiruvallúr taluk, Chingleput district, for M.R.Ry. Seetharam Nayudu.

33. A 7½-h.p. engine and 4″ pump at Manjankaranai, Chingleput district, for M.R.Ry. Ramakrishna Nayudu.

34. A 3½-h.p. engine at Surapet, Chingleput district, for Messrs. T. R. Tawker & Sons, Madras.

35. A 7½-h.p. engine and 4″ pump at Surapet, Chingleput district, for Messrs. T. R. Tawker & Sons, Madras.

36. A 6-h.p. engine and 4″ pump at Government Farm, Hagari, Bellary district.

37. A 7½-h.p. engine at Mannadipet, South Arcot district, for M.R.Ry. Viswanatha Reddi.

38. A 7½-h.p. engine and 4″ pump at Veermachampetti, Trichinopoly district, for M.R.Ry. Rama Aiyar.

39. A 9-h.p. engine and 5″ pump at Anamalai, Coimbatore district, for M.R.Ry. L. Subbaraya Mudali.

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2. Agricultural loans to the extent of Rs. 22,000 were granted to the following applicants during the year and there are still a large number of applications for such loans pending:—

List of loans sanctioned from 1st April 1907 to 1st May 1908.

			Rs.
1.	M.R.Ry.	Chikka Naicker of Anamalai, Coimbatore district ...	2,500
2.	,,	Ratnasabapathi Mudaliar, Tondiarpet, Madras ...	2,500
3.	,,	Appavoo Padaiachi, Nellikuppam, South Arcot district ...	3,000
4.	,,	V. Desikachari, Tiruvendipuram, South Arcot district ...	3,000
5.	Zamindarni of Alinjivakam, Chingleput district		1,500
6.	M.R.Ry.	Rama Aiyar of Viramachampatti, Trichinopoly district...	4,000
7.	,,	Paramasiva Gounden, Vadakariattur, Trichinopoly district	500
8.	,,	L. Subbaraya Mudaliar of Anamalai, Coimbatore ...	5,000
		Total ...	22,000

3. The bulk of the engines and pumps have been purchased from Messrs. Massey & Co. on the hire-purchase system, the terms of payment usually being one-fourth of the cost when the agreement is signed and three subsequent instalments of one-fourth of the cost at intervals of six months, interest being charged on the balance due at the rate of 8 per cent. per annum.

4. The centre in which oil-engine irrigation is most rapidly developing is the South Arcot district where there are now 83 engines and pumps at work. The reason of this is that the soil is fertile and there is a very abundant supply of water in beds of coarse sand lying from 10 to 15 feet below the surface of the ground. To the north of Madras the boring operations in the Ponnéri and Tiruvallúr taluks have revealed extensive supplies of sub-artesian water, and within the last three months five engines and pumps have been purchased by local ryots in addition to three engines and pumps already installed by Mr. Gopinatha Tawker in Surapet. In previous reports and in a number of papers which I have written upon the advantages of this method of irrigation I have dealt with most of the questions connected with this work, and it is unnecessary to unduly lengthen this report by going over the same ground again. I append, however, a copy of the paper on "Lift Irrigation", which was contributed to the Industrial Conference held at Surat in December 1907, as it contains a fairly full statement of the present position.

5. From the facts stated above it will be seen that irrigation with water lifted by oil-engines and pumps is making steady progress and this is sufficient evidence that the same is profitable. It is very difficult to get any reliable information regarding actual profits, and on this point I am only able to submit conclusions based on general observations and on the reports of my subordinates. In a few cases the installations have been badly managed or from unavoidable causes crops have suffered injury, with the result that the working has entailed a loss or very little profit, but in most cases the returns have been excellent and it would probably be an underestimate to place the net profit at 25 per cent. per annum on the capital invested in the installations and in the improvement of the lands The high prices at present prevailing have placed the ryots in a very enviable position, and as the cost of labour and cattle have risen proportionately they are beginning to appreciate the advantages offered by these powerful labour-saving devices. In those tracts where water is abundant it is the smallness of the holdings and the lack of capital that delay the adoption of irrigation by pumping. There is no longer any doubt about the advantages of this way of lifting water. The ryot is not afraid of the oil-engine and I think it may be fairly said that those who are able to purchase them are envied by their neighbours instead of derided by them as was invariably the case two years ago. Only one case has so far come to my notice where a number of ryots have joined together to purchase an oil-engine and pump, but I am of opinion that it will not long be singular and I have instructed the Supervisors to render all possible assistance and to do what they can to initiate co-operative working in this direction. In one instance a Lift Irrigation Company has been formed with a capital of Rs. 12,000 to install a pumping station on the banks of the Kistna Western Delta Main Canal to irrigate 500 acres of land too high to be commanded by direct flow. The average lift will be about 8 feet and the maximum lift 10 feet. Two 12-h.p. engines and two 10″ pumps are now being erected and irrigation will commence in July. It is desirable to encourage such experiments as it may be fairly assumed that when the water has to be pumped it will be used with economy and the data from these pumping stations should be useful in ascertaining what duty of water is most profitable.

6. It is well known that the duty of water ranges between rather wide limits, but there is no information of any value to show what is the duty of water which yields the best results. It was thought that the establishment of the Experimental Pumping Department would lead to the collection of a good deal of information on this point, but so far very little has been gathered, and there seems little prospect that in the immediate future the Pumping Department will be able to do much, as the staff is fully occupied in extending the sphere of operations.

7. *Government installations.*—The first experiment with an oil-engine and pump was made at Melrosapuram six years ago and the Rev. Mr. Andrew, who is still in charge of the Settlement, reports that during the last year the engine ran for 1,005 hours and raised 1,870,000 cubic feet on an average height of 23 feet. The area under cultivation was 17·66 acres which yielded crops worth Rs. 1,691. The cost of running the engine was Rs. 303–10–0 to which may be added another Rs. 300 for interest and depreciation.

Of the other installations, that at Panampet which was lent to Messrs. Parry & Co. for two years has now been handed over from the 1st of January to the munsif of the village for a period of three years, the man having deposited a sum of Rs. 1,000 as security for the maintenance of the same in good order. The water-supply is good, but the soil in the immediate neighbourhood of the well is very sandy. The ryots in the village purchase water from the munsif at a fixed rate per hour for the whole of the supply from the engine, and careful accounts are being kept to ascertain whether this system of working is profitable and whether it is desirable to encourage it. A second installation is at Madura in charge of the District Agricultural Association, a third is at Kadiampatti with the Rev. Mr. Anderson, a fourth is at the Government Farm, Saidapet, whilst a fifth has been temporarily lent to several people for preliminary work in putting down larger installations. These engines and pumps have served their original purpose well and they are all still at work. It has been impracticable this year on account of the pressure of more important work to scrutinize the detailed information regarding them which has been recorded, but it will be done later on and any information of value will be published in the Scientific Report.

8. The working of the engines and pumps used by the Agricultural Department appears to have been satisfactory as no complaints have been made. At the Hagari Experimental Farm I have had a Supervisor stationed during the greater part of the year completing the erection of the farm buildings and studying the water-supply question. From the time the freshes first come down the river till the beginning of the hot weather there is no difficulty with the water-supply, but the well sunk in the padugai land adjacent to the pumping station yields scarcely more than one-tenth of the quantity which it was calculated would be derived by this means from the sand of the Hagari river. This is due to the exhaustion of the water in the cone of sand round the well. Once the water is drawn off no further supply can be obtained till either local rainfall occurs or a flood passes down the river. As explained in the scientific report of last year the only way to get a large supply of water at the Hagari farm in the hot weather will be to put up a number of small pumping plants at some distance from one another so as to draw the water from a larger mass of sand.

9. *Gunjana installation.*—This pumping project, which was started in the Public Works Department, was sanctioned in G.O., No. 1793, Revenue, dated 17th July 1907, and has been handed over to this department to be carried out. At the end of the year no work had been done on the site, but the plans have been finally revised and the engine and pump ordered from England. This plant will be noteworthy as being the first pumping station in which a suction gas producer plant will be at work. The engine, which is of the Crossley type, is 32 B.H.P. and will drive a 10" centrifugal pump to irrigate 500 acres of land which is at present chiefly devoted to the growing of turmeric. The working of the installation will be conducted on the same lines as a minor Government irrigation work, the idea being that the ryots should be charged the actual cost of lifting the water they use. This charge, of course, includes an allowance for interest and depreciation.

10. The establishment employed in the Irrigation Pumping Department consisted of one Sub-Engineer, four Supervisors and one Overseer. Practically the whole of the time of the Supervisors was devoted to pumping work, but the Sub-Engineer Mr. Rajagopalswami Mudaliar was employed for a considerable part of time on other work, chiefly the reconstruction of the Tannery at Sembiam and the erection of the new machinery and plant. The Overseer worked under the Deputy Collector and was employed the whole of the time in the Ponneri taluk and the valuable nature of the work done there testifies to his practical knowledge and skill in boring.

11. The expenditure in the Pumping Department amounted to Rs. 16,853–1–6, of which Rs. 12,800–5–4 was on account of the pay and travelling allowances of the establishment. From the time the experiments first began up to the 31st March 1908, the total expenditure on experiments in pumping with oil-engines and in the development of the same has amounted to Rs. 95,491–12–6. Against this sum there are assets which will probably realise from Rupees 15,000 to Rs. 20,000, so that the net cost of introducing oil-engine irrigation in this Presidency may be taken as not less than three-quarters of a lakh.

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illusion. It will probably lead to some attempting to do the work on their own account to avoid paying fees, but it is equally certain that these enterprising individuals will make a mess of it and finally seek the assistance of the department to extricate them from their difficulties. This will be an object lesson not without considerable value to the country, as the sooner the people learn that it is extremely unwise to invest money without the advice of competent and disinterested Engineers the better it will be for them.

13. Towards the end of 1906 a Deputy Collector was placed on special duty to assist the ryots of the Tiruvállúr and Ponneri taluks of the Chingleput district in sinking wells. The idea was to develop well irrigation by granting loans under the Agricultural Improvement Loans Act and to prevent waste of money by a preliminary exploration of the ground with boring tools. At first the scheme was not very successful, but when it was modified to include the improvement of existing wells very satisfactory results were obtained. The sub-artesian water, which had previously been discovered in the village of Surapet to the south of the Kortaliyar river, was found to extend over a large tract of country in the Ponneri taluk to the east of the Main Trunk road. The work was in the immediate charge of the special Deputy Collector till the end of 1907, when he was transferred to the Coimbatore district, and I took over the detailed control of the boring operations, placing one of my Supervisors in charge of the same. The work was then extended into the Tiruvallúr taluk and the results of the first four months working in that taluk indicate that there also considerable bodies of underground water under pressure exist. As already mentioned a beginning has been made to utilize these valuable sources of water-supply by the installation of five engines and pumps, and, doubtless, as time goes on, the number will steadily increase. The exploratory work, however, is mainly intended in the first instance to open out new sources of water-supply which the ryots can utilize with the means at present at their disposal. Many wells which formerly dried up in the hot weather owing to the failure of the surface sub-soil water now yield an abundant supply of water which rises into them through pipes which penetrate the impervious layer of clay overlying the water-bearing sands. The conditions are somewhat similar to those which prevail in the United Provinces but with this important difference that the water-bearing sands are very coarse and yield a much larger supply of water without any risk of the well being filled with sand. It is at present impossible to say what quantity of water is available, or what is the largest quantity that can be drawn off at any one point, as so far the ryots have not been able to make use of more than a small fraction of the water-supply which has been placed at their disposal. It is only at Surapet that any data bearing on this point have so far been obtained. The static water-level is generally from 12 to 16 feet below the surface of the ground and the inflow to the wells depends upon the diameter of the pipe connecting the well with the water-bearing sands and upon the extent the water-level in the well is lowered below the static level. In one well at Surapet with a head of about 9 feet 700 gallons per minute can be continuously obtained through two 7" pipes sunk close together. A Venturi Meter has been fixed at this installation and from time to time tests are made to determine whether there is any material variation in the flow. So far no indications of a decreased supply have been observed, but it is possible that later on the pressure may decrease somewhat and the vertical height through which the water has to be lifted will increase. In another instance also at Surapet a 4" pipe sunk through the bed of an old tank yields a sufficient supply of water to keep a 4" pump going. The volume in the case cannot be accurately estimated as part of the water is due to percolation from the sub-soil. The supply is sufficient for the engine and pump, but if more water were required it would be easy to increase the volume by putting down a larger tube.

14. In the previous quarterly reports of the Deputy Collector, the latest of which deals with the work done up to the end of December last year, the information regarding the borings is given in tabular form, and I submit a modified tabular statement bringing the information up to the end of the year under review.

TABLE I.

Total number of borings, 259	Fresh wells, 106	Sub-artesian	38
		Percolation water	16
		Failed	52
	Existing wells, 153	Sub-artesian	74
		Percolation water	2
		Failed	77

From this statement it will be seen that in all 259 borings have been made of a total length of 8,845 feet. Of these 74 borings have disclosed the certain existence of sub-artesian water, 38 the probable existence of the same and 18, while failing in this respect, have penetrated beds of coarse sand from which fair supplies of water can be derived by ordinary surface wells. One hundred and twenty nine or one-half of the borings proved a failure, and these naturally included those which penetrated to the greatest depth, as the work was carried on in the hope that by its continuance success might result. The average depth from the surface of the ground of the borings in wells when sub-artesian water-bearing sand was reached was 42·5 feet, whilst when the work was started from the ground the depth was only 35·2 feet.

15. From the beginning records have been kept showing the strata passed through by each boring, but unfortunately owing to the lack of education on the part of boring maistries these sections are not very reliable, and it is doubtful in many cases whether the actual depth of the water-bearing sand below the surface of the ground has been accurately recorded. It is nevertheless of great importance to endeavour to ascertain the general level at which these sands exist and to ascertain with the smallest possible amount of boring the absence of these sands.

TABLE II

Showing depths in feet at which the sub-artesian supply was tapped in wells.

21 to 30 ft.		31 to 40 ft.		41 to 50 ft.		51 to 60 ft.		61 to 70 ft.		71 to 80 ft.		81 to 90 ft.		91 to 100 ft.	
No.	Depth.	No.	Depth.	No.	Depth.	No.	Depth.	No.	Depth.	No.	Depth.	No.	Depth.	No.	Depth.
1	24	4	31	1	41	2	51	1	62	1	73	...	...	1	96
1	25	3	32	5	42	3	52	...	...	...	...	...	...	...	...
3	26	1	33	3	43	2	53	...	...	...	...	...	...	...	...
1	28	4	34	1	44	1	54	...	...	...	...	...	...	...	...
...	...	2	35	2	45	2	56	...	...	...	...	...	...	...	...
...	...	4	36	1	46	2	57	...	...	...	...	...	...	...	...
...	...	5	37	3	47	1	59	...	...	...	...	...	...	...	...
...	...	2	38	1	48	...	...	...	...	...	...	...	...	...	...
...	...	2	39	3	49	...	...	...	...	...	...	...	...	...	...
...	...	3	40	2	50	...	...	...	...	...	...	...	...	...	...

In Table II is recorded the depth from the surface of the ground at which each successful boring from the bottom of a well reached the water-bearing sand. From this table it will be seen that in the great majority of cases borings under 50 feet in depth struck the water and that there were only three borings over 60 feet in depth which were successful and of these two were in the Tiruvallûr taluk nearly 40 miles from the coast.

TABLE III

Showing borings from the surface which probably tapped sub-artesian water.

21 to 30 ft.		31 to 40 ft.		41 to 50 ft.		51 to 60 ft.	
No.	Depth in ft.	No.	Depth in ft.	No.	Depth in ft.	No.	Depth in ft.
1	24	2	31	1	42	1	54
2	25	1	32	2	43	...	...
1	26	3	34	1	44	...	...
3	27	1	33	2	48	...	...
2	28	2	35	1	49	...	...
1	29	1	36	1	50	...	...
2	30	1	37	...	...	...	...
...	...	3	38	...	...	...	...
...	...	1	39	...	...	...	...
...	...	1	40	...	...	...	...

Evidence of a similar character is furnished by Table III which shows the depth at which water-bearing sand was reached for which there is strong presumption that the water contained therein is under pressure. Till wells are sunk and attempts made to utilize the water, it is not

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absolutely certain that the supply is of a sub-artesian nature. These results are of considerable importance as tentatively at any rate they point to the conclusion that, when a boring has penetrated 60 feet from the surface of the ground and sub-artesian water is not struck, there is little likelihood of it being struck at a greater depth. This of course only applies to the area round Ponnéri in which borings have been made.

TABLE IV

Showing depths, etc., bored through with no results up to 31st March 1908.

31 to 40 ft.		41 to 50 ft.		51 to 60 ft.		61 to 70 ft.		71 to 80 ft.		81 to 90 ft.		91 to 100 ft.	
No.	Depth in ft.	No.	Depth in ft.	No.	Depth in ft.	No.	Depth in ft.	No.	Depth in ft.	No.	Depth in ft.	No.	Depth in ft.
1	31	1	41	1	51	4	61	1	71	1	84	1	93
2	37	1	42	4	52	3	62	1	74	...	...	...	...
2	38	1	43	1	53	2	63	1	80	...	...	...	...
1	40	1	45	4	54	3	65	...	...	...	...	...	...
...	...	2	46	2	55	1	66	...	...	...	...	...	...
...	...	3	47	3	56	1	67	...	...	...	...	...	...
...	...	1	48	3	57	5	68	...	...	...	...	...	...
...	...	1	49	5	58	2	69	...	...	...	...	...	...
...	...	...	...	2	59	...	...	...	...	...	...	...	...
...	...	...	...	3	60	...	...	...	...	...	...	...	...
6	211	11	501	33	1,835	21	1,362	3	225	1	84	1	93

In Table IV is furnished a statement showing the depth to which the boreholes were carried from which no result was obtained. Some of the boreholes obviously were stopped too soon, but 21 were carried beyond 60 feet, and 5 beyond 70 and up to 93 feet. It is only recently that boring tools have been supplied capable of boring to a greater depth than 50 feet, and I hope that a considerable number of boreholes will be put down from the bottom of existing wells to much greater depths than has hitherto been possible so as to definitely ascertain whether there are deep-seated beds of sand containing water such as exist in the neighbourhood of Pondicherry, where the depth of the artesian boreholes varies from 120 to 350 feet. In the alluvial deposits along the coast boring work is not very expensive, the average cost for a 3-inch borehole being about 4 annas a foot up to a depth of 20 feet. Thence onward to 40 feet depth it costs 6 annas a foot, and beyond up to 60 feet 12 annas a foot. From 60 to 70 feet the cost is Re. 1 a foot and from 70 to 80 feet Rs. 1-4-0 a foot. Beyond that depth only a few borings have been made and the cost of the work done has varied considerably.

16. In the reports of the Deputy Collector a certain amount of information has been furnished regarding the utilization of the water-supplies which have been opened up, and to that information I can, at the present time, add very little, but I am informed that a considerable number of wells will be sunk towards the end of the hot weather when the work can be done most cheaply. I have already alluded to the important fact that five oil-engines and pumps are now being installed and will all shortly be at work.

17. The expenditure upon boring operations during the nine months the Deputy Collector was in charge amounted to Rs. 2,230-1-11, and during the last three months an additional expenditure amounting to Rs. 5,091-3-9 was incurred, of which over Rs. 4,000 was for the purchase of new boring tools.

MADRAS,
June 1908.

A. CHATTERTON,
Director of Industrial and Technical Inquiries.

APPENDIX II.

ANNUAL REPORT OF THE GOVERNMENT BOTANIST—1907-08.

I have the honour to present the following report of the work done in the Government Botanist's office during the year 1907-1908.

Mr. (now Dr.) C. A. Barber continued to be on leave in England and the Director of Agriculture was in charge of the office for one month in the beginning of the year. On the 1st May M.R.Ry. Rao Bahadur C. K. Subba Row Avargal took charge as Acting Government Botanist and continued in this capacity for the rest of the year. In his untimely death, which has just been reported, the department has sustained an irreparable loss. His knowledge of the agriculture of the Presidency was unequalled and he had the gift of acquiring the confidence of the agricultural classes in a unique degree.

A few changes were made in the clerical section. The first two clerks were transferred to the office of the Deputy Director of Southern Division and the Librarian of the Agricultural Department was doing the duties of the Head clerk assisted by the third clerk without prejudice to his own duties till December 1907, when the third clerk was appointed to the post of Head clerk. The other sanctioned post was filled up in January.

The three appointments of fieldmen that fell vacant were filled up and they were placed under the Systematic, Economic and Entomological Assistants respectively for training.

2. The Acting Government Botanist spent 175 days on tour visiting Ganjám, Vizagapatam, Gódávari, Kistna, Kurnool, Bellary, South Arcot, Tanjore, Madura, Tinnevelly, Coimbatore, Malabar and South Canara districts. He exhibited his waterlift at the Mysore Dasara exhibition and attended the Agricultural Conference at Pusa.

On his first tour in the Southern districts, "the Ceded Districts method" of extracting edible oil from safflower seed was shown to the people of Tinnevelly. At present they only extract a burning oil from the seed. Advice was given to the Kumbakónam Agricultural Association as to the work to be done by them in their farm, and the Tambiran of Tirupanandal and Diwan Bahadur Raghunada Rao were interviewed, and the advantages of manufacturing sugarcandy and jaggery according to Hadi's improved methods were explained to them. Sir Subramania Aiyar's mango garden at Nidamangalam was again visited and a few hints regarding the treatment of barren trees were given, the chief advice being the application of different kinds of manures. The cultivation of the Indian mulberry, which generally grows to a tree, as a field crop, was inspected at Mangudi in the Tanjore district.

A thorough inquiry was made in many parts of the Presidency into the cultivation of sunn-hemp and a bulletin containing much valuable information was compiled.

The Government Botanist also visited in the course of the year most of the centres where the cultivation of grapes and figs is carried on and wrote a bulletin on the methods observed and the prospects of extending the cultivation, at present confined to a few localities.

The fibre inquiry was extended to different kinds of plantains and the percentage of fibre obtained from each, the chief being the Sirumalai plantain of Dindigul and Nandrum of Malabar. Fibre was also extracted from "Kurinja kodi" (*Dregea volubilis*) and about a pound of it was forwarded to the Reporter on Economic Products. A few Erukkan (*Madar-Calotropis gigantea*) plants were thickly planted in the office paddock to get them to grow tall and branchless for extracting long fibre. Experiments were made to extract fibre from kittal (*Agave cantula*) blades and good results obtained and a trial for fibre from pineapple was also made. Efforts were made to get fibre from *Agave americana* by passing the blades in a sugar mill, but the results were not satisfactory.

Experiments in extracting oil called "Cardolo" from cashewnut shells were made and some oil extracted.

The Mysore Agricultural Show was visited under Government orders and the see-saw waterlift exhibited.

The flora and fauna of the Kolair lake were studied, and even though the monsoon there was a failure "Alliyalu" (*Nymphæa lotus*) largely used as a food by some classes was found to grow extensively and the best economic use of its seeds noted and a short report written on it.

A collection of samples of commercial rice was made for the Reporter on Economic Products.

During the tour in Malabar and South Canara products of interesting economic importance were collected and useful information on fish manure and other points of agricultural importance was obtained.

4. *Work in Systematic Botany.*—The Systematic Assistant was on leave on medical certificate during the first nine weeks of the year owing to a severe attack of the Nallamalais fever and on joining duty he attended to the thorough cleaning of the herbarium collections and office in general and to the preparation of a full list of the host plants of different root parasites for forwardal to Dr. Barber in England.

The work in general of this Assistant has been of a varied character. Besides keeping the herbarium collections in thorough order, the collection "not yet added to the herbarium" has been supplemented by about 2,000 sheets mounted from the old collections. The sheets set apart for the Calcutta herbarium now number about 1,470 and will be forwarded as soon as they are dealt with.

Seeds of the following root parasites were sent to Dr. Barber in England for experimental sowing and special study :—*Santalum album* from Mysore, *Olax scandens* from Palur, *Ximenia* and *Opilia* obtained from the Nallamalais forests and lastly *Cansjera Rheedii* collected by the Assistant in the Madura and Tinnevelly lower hills.

A large number of specimens was selected from the old duplicate collections of the office for forwardal to Mr. Reineck of Germany.

The whole set of the Grewia collections of the Madras herbarium was sent to Mr. Drummond at Kew for examination and return and a series of Balanophora specimens (spirit and dry) to the Botany school at Cambridge.

A few minor lots of plants were named for some forest officers, Deputy Director, Northern Division; Deputy Director, Southern Division; and Mr. Fyson, Professor of Biology, Presidency College; and among these were the alkali land plants of Bellary.

A set of dried graft mango plants was sent by the Magistrate of Calicut, in connection with a criminal case, for expert opinion. The specimens were examined and reported to be false graft plants. The Assistant had to appear in this connection before the Presidency Magistrate, Egmore, to record evidence on commission to the above effect.

Mr. Main, Assistant to the Inspector-General of Agriculture, visited the herbarium and examined the whole collection of pepper in company with Mr. Sampson.

The chief work of the Assistant has been the examination and study of the fodder grasses of the Northern Circars, Vizagapatam excepted, under the orders of the Director of Agriculture on a letter from the Inspector-General of Agriculture. A good number of grasses of feeding value, in different stages, was collected, and a special study was also made of the grass flora of the Samalkót farm. Among the fodder grasses and plants collected Chengali (*Iseilema Wightii* and *I. laxum*), Molava (*Andropogon annulatus* and *A. caricosus*), Thondungi (*Ischaemum aristatum*), Alumu (*Rhynchosia aurea*) and Pillimisera (*Phaseolus trilobus*) appear to be the best. A fair quantity of seed of each variety was collected and forwarded to the Deputy Director, Northern Division, Deputy Director, Southern Division, and the Principal of the Coimbatore Research Institute for experimental cultivation. The Thondungi grass seeds were sown in the office paddock for purposes of identification. Two reports were prepared on this collection of grasses and submitted to the Director of Agriculture. A set of these grasses has since been sent to the Agricultural Chemist for favour of analysis.

About the end of the official year the Madura and Tinnevelly lower hills were visited for re-examining the root system of *Cansjera Rheedii* and collecting its fruits. In this tour *Olax Wightiana* was also found to be a root parasite.

The Assistant was on tour for 119 days, of which 104 days were spent in the study and collection of grasses in the Circars and 15 days in Tinnevelly and Madura hills regarding *Cansjera*.

No special systematic survey was made owing to the absence of Dr. Barber in England.

5. *Work in Economic Botany.*—The Assistant was on tour over 142 days accompanying the Government Botanist in most of the tours and assisted him in his enquiries. Independent tours were made in Horseley konda, the Tettu hills, Markanam, Courtallum, Mundanthorai and a few other places in connection with the collection of varieties of lichens which were forwarded to Austria for identification. A collection of fodder grasses of the Tiruvellore taluk of the Chinglepat district was made, and lastly a tour was undertaken in the Coimbatore district for ascertaining the present state of the agave fibre industry.

6. *Work in Mycology.*—The Assistant in Mycology, who was deputed to be in charge of the palmyra disease operations in October 1906, is still engaged in the same work. He has also conducted several inoculation experiments with the palmyra disease fungus (*Pythium palmivorum*), under instructions from the Imperial Mycologist.

7. *Work in Entomology.*—The chief work of the Assistants consisted of the study of the important crop pests in some of the Government, Court of Wards and private farms and the investigation of the insect pests reported by the Agricultural Associations, district officers and private agriculturists. The economic collection was thus increased considerably, the serial number being double that of the last year. Of the various pests studied, special attention was devoted.

to the study of surul on groundnut and stem borer on paddy. A report has been prepared on the former and may be shortly published. Experiments in the shape of spraying were tried mostly with encouraging results, in the Government farms and private fields.

The Imperial and Supernumerary Imperial Entomologists visited this province; the former, came twice and inspected the work of the Assistants on both the occasions, and the latter spent about four months touring in different parts of the Presidency.

8. The First Assistant was on tour for about 158 days. He visited most of the Government farms, a few zamindari ones and many other places noting the important crop pests and collecting specimens. At the instance of the Imperial Entomologist he visited the Nilgiris, Shevaroys and Bangalore for investigating the potato pest, Cuddapah, Kurnool, Anantapur and Coimbatore for the melon-fly and Kamalapuram for Caravonica cotton boll worm.

9. The Second Assistant was away for about 170 days. He attended to the crop pests and tried remedial measures at Hagari and Palur for about two months. He visited several other places and made a study and collection of crop pests. During his examination of a paddy pest at Settigunta he met with a pest "probably surul" on a wild plant called *Psoralea corylifolia*. Light trap experiments were also made by him at Palur.

CAMP, PALLADAM,
20th June 1908.

M. E. COUCHMAN,
Director of Agriculture in charge of the Government Botanist's office.

APPENDIX III.

REPORT ON THE COLLEGE OF AGRICULTURE, SAIDAPET, FOR 1907-1908.

I have the honour to submit the report on the College, Veterinary Hospital, the Farm and Botanical garden for the year ending 31st March 1908. In accordance with the instructions contained in your letter Dis. No. 704, dated 21st March 1908, the report has been made concise and comprehensive. It consists of two parts, the first part dealing with the College and Veterinary Hospital and the second with the Farm and Botanical Garden.

PART I.—COLLEGE AND VETERINARY HOSPITAL.

1. I continued to act as Vice-Principal in charge and M.R.Ry. R. V. Subramania Aiyar, M. R. Ramaswami Sivan, J. Chelvaranga Raju and T. V. Narayana Rao as second, third, fourth and fifth assistants respectively. M.R.Ry. R. V. Subramania Aiyar, who was deputed in April 1907 to survey and map the Central Farm at Coimbatore and the other agricultural farms, returned to the College in October and was engaged till December in instructing the candidates from among the students and ex-students for Surveying and Levelling and Agricultural Engineering. The candidates were men who had previously appeared in these subjects and failed. From January he was engaged with the other assistants in connection with the packing and despatching of furniture, apparatus, etc., to Coimbatore. M.R.Ry. J. Chelvaranga Raju went on a year's furlough in continuation of the college summer vacation. He was recalled from leave on 14th January 1908 and has since been placed on special duty under the Deputy Director of Agriculture, Southern Division. During his absence on furlough, M.R.Ry. T. V. Narayana Rao acted as fourth assistant and M.R.Ry. S. P. Swaminathen, as fifth assistant, without prejudice to his duties as hospital-keeper. M.R.Ry. S. Ramji Singh continued to be Gymnastic Instructor till 6th August 1907, when he was transferred to the Veterinary College, Vepery.

2. As mentioned in the last year's report, there was but one class left at the beginning of the year and its strength was 17. One of the students discontinued his studies and two ex-students joined the college towards the latter part of the session with a view to complete their tests for the Diploma, so that the strength of the class at the end of the session—31st December 1907—was 18.

3. *Instruction.*—Instruction was given as in previous years as laid down in G.O., No. 429, Educational, dated 24th July 1902.

4. There were numerous applications for admission into the college, and the demand for the services of trained candidates was greater than in previous years. This is evidently due to the institution of Agricultural Associations and the wide-spread interest now being taken in agricultural matters.

5. Gymnastic and Physical drill classes were held till 6th August 1907 when they were dropped on account of the removal of the Instructor from the college staff.

6. All the 18 students referred to in paragraph 2 above, applied for admission to the Government Technical Examinations held in December last, but only 17 appeared, the remaining one having been prevented by illness. The results are shown in the subjoined statement. They were on the whole satisfactory. Six candidates qualified themselves for the Diploma. All these were from among the regular students of the class.

Subject.	Candidates who appeared for the first time.			Candidates who appeared after having previously failed.		
	Appeared.	Passed.	Percentage.	Appeared.	Passed.	Percentage.
Botany, Intermediate, Special	..	..	..	4	2	50·0
Meteorology and Geology, Intermediate, Special	..	..	..	* 4	3	75·0
General Chemistry, Intermediate	..	..	..	3	1	33·3
Anatomy and Physiology, Intermediate, Special	..	..	..	* 9	(a) 7	77·7
Veterinary Science and Hygiene, Intermediate, Special.	15	(b) 14	93·3	..	..	..
Surveying and Levelling, Intermediate, Special	..	..	..	* 4	3	75·0
Agricultural Engineering, Intermediate, Special	..	..	..	† 7	5	71·4
Agricultural Chemistry, Advanced	12	(c) 5	66·7	1	0	0·0
Agriculture, Advanced	* 15	(d) 11	73·3	1	1	100·0

* Exclusive of one who did not appear. † Exclusive of one who did not give his second paper.
First-class—(a) 2; (b) 3; (c) 1; (d) 1.

Nine ex-students appeared for the examination in different subjects and four of them completed their tests for the Diploma.

7. The Clogstoun prize of the value of Rs. 45-6-2 was won by K. Unni Krishna Menon, a stipendiary student from Malabar, for having secured the highest number of marks in the college examinations during the three years' course. The Robertson prize of the value of Rs. 87-4-6 was won by V. M. Bania, a paying student from Central India. This prize is awarded to the student who secures the first place in Agriculture advanced at the Government Technical examinations. V. M. Bania was also entitled to the guaranteed appointment of Rs. 40, for having secured the highest number of marks in the Diploma examination. He declined to accept it as he is a large land-holder and intends to engage himself in farming his own lands. Krishna Menon ranks second with regard to the total number of marks, and I have submitted to you with recommendation his application for the guaranteed appointment.

8. *Museum.*—On account of the approaching closure of the college and the numerical weakness of the staff, the museum did not receive any special attention.

9. *Veterinary hospital.*—I continued to be the officer in charge with M.R.Ry. S. P. Swaminathan as hospital-keeper. As mentioned in the last year's report, he has been conducting practically all the work of the hospital ever since I was placed in charge of the office of Principal and he has done it well. There was a considerable improvement in the number of cases treated this year, and the increase in cattle patients is particularly notable, and is an evidence of the increasing popularity of the hospital among the local ryots. The number of cases treated during the last three years has been as below:—

	1905-06.	1906-07.	1907-08.
Horses	350	386	413
Cattle	551	557	630
Other animals	351	360	371
	1,252	1,303	1,414

The increase in receipts, which were Rs. 978-5-4 as against Rs. 969-9-5 in the past year, was slight. The expenditure was Rs. 1,474-8-8 as against Rs. 1,686-5-9 in 1906-07. The fall was chiefly due to the appointment of M.R.Ry. S. P. Swaminathan as acting fifth assistant during a part of the year, when his pay was drawn under the college establishment. A statement showing the details of income and expenditure of the Veterinary Hospital is appended.

10. The financial statement for the year is also appended.

11. I beg to acknowledge the services of the staff and officers of the college.

Part II.—Farm and Botanical Garden.

1. During the year under report, I continued to be in charge of the farm and botanical garden. M.R.Ry. J. Chelvaranga Raju continued to be Farm Manager until 30th April, when he went on furlough. M.R.Ry T. V. Narayana Rao succeeded him on 1st May as Farm Manager and has held the post since. V. S. Subramania Sastri was Bailiff throughout the year. The post of Assistant Bailiff which had been vacant from 1st July 1906 was filled up on 1st July 1907 by the appointment of N. S. Kulandaiswami Pillai, a passed student of the college. He was transferred for employment under the Deputy Director of Agriculture, Southern Division, on the afternoon of 29th February and the place has since remained unfilled.

There is nothing of special interest to note in the working of the farm and the botanical garden during the year. Both were kept going with the minimum expenditure. The number of working cattle fell to half the usual number and the establishment of permanent coolies underwent a great reduction, many coolies having left in consequence of the approaching closure of the farm.

2. *Season.*—The rainfall registered during the year was as below. Hot weather (April and May) 0·13 inch; south-west monsoon (June to September) 12·42 inches; north-east monsoon (October to December) 36·18 inches; dry weather (January to March) 0·94 inch; total 49·67 inches.

During the south-west monsoon the rainfall was below the average of 17·21 inches. There were some showers in June and, taking advantage of these, some catch crops were sown but as the showers later were few and light and far between, some of the crops failed and cattle were allowed to graze them up, while the yield from the others was very poor. During this season paddy was sown dry and a crop of varagu was also sown.

The fall during the north-east monsoon was above the average of 30·68 inches. Nearly half the amount fell in November alone which damaged to some extent a crop of paddy which had then far advanced in maturity. This crop had been transplanted in September and was being irrigated from the oil-engine. In this season the wet cultivation of paddy and the cultivation of some dry grain crops was taken up.

3. *Crops and cropping.*—A statement giving the necessary particulars about the crops grown is appended. The number of working cattle and of permanent coolies being limited, water for irrigation not being available in the Mylapore tank in time, and owing to the approaching closure of the farm, it was not possible nor was it considered necessary to crop the farm to the usual extent. The total cultivated area including double and single crop lands with the lands on which crops stood throughout the year was 74·92 acres. The following notes about some of the crops may be of interest.

Paddies occupied 22·31 acres—sixty-day samba, 7·90 acres; chinna samba, 8·01 acres; sirumani, 5·20 acres; Bombay varieties, 1·20 acres. The three usual methods of cultivation were followed, namely, drilling dry, sowing sprouted grain in puddle and transplanting.

Sixty-day samba was sown dry by gorru on 1·6 acres on 17th September and harvested on 30th December. The crop was treated dry throughout. It practically failed.

2·60 acres were under sirumani sown dry with gorru and subsequently irrigated from the Mylapore tank. The outturn was at the rate of 1,904 lb. of grain and 1,940 lb. of straw per acre. No manure was applied. About the same time an acre was cropped with chinna samba sown dry and then irrigated from the Mylapore tank. 224 lbs. of bone dust were applied. The yield was 1,278 lbs. of grain and 2,800 lbs. of straw. 2·35 acres were sown with chinna samba and irrigated as above. No manure was applied. The outturn was at the rate of 1,138 lbs. of grain and 1,800 lbs. of straw per acre.

50 lbs. of sirumani paddy were sown in a nursery of 15 cents and transplanted on 2·6 acres. The soil was loamy. An acre of the crop had the stubbles of a previous crop of sugarcane ploughed in and the yield was 3,080 lbs. of grain and 3,200 lbs. of straw. To the remaining 1·6 acres 400 lbs. of white castor cake were applied and the outturn was at the rate of 3,325 lbs. of grain and 3,400 lbs. of straw per acre. The seedlings were planted at the usual distance but only 2 or 3 in each spot. It will be seen that the seed rate in this case was only 19 lbs. per acre and that the outturn was nevertheless very good.

Chinna samba sprouted was sown on ·76 acre of puddled land, of which ·30 acre was irrigated from the oil-engine and the remaining ·46 from the Mylapore tank. The yield per acre was 1,120 lbs. of grain and 1,867 lbs. of straw and 2,326 lbs. of grain and 2,240 lbs. of straw, respectively. The second crop had castor cake applied to it at the rate of 200 lbs. per acre.

Sixty-day samba sprouted was sown in puddle on 6·30 acres. Of this, 4·30 acres were under the oil-engine and were sown on different dates between January and September 1907. The remaining 2 acres were under the Mylapore tank and were sown in October. The former crops yielded at the rate of 3,350 lbs. of grain and 2,240 lbs. of straw per acre and the latter at the rate of 1,296 lbs. of grain and 1,360 lbs. of straw. There is a general impression that this variety of paddy does not do well in the rainy season and this has been the experience on the farm.

The eight varieties of Bombay paddy mentioned in the last year's report were grown on an acre—each variety on 12½ cents. They were sown sprouted in puddle in October and irrigated from the oil-engine; 10 lbs. of saltpetre were applied to each plot. The yield was poor as in last year, the average of all the varieties being 1,124 lbs. of grain and 1,529 lbs. of straw per acre as against 1,107 lbs. of grain and 2,753 lbs. of straw last year. Banku which is the variety that is in general demand yielded fairly well, the outturn being at the rate of 1,440 lbs. of grain as against 1,361 lbs. last year.

Cholam and varagu for grain grown on 10·1 acres yielded fairly well.

Horse-gram for grain was sown on 9·50 acres. The crop was sown late (December) and the harvesting was not completed before the end of the official year.

A crop of cholum for fodder sown in February 1907 on 2½ acres gave 25,032 lb. in three cuttings. Another crop on 2½ acres sown at the beginning of July suffered for want of timely rains and yielded only one cutting of 7,280 lbs.

Horse-gram for fodder occupied 9·75 acres of poor sandy soil. The yield as hay was 15,513 lbs.

Guinea-grass occupied 6·06 acres. The crop was weeded and intercultured but no manure was applied. The yield from the whole area during the year was 85,736 lbs. which means 14,148 lbs. per acre.

The plantain crop on 2 acres referred to in the last year's report is still standing. Nothing was done beyond occasional watering. Sale-proceeds of fruits, leaves, suckers, etc., during the year amounted to Rs. 237. The crop on 1½ acres is more than 3½ years' old and that on the remaining ½ acre came into bearing about six months ago.

Caravonica cotton stands on ·2 acre. The crop was raised in August 1905. As reported in previous reports this crop has been a practical failure on the Saidapet farm. It bore only 3¼ lb. of cotton-in-seed during the year.

4. *Manures.*—No manurial experiments were conducted nor were any special manures purchased but such as were in stock were applied to paddy crops. The collection of farm yard manure during the year amounted to 95 tons.

5. *Implements, machines, etc.*—The ordinary farm implements such as ploughs, seed drill, etc., were freely used. The chaff-cutter and dairy appliances were also in frequent use. Of the machines, implements and tools selected for the Coimbatore College almost all were despatched at the end of the year. The few that are still remaining will be sent when the farm is closed, as they are necessary for current use.

The oil-engine worked fairly steadily throughout the year. The cost of working was Rs. 620–14–3 for raising 25,662,500 gallons through an average height of 21·57 feet as against Rs. 542–13–9, the cost last year for raising 31,018,667 gallons through an average height of 22·48 feet. This works out to Re. 0–0–4·89 for lifting one acre inch to a height of one foot during the current year as against Re. 0–0–3·40 in last year. The increase in cost this year was due to the charges incurred in repairing certain parts of the engine, to the high wages which had to be paid to a driver engaged from Messrs. Massey & Co. during the absence of the permanent incumbent on leave, and also, to some extent, to the engine not raising the full quantity of water during the last few months of the year, owing to a crack in the vaporizer.

6. *Livestock—Cattle.*—There were 66 head of cattle at the commencement of the year. Ten calves were born during the year. Twenty-six head of cattle (six cows, four heifers, two heifer calves, four bull calves, five bulls and five bullocks) were sold in auction by the Madras Stable Company in May. Four head of working cattle were sold to the Deputy Director of Agriculture, Southern Division, for the Palur farm. Ten head (three cows with calves at foot, two heifers and two bullocks) were transferred to the Coimbatore farm. One bull was accidentally drowned in the Adyar river and one calf died of the bite of some venomous reptile. There were thus at the end of the year 34 head—eight cows, nine heifers, one heifer calf, nine bulls, one bullock and six bull calves.

Sheep.—At the beginning of the year they were 65 head. During the year there were 35 births and 8 deaths and 64 were sold, so that at the close of the year the number of the stock was 28.

7. *Distribution of seeds, implements, etc.*—Bombay varieties of paddy, guinea-grass roots and plantain suckers were supplied to those that applied for them. Fifteen applications were received for the "Neelakantacharry" ploughs and were complied with.

8. *Botanical garden.*—M.R.Ry. T. V. Narayana Rao continued to be in separate charge of the graden until the end of April. After he was appointed Farm Manager on 1st May consequent on the grant of furlough to M.R.Ry. J. Chelvara ngaraju, the garden was looked after by the manager and the bailiff as part of the farm. There is nothing of special interest to be recorded about the working. Owing to the impending closure of the college, about half the number of coolies left of their own accord. No special manures were purchased, the only manure used being farm yard, which was supplied from the farm. The permanent botanical specimens were maintained in proper condition. As it was expected that the garden along with the farm would be closed in January, no special vegetable seeds were procured from outside as in previous years. A portion of the garden was under fodder crops, a small portion under plantains and vegetables occupied a small area. The ordinary specimen crops including varieties of sorghum were grown.

A collection of sorghums was exhibited at the Flower Show held at the Agri-Horticultural Society's gardens at Tenampet in February last and secured a prize of Rs. 10.

9. A statement showing the receipts and expenditure of the farm and botanical garden is appended. The receipts and expenditure were Rs. 5,585-10-11 and Rs. 3,948-7-11 as against Rs. 5,657-6-7 and Rs. 5,690-15-9 last year.

10. In conclusion I beg to record my entire satisfaction with the manner in which M.R.Ry. T. V. Narayana Rao and Subramania Sastri discharged their duties as farm manager and bailiff respectively.

S. L. D'SILVA,
Ag. Vice-Principal

Appendix I.

STATEMENT showing expenditure and income at Veterinary Hospital.

	1906-1907.	1907-1908.
Expenditure—	Rs. A. P.	Rs. A. P.
Establishment	876 0 0	552 14 7
Hospital charges	268 3 9	226 11 10
Medicines and instruments	388 14 1	516 14 6
Repairs to hospital buildings	153 3 11	177 15 9
Total ...	1,686 5 9	1,474 8 8

Appendix II.

FINANCIAL statement (including Accountant-General's adjustments received up to date).

No.	Items.	Budget estimate, 1907-1908.	Expenditure. 1906-1907.	Expenditure. 1907-1908.
		Rs.	Rs. A. P.	Rs. A. P.
1	Principal and Vice-Principal	1,557	902 9 8	1,556 10 8
2	Masters and teachers	8,104	8,811 0 0	8,104 7 8
3	Establishment	2,365	2,301 10 4	2,363 0 5
4	Travelling allowances	534	198 0 9	510 1 9
5	Veterinary Hospital establishment	577	876 0 0	552 14 7
6	*Supplies and services*—			
	Library allowance	100	5 12 0	4 8 0
	Prize allowance			..
	Scholarships	1,350	1,786 14 7	550 0 0
	Petty works of construction			..
	Laboratory charges	200	301 12 0	210 12 1
	Veterinary Hospital charges	2,100	268 3 9	226 11 10
	Repairs to Veterinary Hospital buildings		388 14 1	516 14 6
			153 3 11	177 15 9
	Furniture and appliances including Europe stores and purchase of live-stock	100	6 10 3	14 13 0
	Rates and carriage to Agricultural students	300	504 0 9	189 13 0
	Farm manure	5,834	4,931 1 7	3,589 9 9
	Botanical garden	1,000	759 14 2	358 14 11
	Deduct amount transferred	— 6,032	..	..
	Add additional allotment	396	..	..
7	*Contingencies*—			
	Petty repairs to buildings	400	100 11 0	17 7 6
	Cleaning charges	35	39 9 9	40 1 4
	Rents, rates and taxes	170	164 8 0	164 8 0
	Repairs to furniture	50	3 4 0	1 5 6
	Tour charges	80	26 5 9	680 10 2
	Postage charges	80	60 0 6	50 0 0
	Telegraph charges	5	3 0 9	2 10 0
	Purchase of books	12	0 4 0	0 4 0
	Office expenses	487	409 5 9	282 0 11
	Miscellaneous	..	..	..
	Deduct amount transferred	— 771	..	..
	Do. to supplies and services	— 115	..	..
	Add additional allotments sanctioned	750	..	..
		50	..	..
	Total ..	20,218	22,592 13 6 388 14 1	19,599 4 1 516 14 6
	Receipts—			
	Farm manure	..	5,657 6 7	5,585 10 11
	College fees	..	336 0 0	77 0 0
	Rents and miscellaneous	..	201 1 11	189 9 7
	Veterinary Hospital	..	969 9 5	978 5 4
	Total ..	..	7,164 1 11	6,830 9 10

Note.—The figures in clarendon are Accountant-General's adjustments.

Cropping statement for 1907–1908—*cont.*

Serial number.	Field number.	Area.	Name of crop.	Date of cropping.	Date of harvest.	Yield.				Remarks.
						Grain.		Straw or green fodder.		
						Amount.	Per acre.	Amount.	Per acre.	
		ACS.				LB.	LB.	LB.	LB.	
31	16	1·60	'Sixty day' samba.	17th September 1907.	30th December 1907.	385	240	560	350	Poor sandy soil. Seed sown b gorru.
32	18	1·00	Sirumany.	16th October 1907.	24th February 1908.	3,080	3,080	3,200	3,200	Transplanted.
33	18	1·00	'Sixty day' samba.	22nd October 1907.	30th January 1908.	1,396	1,396	1,120	1,120	Sprouted seeds sown in puddle.
34	19	0·70	Chinna-samba	10th October 1907.	7th February 1908.	1,728	2,469	2,352	3,360	Transplanted. 200 lbs. of whit castor cake applied.
35	19	0·46	Do	11th October 1907.	19th February 1908.	1,070	2,326	1,030	2,240	Sprouted seeds sown in puddl 100 lbs. of white castor cal applied.
36	20	1·60	Sirumany.	12th October 1907.	17th February 1908.	5,320	3,325	5,440	3,400	Transplanted. 400 lbs. of whit castor cake applied.
37	21	1·00	Chinna-samba.	14th August 1907.	31st January 1908.	1,278	1,278	2,800	2,800	Sown by gorru. 224 lbs. of bor dust applied.
38	22	2·60	Sirumany.	13th August 1907.	11th February 1908.	4,950	1,904	5,044	1,940	Sown by gorru.
39	26	1·70	Chinna-samba.	15th August 1907.	28rd January 1908.	1,845	1,085	3,400	2,000	Do.
40	28	0·65	Do.	3rd September 1907.	7th February 1908.	774	1,191	1,040	1,600	Do.
41	M.L. No. 7	1·00	'Sixty day' samba.	23rd October 1907.	29th January 1908.	1,197	1,197	1,600	1,600	Sprouted seeds sown in puddle.

Appendix IV.

FINANCIAL statement of the College Farm including Botanical Garden for 1907–1908.

Receipts.				Charges.			
Particulars.	Amount.		Amount.	Particulars.	Amount.		Amount.
	RS. A. P.		RS. A. P.		RS. A. P.		RS. A. P.
Field produce. Botanical gardens.	272 4 10		2,107 6 1	Botanical gardens	358 14 11		358 14 11
Field produce. Farm annexe.	1,835 1 3			Cattle food. Ground-nut cake.	554 0 4		
				Cattle food. Gingelly cake ..	98 1 3		
				Cattle food. Dholl husk ..	238 4 3		
Live-stock. Sale of cows, calves and sheep.	1,299 13 4			Cattle food. Straw	19 10 2		917 0 3
Live-stock. Sale of milk, butter, etc.	1,270 3 2			Cattle food. Rice, etc. ..	3 2 3		
Live-stock. Covering fees ..	70 0 0		2,640 0 6	Cattle food. Salt	3 14 0		
				Live stock	32 4 6		32 4 6
Wood and miscellaneous ..	838 4 4		838 4 4	Manure	1 8 0		1 8 0
				Seeds and plants	29 6 3		29 6 3
				Labour	1,741 7 2		1,741 7 2
				Oil engine	620 14 3		620 14 3
				Machines and implements ..	7 2 3		7 2 3
				Workshop	39 5 9		39 5 9
				Contingencies	200 8 7		200 8 7
Total ..	5,585 10 11		5,585 10 11	Total ..	3,948 7 11		3,948 7 11

II

ANNUAL REPORT OF THE SUPERINTENDENT, CIVIL VETERINARY DEPARTMENT.

I

I have the honour to submit the report of the Civil Veterinary Department for the year 1907–1908.

2. The post of the Superintendent, Civil Veterinary Department, and the Principal of the Madras Veterinary College was held by me throughout the year. In addition to my work at head-quarters, I was on tour for 89 days, and travelled 14,065 miles by rail and 195 miles by road. I had occasions to inspect the veterinary hospitals at Madura, Trichinopoly, Coimbatore, Vellore, Bellary, Pithápuram and Vizagapatam, and was present at the cattle shows held at Tiruppúr, Madura, Berhampur and Ongole. I visited Coonoor and inspected the Pasteur Institute; I attended the Veterinary Conference at Calcutta, supervised the work of the Veterinary Assistants, and attended the outbreaks of cattle diseases. I visited Tuticorin for selecting a site for quarantine station, and Cocanada for selecting a suitable site for a veterinary hospital which was started during the year. I also inspected the Government stallion "Ophir" stationed at Uttukuli, Coimbatore district, which was suffering from chronic lameness.

3. Mr. D. Aitchison, L.C.V.D., who is a probationer, assisted me in the work connected with the college and hospital, and also attended the cattle shows held at Kottavalsa, Cocanada and Ongole.

4. In accordance with the G.O., No. 1355, dated 19th June 1907, communicated in B.P., No. 235, dated 9th July 1907, the department was strengthened by the entertainment of thirteen graduates during the year. The office establishment, however, remains the same as in the previous year, and it is hardly able to cope with the ever-increasing work entailed on it by the development of the department. It is hoped that it will soon be strengthened by the addition of two clerks.

II.—Veterinary College.

There had been no changes in the staff except that the third lecturer was confirmed. In January 1907, 29 students were entertained in class A or first year, out of which 10 left the college leaving 19 students at the end of the year, and this was the number that appeared for the examination held last year early in December. The following is the statement showing the number of passes in each class :—

Class.	Examined.	Passed.	Per cent. of passes.
A or 1st year	19	16	84·2
B or 2nd year	24	20	83·3
C or 3rd year	23	17	73·9

In class B, 26 students attended the college, but two of them failed to appear for the examination. Of the 23 students of class C, 2 of them who had failed in the previous year did not attend the college but were attached to veterinary hospitals in Madras.

As compared with last year's results, it will be observed that the number of passes in each class during the year under report are far more satisfactory.

The Board of Examiners remarked that the material was distinctly good, their theoretical knowledge was above the average, and considering the weakness in the number of the teaching staff and the conveniences available for practical teaching, the knowledge of the students was very fair on the whole.

The total strength of the college at the end of March 1908 was 74, viz., class A 26, class B 23, class C 25. In January 1908 owing to an insufficient number

of matriculates applying for enrolment in the college, only seven or eight matriculates were enrolled. Notwithstanding the advertisements calling for more candidates, applications were received only from candidates who were non-Matriculates. Therefore the required number to complete the strength of the class was selected from non-Matriculates, and an application made to the Board of Revenue for their exemption, and this was sanctioned under B.P., Mis. No. 1706, dated 5th April 1908.

This falling off of applications from Matriculates during the past two years is strong evidence that the rate of the starting pay and the general prospects of the Subordinate Civil Veterinary Department are not sufficient inducement to attract the required class of men. The attendance in all classes, both at practical and theoretical lectures, was good. The final year students were given ample and repeated opportunities of practising operations, and such other practical work, as work in the pharmacy and attendance on sick animals.

The number of major and minor operations performed during the year was 648 against 544 the previous year which may be considered as satisfactory.

They are as detailed below :—

	Major.	Minor.
Horses	178	85
Dogs	192	62
Bovines	100	27
Other animals	4	..
Total ...	474	174

During the year, a Gymnastic Instructor was entertained and he has taken some pains with the students to encourage them to take more physical exercise. The hostel contained on an average 19 students, and the health of the students was fairly good during the year.

Several valuable and useful professional books have during the year been added to the College library and a fairly good number of interesting Museum specimens have been added to the College Museum.

The total receipts of the College Hospital amounted to Rs. 8,438–3–2 during the official year as against 6,846–7–10 in the previous year.

III (*a*)—Cattle Disease.

During the year, reports were received showing a total loss of 152,834 head of cattle from disease and 14,552 from other causes against 113,539 and 15,314 respectively shown in the previous year. The loss was heaviest under "Rinderpest, diarrhœa and dysentery" which alone accounted for 63·6 per cent. of the total mortality. As compared with the previous year, there has been an increase under this heading, also under "Black quarter" and "Epizootic aphtha". On the other hand, there was a decided falling off under "unspecified disease" as well as under "Anthrax" and "Malignant sore throat".

2. The number of deaths from Rinderpest, diarrhœa and dysentery was 97,244 against 31,611 of the previous year. The districts that suffered most from the disease were South Arcot, Chingleput and North Arcot which lost 21,544, 14,430, and 12,202, respectively. With a view to check the prevalence of this disease, a Veterinary Assistant was posted in each of these districts to treat the animals so affected, and at the same time to carry on preventive inoculation. This very large increase in the number of deaths may after all be due to the more careful recording of deaths, but these statistics to my mind are altogether untrustworthy. In this Presidency cattle are only sparingly used for food and if the number of hides exported and the number used for local consumption—probably a matter of two millions—be taken into consideration, it will be seen that the death reports are quite unreliable. As was observed in the last year's report, the decline in the number of deaths from Anthrax has continued to be steady. Deaths from unspecified causes were 27,731 against 53,798 in the previous year. This possibly only indicates more carefulness in the registration of mortality—a result probably due to the increasing professional aid and scrutiny. Criminal poisoning accounted for 56 deaths.

Inoculation against Rinderpest was carried on in 16 districts, and against Anthrax in 8 districts. Preventive inoculation against Anthrax is being abandoned for the present under orders from the Inspector-General, Civil Veterinary Department. Twenty-eight thousand seven hundred and eighty-eight head of cattle were inoculated against "rinderpest", 8,461 against "anthrax" and 1,179 against "hæmorrhagic septicæmia".

It has been reported that the total loss among horses and ponies was 203 from diseases, 14 from snake-bites and 100 from wild animals.

III (*b*)—Veterinary Hospitals.

At the commencement of the year under report there were six Veterinary hospitals at work in this Presidency, but during the year five more were started—one in each of the towns of Vellore, Coimbatore, Pudukkóttai, Vizianagram and Vizagapatam. There are thus eleven dispensaries, of which only two at Madras and Saidapet are maintained directly by Government. Those located in Madura, Trichinopoly, Vellore, Coimbatore and Vizagapatam were under the management of the District Boards concerned. The three Veterinary hospitals at Pithápuram, Pudukkóttai and Vizianagram are situated in Native estates, and are carried on under the management of their respective Rajas, while the Bellary Veterinary dispensary is conducted under the auspices of the Society for the Prevention of Cruelty to Animals and receives an annual donation from Government in aid of its funds. All these hospitals were inspected by me during the year.

The total number of in- and out- patients treated at these institutions is shown in statement No. 5 and their receipts and expenditure in statement No. 6.

In all about 28,248 animals were treated in these hospitals. This gives an average of 2,568 patients for each hospital or about 7 patients per diem. It is very satisfactory to note that in the Trichinopoly hospital there was an increase of about 1,155 cases as compared with that of last year—an unmistakable sign of good work and the popularity of the institution. In the Madura Veterinary hospital, on the other hand, there was a falling off of 1,379 patients when compared with the results of the previous year. This was mainly due to the frequent change of the Veterinary staff consequent on the absence on leave of Mr. Mooley, the permanent incumbent, for over two months and his subsequent resignation towards the close of the year. The hospital is now placed in charge of a Madras Veterinary graduate who, it is hoped, will help it to regain its former popularity.

In the Society for the Prevention of Cruelty to Animals' hospital at Bellary, about 1,904 animals were treated as against 1,968 last year. Though there is a slight decrease in the total number of cases, it is satisfactory to observe that more cattle patients were treated than in the previous year.

In the Saidapet Veterinary hospital, there has been an increase of 111 cases over last year. This hospital from its advantageous locality, being only six miles from the metropolis and in close vicinity of villages, has gained the confidence of the ryots in the neighbourhood and consequently has made great progress especially in the number of cattle patients. During the past year it continued to be under the management of the Agricultural Department, but it has since been transferred to the Civil Veterinary Department.

The hospital at Pithápuram continues in popularity and shows an increase of 328 patients over the previous year, and more cattle and horses were treated both as in- and out- patients.

In the hospital attached to the Madras Veterinary College 2,313 patients were treated during the year, but this hospital has been considered under a separate heading.

IV (*a*)—Pony-breeding Operations.

At the commencement of the year, there were 14 stallions on the rolls, the vacancy caused by the death of "Tigris" in the previous year not having been filled. They were located as usual in the districts of Coimbatore, Salem and Madura. There were ten stallions during the greater portion of the year in the Coimbatore district. A stallion was permanently stationed in Kollegal, Pollachi, Gobichettipalayam,

Palayacotta, Dhárápuram and Kangayam. At Kangayam, in addition to the permanent stallion "Punch", two others "Ahmed" and "Ali" were sent to meet the local demand for their service. The number of coverings effected at Kangayam alone was 54 or nearly one-third of the total number for the district. Stallion "Ophir" which was posted to Dhárápuram covered 17 mares in the course of six months against 16 for the whole of last year. He was taken ill during the early part of November 1907 and had to be destroyed in January 1908.

"Hector" was permanently stationed at Kollegal and covered 20 mares against 26 in the previous year. "Jumna" whose services were required at Erode, Hosúr and Kangayam covered 17 mares and "Ali" who was stationed at Coimbatore covered 9 against 32 and 14 respectively in the previous year. "Ahmed", "Punch", "Mustapha" and "Rahiman" stationed at Kangayam, Dhárápuram, Tiruppúr and Pollachi are credited with 98 coverings against 83. The remaining two stallions "Turk" and "Sheik" covered only 17 and 7 mares respectively against 36 and 11. The decrease is due to the fact that "Turk" was taken ill at the covering season for about a fortnight and that "Sheik" worked in this district only for three months and was subsequently transferred to Madura district.

The total number of coverings effected by the 10 stallions in the Coimbatore district was 186 against 218 in the previous year. The decrease is mainly due to the fact that only six stallions worked in the district throughout the year, and of the rest "Ophir" was useless being affected with kumri and three other stallions were posted here only during the latter part of the year.

There were four stallions at work in the Salem district of which two were posted in Hosúr, one in Krishnagiri, and one in Harúr. In Hosúr "Sunshine" covered 21 mares, and "Jumna" who arrived there so late as December covered only 2. "Selim" at Krishnagiri, and "Carbon" at Harúr covered 23 and 11 mares respectively.

In Madura only two stallions "Samawy" and "Sheik" were at work. "Sheik" who had been standing at Coimbatore was transferred to Madura in October 1907. The total number of coverings effected was 41 against 22 in the year previous.

On the whole, there were 284 coverings during the year against 315 in the one previous, and the average was 21 per stallion approximately. The decrease in the total number of coverings as compared with that of last year is due to the absence of one stallion throughout the year, the frequent illness of "Turk" and the destruction of "Ophir" who suffered from incurable disease (paraphlegia).

Results of coverings.—On the whole, there were 315 coverings during the previous year in the three districts of Coimbatore, Salem and Madura.

It is to be regretted that, notwithstanding the orders of the Board of Revenue directing Revenue Inspectors to ascertain the number of foals dropped to the Government stallions, the results of these coverings were reported only in 83 cases—21 mares foaled, 12 were in foal, 32 proved empty and in 18 cases the whereabouts were not traceable. The Tahsildars concerned have been asked to make further enquiries and report on the remaining cases.

Castrations.—These operations were carried on as usual in the districts of Salem and Coimbatore by three Salustries. Salustri Sheik Ahmed was posted at Hosúr, Salem district, throughout the year, and Salustries Abdhul Rahiman and Abdhul Sathar at Dhárápuram and Kollegal taluk in the Coimbatore district. Seventy-five castrations on pony entires and 62 on bulls were performed at Hosúr. Forty-four pony entires and 120 bulls were castrated at Dhárápuram and Kollegal respectively. In all 301 castrations were performed during the year against 379 in the last year. It is gratifying to note that 119 ponies were castrated against 85 in the previous year.

IV. (*b*)—Cattle Fairs and Shows.

A large number of cattle fairs were held in several districts during the year, but only to three fairs in the Tinnevelly district—(*viz.*) the Kanniseri, Muthilapuram and Kazhugumalai—was it possible to depute a Veterinary Assistant to enforce the provisions of the Cattle Diseases Act II of 1866. From the reports submitted by the Veterinary Assistant, it would seem that upwards of 63,020 animals were gathered

for sale, that no cases of a contagious disease broke out amongst them and that in consequence there was no necessity to take action under the Act. Occasion was, however, taken to demonstrate to the people assembled the process and advantages of preventive inoculation. There were seven other more or less important fairs held in the same district, but no reports were made in consequence of the difficulty of deputing a Veterinary Assistant to look after them.

Under the auspices of the District Agricultural Associations of Madura, Coimbatore, Ganjám, Gódávari, Vizagapatam, and Guntúr, half a dozen cattle shows were organised and held respectively in Madura, Tiruppur, Berhampur, Cocanada, Kottavalsa and Ongole. Detailed reports regarding each of them having been separately submitted to the Board of Revenue, it will suffice to notice here some of their most interesting points. So far as the number and quality of the animals exhibited were concerned, it may be safely asserted that these shows have proved a success. From the breeders' point of view, the Ongole and Tiruppur shows stand out pre-eminently. At the Ongole show, all the animals exhibited were of a distinctive type and indeed this may also be said of those shown at Tiruppur. At Tiruppur there were two distinct breeds exhibited in addition to the large number of pony stock. The magnificient breed of buffaloes so carefully reared and exhibited at Kottavalsa cannot be passed over without comment as they were by far the best exhibited, and eclipsed those shown at other shows. The Maharaja of Bobbili has exhibited some of these buffaloes at several fairs, and has done much in this way to show the people to what extent fine buffaloes may be bred. Such exhibit tends to excite emulation amongst local breeders and may influence them to improve the local breed in the near future. While increasing efforts are made to improve cattle—the backbone of agriculture—it is desirable that attention should be also drawn to the encouragement of breeding and the exhibiting of wool bearing sheep.

Owing to the large purchases of the best young stock of the Ongole breed by purchasers from foreign countries, Government have recognised the advisability of purchasing some of the best male stock exhibited each year for retention in the district and thus to protect the breeder. With this object in view, eight young bulls were purchased at the last Ongole cattle show. One cost Rs. 350. Six of them were stationed in the Guntúr, one in the Vizagapatam district and one in the Madras Veterinary College. They are running loose.

V.—Veterinary Assistants.

Throughout the year six Veterinary Assistants were mainly employed in (1) attending to outbreaks of cattle disease, (2) demonstrating to ryots the benefits of preventive inoculation and (3) carrying on the work of inoculation in the villages affected with infectious disease. There were 700 outbreaks during the year, and the districts mostly affected by them were Ganjám, Gódávari Kistna, Kurnool, Bellary, Anantapur and Nellore in each of which, except Kistna, a Veterinary Assistant was permanently employed throughout the year. Reports of outbreaks from Tanjore, South Arcot, North Arcot and Chingleput were constantly received and Veterinary Assistants were temporarily deputed to combat the epidemics. It is gratifying to observe that ryots were beginning to appreciate the utility of inoculation which was carried on in a pretty large scale in 16 districts against 13 in the previous year.

The subjoined table shows the number of cattle inoculated for each disease, and statement No. III the number inoculated in each of the districts. The staff of Veterinary Assistants engaged in inoculation work has since been strengthened by the addition of 9 Veterinary graduates:—

Year.	Malignant sore throat.	Anthrax.	Rinderpest	Hæmorrhagic septicæmia.	Total.
1905–1906	..	[illegible],152	13,689	838	35,674
1906–1907	..	[illegible]	11,642	679	20,578
1907–1908	..	[illegible]	26,738	1,179	36,488

Senior Veterinary Assistant M. Hassen Alí Sháib visited Kurnool, Chingleput and Tinnevelly districts, and inoculated 500 cattle against rinderpest. He proceeded to Ongole to assist Mr. J. D. leik D'Castro of Brazil in the purchase of bulls and cows. To a great extent the success of the two cattle shows—one at Tiruppúr, Coimbatore district, and the other at Makkajipalli in Mysore province—was due to his energy and organisation. He was on privilege leave from 10th September to 9th October 1907 and on the 1st November his services were lent to the Corporation of Madras.

The other Senior Veterinary Assistant V. P. Subrahmania Mudaliyar was chiefly engaged in inoculation work which he rendered very popular notwithstanding the strong prejudice prevailing against it. He inoculated 6,423 animals against anthrax and 5,798 against rinderpest, making a total of 12,221, which is more than one-third of the number inoculated in the whole Presidency. He was on privilege leave for one month, and visited thirteen districts, of which eight were in connection with outbreaks and fairs, and five in connection with shows to which his time and attention were devoted in the latter part of the year. At one of the shows at Berhampur, he addressed the people assembled on "preventive inoculation and its uses" which was well appreciated. He has since been promoted to the rank of Veterinary Inspector.

Veterinary Assistant S. C. Jeyasing Raj was stationed at Bellary for the major portion of the year, but as reports of outbreaks were received from Trichinopoly and South Canara he had, in addition, to visit these districts. His services were lent to the District Board Hospital at Madura during the absence of the permanent incumbent on privilege leave for two months. He inoculated 1,233 animals on the whole and was on privilege leave for a month and a half.

Veterinary Assistant S. A. Padmanabha Pillai was engaged in the earlier part of the year in treating Government elephants. He visited Ganjám, Cuddapah and Guntúr districts, attended to outbreaks of cattle disease and inoculated 1,827 animals. On the 25th December he proceeded to Trichinopoly to relieve the Veterinary Assistant in charge of the District Board Hospital who was granted privilege leave for a month. In February 1908 he took charge of the District Board Hospital, Coimbatore.

Veterinary Assistant A. Ramalinga Mudaliyar was carrying on preventive inoculation in the Southern districts—Tinnevelly, Tanjore, Coimbatore, North Arcot and South Arcot. He also attended the cattle fair held at Kalugumalai, Tinnevelly district. The total number of inoculations performed by him was 5,511, of which 5,400 were against rinderpest and 111 against anthrax.

Veterinary Assistant A. Rajappa who was mainly engaged in inoculation work in the districts of Bellary, Kurnool, Kistna and North Arcot was deputed to Gódávari to treat the Government elephant suffering from diarrhœa.

Veterinary Assistant A. Subrahmania Aiyar was at the commencement of the year posted to Anantapur district where he carried out on a large scale the preventive inoculation against rinderpest and anthrax. He was also called upon to attend to outbreaks of cattle disease in the Kurnool, Guntúr and Cuddapah districts. He inoculated on the whole 6,957 cattle. His health having broken down, he was obliged to go on privilege leave for one month.

Veterinary Assistant M. P. Kanniah Nayudu was on duty for the most part of the year in the district of Chingleput where rinderpest broke out in a very virulent type. He also visited Kurnool and Nellore districts, and inoculated 6,097 animals, of which 914 were against anthrax, 5,183 against rinderpest.

The following doses of serum were received from the Imperial Bacteriologist during the year:—

Rinderpest	36,000
Anthrax	7,000

Madras,
1st *July* 1908.

W. D. GUNN, Lt.-Col.,
Superintendent, Civil Veterinary Department.

TABLE I.—Abstract showing main results of Veterinary Colleges and Schools during the year 1907–1908.

Veterinary College and Schools.	Name of course of instruction if more than one course followed.	Number of students.						Students admitted during the year classed by educational qualifications.		
		Admitted during the year.		Passed final examination during the year.	Failed to pass final examination.	Remaining under instruction at the end of the year.				
		Scholarship holders.	Others.			In ordinary course.	Instruction prolonged by reason of failure.	Matriculated with higher qualifications.	Knowing English but not matriculated.	Knowing very little English.
1	2	3	4	5	6	7	8	9	10	11
Veterinary College, Madras.	..	10	16	17	6	74	5	6	20	..

Veterinary College and Schools.	Receipts.			Expenditure.			Employment of students passed out during the two years preceding.				
	From fees.	From other sources.	Total.	Salaries of instruction staff.	Other expenses.	Total.	Total number passed.	In service of local bodies or Government.	In the service of other bodies.	In private practice.	Number unemployed.
	12	13	14	15	16	17	18	19	20	21	22
Veterinary College, Madras.	..	..	..	Rs. A. P. 6,686 9 8	Rs. 3,290 (stipends).	Rs. A. P. 9,976 9 8	29	20	8	..	* 1

* Died.

TABLE II.—Showing number of deaths from contagious diseases amongst animals during the year 1907–1908.

Province.	Equines.						Bovines.			
	Glanders.	Anthrax.	Surra.	Dourine.	Other contagious diseases.	Total.	Rinderpest.	Foot and mouth disease.	Hæmorrhagic Septicæmia.	Black quarter.
1	2	3	4	5	6	7	8	9	10	11
Madras Presidency ..	..	15	..	.	188	203	97,244	3,544	..	6,148

Province.	Bovines—*cont.*			Others.						
	Anthrax.	Other contagious diseases.	Total.	Rabies.	Plague.	Hæmorrhagic Septicæmia.	Gillar.	Anthrax.	Other contagious diseases.	Total.
	12	13	14	15	16	17	18	19	20	21
Madras Presidency ..	16,977	34,921	152,334	12	..	..	..	1	40	53

TABLE III.—Statement showing results of preventive inoculation during the year 1907–1908.

Districts.	Name of disease against which inoculation was carried out.	Method of inoculation followed.	Number of outbreaks in which inoculation was undertaken.	Number of animals which died uninoculated in course of outbreak.			Number of animals inoculated.			Number of animals which died after inoculation.		
				Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.
1	2	3	4	5	6	7	8	9	10	11	12	13
1. Ganjám	"Rinderpest."	By serum alone.	4	..	6	..	..	122	..	..	1	..
2. Vizagapatam			2	..	6	..	..	105	..	..	..	..
3. Kistna			33	..	312	..	..	2,911	..	..	.	..
4. Guntúr			12	..	235	..	..	3,073	..	..	..	..
5. Karnool			139	..	1,826	..	..	1,839	100	..	1	..
6. Bellary			93	..	696	..	..	1,989	..	..	2	..
7. Anantapur			51	..	1,694	..	..	5,361	26	..	7	..
8. Cuddapah			33	..	341	..	..	572	..	..	..	..
9. Nellore			7	..	55	..	..	695	..	..	1	..
10. Chingleput			57	..	1,984	..	..	3,509	..	..	.	..
11. Madras			6	..	62	..	..	1,218	..	..	5	..
12. South Arcot			28	..	1,536	..	..	3,250	..	..	59	..
13. North Arcot			37	..	1,792	..	..	1,866	..	..	3	..
14. Salem			.	..	..	..	..	50	..	..	..	..
15. Tanjore			10	..	624	..	..	2,905	..	..	40	..
16. Tinnevelly			1	..	..	..	..	28	..	..	..	.
Total ..	..	..	643	..	10,929	..	..	28,783	126	..	119	..

Statement showing results of preventive inoculation during the year 1907–1908—*cont.*

Districts.	Name of disease against which inoculation was carried out.	Method of inoculation followed.	Number of outbreaks in which inoculation was undertaken.	Number of animals which died uninoculated in course of outbreak.			Number of animals inoculated.			Number of animals which died after inoculation.		
				Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.
1	2	3	4	5	6	7	8	9	10	11	12	13
1. Vizagapatam	Anthrax.	By serum.	3	..	81	..	..	80	..	..	..	..
2. Kistna			1	..	4	..	..	129	..	..	6	..
3. Guntór			4	..	42	..	..	762	..	..	..	..
4. Bellary			8	..	27	..	..	355	..	..	..	..
5. Nellore			3	..	10	..	..	429	..	..	..	..
6. North Arcot			2	..	40	..	..	111	..	..	..	..
7. Trichinopoly			..	..	..	..	..	205	..	..	..	..
8. Tanjore			29	..	272	..	..	6,400	..	..	79	..
		Total ..	45	..	482	..	..	8,461	..	..	79	..
1. Ganjám	Hæmorrhagic Septicæmia.	By serum alone.	8	..	14	..	..	330	..	..	..	..
2. Guntór			4	..	43	..	..	849	..	..	..	..
		Total ..	12	..	57	..	..	1,179	..	..	..	..

TABLE IV.—Abstract showing the number of animals treated and castrated by Veterinary Assistants and Salustries on tour during the year 1907–1908.

Province.	Number of villages visited.	Number of veterinary assistants or salustries employed.	Castrations performed.				Treated for contagious diseases.				Treated for non-contagious diseases.				Total number of cases treated and castrations performed.
			Equines.	Bovines.	Others.	Total.	Equines.	Bovines.	Others.	Total.	Equines.	Bovines.	Others.	Total.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Madras	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Veterinary Assistants ..	..	5 *	..	..	..	..	..	..	..	..	..	..	..	..	..
Salustries	..	3	119	182	..	301	..	..	..	..	..	..	..	..	301

* Veterinary Assistants on tour are engaged in inoculation work.

TABLE V.—Statement showing the number of animals treated at Veterinary Hospitals during 1907–1908.

Province.	Number of veterinary dispensaries.	Number of Veterinary Assistants employed at dispensaries.	In-patients.											
			Remaining on 1st April 1907.			Admitted during the year.			Total.			Discharged during the year.		
			Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Madras ..	1	4	16	16	16	540	164	852	556	180	867	531	158	243
Saidapet ..	1	1	8	2	4	111	93	77	119	95	81	112	94	76
Vellore ..	1	1	..	..	..	25	9	7	25	9	7	19	9	7
Madura ..	1	1	2	..	..	44	25	11	46	25	11	39	22	10
Trichinopoly ..	1	1	9	12	4	299	332	194	308	344	198	296	329	193
Coimbatore ..	1	..	..	..	..	155	99	50	155	99	50	145	95	45
Vizianagram ..	1	1	..	..	..	10	16	6	10	16	6	7	16	6
Vizagapatam ..	1	1	..	..	..	11	9	7	11	9	7	11	9	4
Pithápuram ..	1	1	1	1	..	13	..	1	14	1	1	14	1	1
Bellary ..	1	1	1	12	31	80	177	84	81	189	115	77	178	111
Pudukkóttai ..	1	1	..	..	..	..	..	..	..	..	..	..	..	..
Total ..	11	14	37	43	54	1,288	924	789	1,325	967	843	1,251	911	695

Province.	In-patients—*cont.*			Out-patients.													
	Balance on 31st March 1908.			Number treated during the year.			Average daily attendance.			Total number of in- and out-patients treated during the year.				Receipts.		Expenditure	
	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Equines.	Bovines.	Others.	Total.				
	16	17	18	19	20	21	22	23	24	25	26	27	28	29		30	
														Rs. A. P.		Rs. A. P.	
Madras ..	25	22	126	353	102	755	6	3	14	909	282	1,122	2,313	8,438	3 2	15,862	1 11
Saidapet ..	7	1	5	294	635	290	4·8	10·7	4·1	413	630	371	1,414	2,677	0 0	1,474	8 8
Vellore ..	6	.	..	147	94	110	12·6	6·8	5·5	172	108	117	392	7	12 10	822	7 11
Madura ..	7	3	1	379	590	218	12·3	13·7	4·6	425	615	229	1,269	269	0 0	1,845	0 0
Trichinopoly ..	12	15	5	4,701	7,522	984	13	21	3	5,009	7,866	1,182	14,057	1,013	10 0	2,521	2 11
Coimbatore ..	10	4	5	1,442	926	339	9	6	2	1,597	1,024	382	3,003	..		556	2 6
Vizianagram ..	3	..	..	226	79	44	12	2	2	236	95	50	381	2,551	8 0	1,712	4 5
Vizagapatam ..	..	..	3	119	99	203	5·8	3·6	6·8	130	108	210	448	2,080	0 0	1,077	2 7
Pithápuram ..	..	.	..	172	568	358	·4	1·5	·9	186	569	359	1,114	..		1,589	0 0
Bellary ..	4	11	4	411	712	396	14·2	25·1	10·7	492	901	511	1,904	2,519	13 10	2,519	13 10
Pudukkóttai ..	..	..	..	314	1,425	214	2	10·7	1·6	314	1,425	214	1,953	10	6 0	2,100	0 0
Total ..	74	56	148	8,558	12,651	3,904	92·0	104·1	55·2	9,883	13,618	4,747	28,248	19,517	5 10	32,039	13 9

TABLE VI.—Abstract showing receipts and expenditure of Veterinary Dispensaries during 1907–1908.

Province.	Receipts.						
	Last year's balance.	By local fund grants.	By Government grants.	By municipal contributions.	By fees.	By other sources.	Total.
1	2	3	4	5	6	7	8
	Rs. A. P.	Rs. A. P.	Rs. A. P.		Rs. A. P.	Rs. A. P.	Rs. A. P.
1. Madras	— 887 13 0	..	..	..	8,438 3 2	..	8,438 3 2
2. Saidapet	*	..	1,698 10 8	..	879 12 10	98 8 6	2,677 0 0
3. Vellore	*Nil.*	..	..	..	6 8 10	1 4 0	7 12 10
4. Madura	124 12 2	..	..	..	269 0 0	..	269 0 0
5. Trichinopoly	*	..	..	..	1,013 10 0	..	1,013 10 0
6. Coimbatore	*Nil.*	..	..	..	..	..	..
7. Vizianagram	*Nil.*	2,500 0 0	..	..	51 8 0	..	2,551 8 0
8. Visagapatam	*Nil.*	2,000 0 0	..	..	..	30 0 0	2,030 0 0
9. Pithápuram	*	..	..	..	..	..	..
10. Bellary	*	1,095 4 7	360 0 0	..	897 7 3	667 2 0	2,519 13 10
11. Pudukkóttai	*Nil.*	..	..	..	10 6 0	..	10 6 0
Total ..	..	5,595 4 7	2,058 10 8	..	11,066 8 1	796 14 6	19,517 5 10

Province.	Expenditure.						Balance.
	Pay.	Travelling allowance.	Medicines and instruments.	Furniture.	Contingencies.	Total.	
	9	10	11	12	13	14	15
	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.	Rs. A. P.
1. Madras	11,555 11 9	100 8 0	1,196 11 9	411 7 11	2,597 10 6	15,862 1 11	— 7,811 11 9
2. Saidapet	552 14 7	..	616 14 6	..	404 11 7	1,474 8 8	1,202 7 0
3. Vellore	433 15 10	..	..	208 9 0	161 0 0	802 7 11	— 814 11 1
4. Madura	1,448 0 0	..	236 0 0	..	161 0 0	1,845 0 0	*
5. Trichinopoly	1,595 12 0	244 0 0	..	..	678 6 11	2,521 2 11	*
6. Coimbatore	304 0 0	..	188 2 6	20 0 0	54 0 0	566 2 6	..
7. Vizianagram	667 9 11	65 11 0	835 12 0	14 11 0	128 8 6	1,712 4 5	839 3 7
8. Visagapatam	623 15 1	5 5 6	69 10 0	308 8 10	54 12 2	{ 1,062 3 7 ††15 0 0 }	952 12 5
9. Pithápuram	948 0 0	..	421 0 0	..	170 0 0	1,539 0 0	*
10. Bellary	1,425 12 6	..	94 1 0	527 6 6	472 10 10	2,519 13 1	*
11. Pudukkóttai	945 5 4	17 8 0	818 10 0	240 14 8	77 10 0	2,100 0 0	*
Total ..	20,504 1 0	433 0 6	4,276 13 9	1,781 8 11	4,979 5 7	{ 32,024 13 9 †† 15 0 0 }	..

* The opening and closing balances are not reported.

† Visiting fee.

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TABLE VII.—Statement showing strength of subordinate Veterinary staff employed during the year 1907–1908.

Province.	How occupied.	Whether paid from Provincial or Local funds.	Veterinary Inspector.	Veterinary Assistant.	Subordinate staff not included in previous columns.	Remarks.
1	2	3	4	5	6	7
Madras ..	Itenerating and attending cattle fairs and shows.	Provincial ..	1	* 17	..	* No. 17 includes senior Veterinary assistant Hassan Ali Sahib, whose services were lent to the Municipality in 1st November 1907.
	In charge of hospitals.	Local Fund ..	..	6	..	
		Rajas ..	..	3	..	
		Society for the Prevention of Cruelty to Animals, Bellary.	..	1	..	
	College work ..	Provincial ..	..	..	† 4	† One Assistant Principal and three Lecturers.
		Total ..	1	27	4	

TABLE VIII.—Return of stud bulls for the year 1907–1908.

Province.	Property of Government.					Property of local bodies.				
	Number on 1st April 1907.	Obtained during the year.		Casualties during the year.	Balance remaining on 31st March 1908.	Number on 1st April 1907.	Obtained during the year.		Casualties during the year.	Balance remaining on 31st March 1908.
		No.	Average price paid.				No.	Average price paid.		
1	2	3	4	5	6	7	8	9	10	11
			Rs.							
Madras	6	13	108	*Nil.*	19	..	..	..	..	..

REMARKS.—The bulls are posted thus—Four at Tinnevelly district, twelve at Guntúr, one at Visagapatam and two at the Madras Veterinary College.

TABLE IX.—Statement showing main results of the working of Provincial Cattle Farm during the year 1907–1908—*Nil.*

TABLE X.—Return of horse, pony and donkey stallions under local bodies for the year 1907–1908.

	No.
Arab	* 14

The stallions at stud are under the Provincial Department of Government.

* One stallion was destroyed in January 1908.

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Table XI.—Services and produce of each class of horse, pony and donkey stallions under local bodies during the year 1907–1908.

Horse, pony or donkey.	Province.	Stallions on register on 31st March 1908.	Stallions actually employed at stud.		Number of mares covered.		Average number of mares covered per stallion employed at stud.		Remarks.
			Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	
1	2	3	4	5	6	7	8	9	10
Pony	Madras ..	13	* 14	14	284	316	21	22	* One of the stallions "Ophis" was destroyed in January 1908.

N.B.—The stallions at stud are under the Provincial Department of Government.

Table XII.—Average cost of feed, keep, attendance, etc., of horse, pony and donkey stallions during the year 1907–1908.

Province.	Horse.		Pony.		Donkey.		Remarks.
	Year under report.	Previous year.	Year under report.	Previous year.	Year under report.	Previous year.	
1	2	3	4	5	6	7	8
Madras	..	..	Rs. A. P. 13 6 9	Rs. A. P. 24 14 7	..	..	The total expenditure for fodder alone of 13 Government stallions for the whole year and one for ten months amounted to Rs. 5,862-0-9. Report from Madura having since been received, the figures have been included in the statement.

Table XIV.—Abstract of particulars regarding Cattle Fair and Shows held during the year 1907–1908.

Province.	Number of cattle fairs and shows held.	Total number of stock present.							Average price of animals sold.				
		Bulls	Bullocks.	Cows.	Young stock.	Buffaloes.	Camels.	Others.	Bulls.	Bullocks.	Cows.	Buffaloes.	Camels.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Tinnevelly Cattle Fairs.									Rs.				
1. Kanniseri	1	..	17,000	200	500	20	..	..	Information not available.				
2. Muthilapuram ..	1	50	18,000	150	1,000	800	..	..					
3. Kashugumalai ..	1	..	25,000	50	..	250	..	..					
Cattle Shows.													
1. Madura	1	89	138	4	..	..	..	..	..	..	..	..	..
2. Tiruppúr	1	(1,918) cattle and 196 ponies.							..	..	..	..	..
3. Berhampúr	1	15	127	33	..	45	..	24	..	..	..	..	..
4. Cocanada	1	19	52	28	18	85	..	27	..	..	..	..	..
5. Kotavalsa	1	87	190	20	..	101	..	8	..	..	..	75	..
6. Ongole	1	225	45	445	..	68	..	88	206	..	..	..	..
Total ..	9	465	62,470	930	1,518	1,369	..	343	206	..	..	75	..

—	Amount realised in fees.	Total number of animals that competed for prizes.	Prizes awarded.						Number of medals.	Remarks.
			From Imperial Funds.	From Provincial Funds.	From local bodies.	From other sources.	Total.	Amount actually awarded.		
	15	16	17	18	19	20	21	22	23	24
Tinnevelly Cattle Fairs.	Rs. A.	Rs.	Rs.		Rs. A.		Rs. A. P.	Rs. A. P.		
1. Kanniseri	Information not available.									
2. Muthilapuram ..										
3. Kashugumalai ..										
Cattle Shows.										
1. Madura	..	311	300	..	436 0	10	746 0 0	424 13 6	1	Silver medal.
2. Tiruppúr	..	2,114	..	..	..	..	..	1,311 0 0	2	Do.
3. Berhampúr	..	344	..	..	..	..	..	862 0 0	4	Do.
4. Cocanada	..	330	500	..	600 0	..	1,100 0 0	1,197 0 0	10	4 gold and 6 silver and 1 silver cup.
5. Kotavalsa	88 0	466	500	..	300 0	684	1,484 0 0	1,019 0 0	7	1 gold and 6 silver.
6. Ongole	340 8	861	1,000	..	2,600 12	..	3,600 12 0	2,513 0 0	1	Gold medal (Canadian).
Total ..	378 8	4,065	2,300	..	3,945 12	694	6,930 12 0	7,326 13 6	25	

TABLE XIV (*a*).—Statement showing the cost of the Civil Veterinary Department during the official year 1907–1908.

Major heads.	Amount.			
	Imperial.	Provincial.	Local.	Total.
1	2	3	4	5
	Rs. A. P.	Rs. A. P.		Rs. A. P.
Salaries of officers	36,245 2 10	...	..	36,245 2 10
Do. of subordinates	*Nil.*	6,919 13 5	..	6,919 13 5
Travelling allowance of officers	..	2,900 12 0	..	2,900 12 0
Do. of the subordinates	..	3,939 7 6	..	3,939 7 6
Other allowances	..	600 0 0	..	600 0 0
Supplies and services	..	76 4 0	..	76 4 0
Contingencies	..	5,250 6 2	..	5,250 6 2
Prevention of disease	..	..	..	..
Schools and colleges	..	..	..	..
Prizes at fairs and shows	1,500 0 0	19,567 5 0	..	19,567 5 0
		..	..	1,500 0 0
Total ..	37,745 2 10	39,254 0 1	..	76,999 2 11

TABLE XV.—Comparative statement of cattle mortality for five years ending 1907–1908.

Causes of death.	Number of deaths among cattle for the official year 1907–1908.				
	1903–1904.	1904–1905.	1905–1906.	1906–1907.	1907–1908.
Rinderpest, diarrhœa and dysentery	17,655	19,772	19,050	31,611	97,244
Anthrax	16,887	14,996	13,474	12,082	10,977
Malignant sore-throat	13,769	11,317	8,838	9,086	7,190
Black quarter	7,616	7,682	5,952	4,166	6,148
Epizootic aphtha	4,683	2,767	4,074	2,794	3,544
Others	22,548	33,336	38,905	33,708	27,731
Total ..	83,156	89,871	90,293	113,539	152,834
Snake bite	2,276	2,257	2,011	1,899	1,885
Wild animals	19,886	12,061	13,282	13,272	12,611
Criminal poisoning	71	52	58	68	56
Total ..	13,235	14,370	15,301	15,314	14,552
Grand total ..	106,393	104,241	105,594	128,853	167,386

TABLE XVI.—Statistics of mortality among Cattle, Horses and Ponies in the several districts of the Madras Presidency during the year 1907–1908.

Districts.	Number of deaths among Cattle										
	From Diseases.								From snake-bite.	By wild animals.	From criminal poisoning.
	Rinderpest.	Diarrhœa and dysentery.	Anthrax.	Malignant sore-throat.	Black quarter or quarter ill or evil.	Epizootic aphtha.	Others.	Total.			
1	2	3	4	5	6	7	8	9	10	11	12
1. Ganjám	2,790	..	528	547	355	1,277	1,041	6,538	69	211	..
2. Vizagapatam	977	..	547	311	167	69	432	2,503	36	69	..
3. Gódávari	654	..	1,017	144	84	116	2,116	4,131	84	151	7
4. Kistna	3,342	..	1,567	1,241	172	271	2,752	9,345	237	46	11
5. Guntúr	1,165	..	184	1,077	202	54	519	3,201	43	15	5
6. Kurnool	8,865	..	810	236	570	105	3,397	13,983	78	393	..
7. Bellary	7,289	..	726	330	445	157	2,389	11,336	16	171	2
8. Anantapur	8,677	..	354	333	845	318	2,423	12,950	41	222	2
9. Cuddapah	4,765	..	547	238	1,835	144	1,088	8,617	50	574	2
10. Nellore	3,222	..	849	519	301	156	2,122	7,169	194	109	8
11. Chingleput	14,430	..	531	153	17	58	527	15,716	105	14	2
12. South Arcot	21,544	..	712	156	179	118	2,973	25,682	136	192	2
13. North Arcot	12,202	..	438	301	392	106	949	14,388	251	716	1
14. Salem	300	..	88	70	128	53	414	1,053	32	235	1
15. Coimbatore	692	..	127	98	128	239	811	2,095	50	961	3
16. Trichinopoly	378	..	281	106	28	38	1,246	2,077	69	39	1
17. Tanjore	2,798	..	511	479	79	34	298	4,199	91	..	..
18. Madura	1,014	..	740	211	202	2	909	3,078	122	132	2
19. Tinnevelly	284	..	239	102	..	3	490	1,118	97	78	7
20. Nilgiris	35	..	3	296	8	41	60	443	4	287	..
21. Malabar	279	..	52	223	3	167	122	846	67	2,605	..
22. South Canara	1,542	..	126	19	8	18	653	2,366	12	5,391	..
Total ..	97,244	..	10,977	7,190	6,148	3,544	27,731	152,834	1,985	12,611	56

Districts.	Number of deaths among—*cont.*												
	Cattle—*cont.*			Horses and ponies.									
				From diseases.									
	Total.	Grand total.	Total stock by the latest census.	Diarrhœa and Dysentery.	Anthrax.	Others.	Total.	From snake-bite.	By wild animals.	From criminal poisoning.	Total.	Grand total.
	13	14	15	16	17	18	19	20	21	22	23	24
1. Ganjám	260	6,818	..	..	..	..	..	..	1	..	1	1
2. Vizagapatam	105	2,608	..	..	..	3	3	..	..	..	..	3
3. Gódávari	242	4,373	..	2	2	18	22	1	1	..	2	24
4. Kistna	294	9,639	..	1	4	31	36	2	..	..	2	38
5. Guntúr	63	3,264	..	1	1	1	3	1	..	..	1	4
6. Kurnool	471	14,454	..	..	1	13	14	..	8	..	8	22
7. Bellary	189	11,525	..	2	2	28	32	2	8	..	10	42
8. Anantapur	265	13,215	..	2	..	20	22	..	12	..	12	34
9. Cuddapah	626	9,243	..	3	..	4	7	1	..	..	1	8
10. Nellore	311	7,480	..	..	..	15	15	..	..	..	..	15
11. Chingleput	121	15,837	..	..	..	1	1	..	..	..	..	1
12. South Arcot	330	26,012	..	..	1	5	6	..	1	..	1	7
13. North Arcot	968	15,356	..	..	..	..	..	..	3	..	3	3
14. Salem	268	1,321	..	..	..	1	1	1	1	..	2	3
15. Coimbatore	1,014	3,109	..	2	1	7	10	3	8	..	11	21
16. Trichinopoly	109	2,186	..	..	..	7	7	..	..	..	..	7
17. Tanjore	91	4,290	..	..	..	1	1	..	..	..	..	1
18. Madura	256	3,334	..	1	2	13	16	3	34	..	37	53
19. Tinnevelly	182	1,300	..	..	1	1	2	..	..	..	..	2
20. Nilgiris	291	734	..	1	..	2	3	..	23	..	23	26
21. Malabar	2,672	3,518	..	1	..	1	2	..	..	..	..	2
22. South Canara	5,404	7,770	..	..	..	..	..	..	..	..	..	..
Total ..	14,552	167,386	..	16	15	172	203	14	100	..	114	317

3 0 2

GOVERNMENT OF MADRAS.

REVENUE DEPARTMENT.

READ—the following paper :—

Proceedings of the Board of Revenue (R.S., Sur., L.R. and Agri.), No. 279, dated 28th July 1908.

The Hon'ble Mr. J. TWIGG.

The reports of the Director of Agriculture and the Superintendent, Civil Veterinary Department, on the operations of their respective departments for the year 1907–1908 will be submitted to Government.

2. *Agricultural stations.*—The Director's report shows a record of good work done during the year by the two Deputy Directors of Agriculture and by Mr. Shepperson on the farms under their charge. No new agricultural stations were opened during the year. The management of the ten existing stations occupied most of the time of the Deputy Directors, but the Director expresses the hope that when the managers of these stations gain more experience, less supervision will be required and the two Deputy Directors may be able to devote more time to touring in the districts. The season at the Bellary farm was not favourable, but at the remaining stations useful experimental and demonstration work was carried on during the year. Experiments towards improving the cultivation of cotton were continued at Nandyal, Koilpatti and Hagari. The results at Koilpatti were particularly gratifying. The system introduced in the Kurnool and Cuddapah districts of paying a premium of two annas per acre to ryots who had grown pure cotton has not met with much success, the extent on which such premia were paid during the year 1907–1908 being only ·54 per cent. of the total area under cotton in the tracts concerned. The continuance of the experiment for another year has been sanctioned. The Board is glad to note that the sugarcane experiments conducted at the farms at Samalkotta in Gódávari and at Palur in South Arcot have so far succeeded that the cultivation of the new varieties is spreading rapidly. As a result of the successful cultivation of the cane in a small plot of land at the Taliparamba farm, 79 applications for cane sets were received from people in Malabar who wished to grow the canes. The experiments should be continued and the ryots encouraged to grow the crop for which the climate and conditions of the district seem to be favourable. Improvements in paddy cultivation were attempted on all the wet land farms. As a result of further investigation into the prospects of agave cultivation at Hindupur, it was decided to persevere with the experiments, the aim of which is to introduce fibre-making from agave as a cottage industry of the district. The Attur station which was started with the object of conducting a thorough trial of perennial and exotic cottons under irrigation and the growth of fodder crops was found to be unsuited to the experiments and it has therefore been decided to abandon it.

3. *Agricultural instruction.*—The College and farm at Saidapet were closed at the end of the calendar year and the new College at Coimbatore was opened in June last. The required buildings at the latter station are still unfinished, but it is hoped that they will shortly be completed and handed over to the Agricultural department. Four managers of agricultural stations were sent during the year to the United

Provinces to undergo a course of training in Mr. Hadi's improved method of sugar-making. Apprentices sent either by District Agricultural Associations or by private individuals were freely received at the Government farms. The object and scope of the several farms were also explained to the ryots who visited them and every facility was afforded to the visitors to understand the work carried on there.

4. *Agricultural associations and exhibitions.*—The Board notes with satisfaction the useful work done by the Agricultural Associations in the several districts. Cattle and agricultural shows were held during the year in the districts of Ganjám, Vizagapatam, Gódávari, Guntúr, Coimbatore, Madura and Trichinopoly.

5. The Government Botanist (Dr. C. A. Barber) was on leave throughout the year. During his absence the appointment was held by M.R.Ry. Rao Bahadur C. K. Subba Rao, whose untimely death which occurred after the close of the year is a heavy loss to the department. Extensive operations for the eradication of palm disease in Gódávari were carried out by the Assistant in Mycology and the special Revenue staff during the year, but as it is reported that the disease spreads most rapidly during the rains, the results of the preventive measures adopted can be judged only after the rains set in. Dr. Butler visited the scene of operations twice during the year and also paid a visit to the Native State of Travancore for the investigation of an obscure disease from which the cocoanut gardens in the State were reported to be suffering. In this connection, the Board begs to endorse the Director's remark in paragraph 10 of his report regarding the need for an European Provincial Mycologist to carry on systematic research in Madras. In paragraph 7 of his Despatch to the Government of India No. 226, Revenue, dated 14th December 1906, which is among the papers printed in G.O., No. 910, Revenue, dated 20th April 1907, the Secretary of State for India expressed his inability to sanction the local Government's recommendations on the subject and considered that the Botanical Department at Pusa should in time be able to provide competent Mycologists to be attached to the several Provinces. The interests at stake in Gódávari and elsewhere are, however, so important that the Board would suggest that the request for the appointment of a Mycologist for Madras might be renewed.

6. *Pumping experiments.*—The conduct of the experiments continued as in the preceding year under the control of Mr. Chatterton, Director of Industrial and Technical Inquiries, to whom the direction of the boring operations in the Tiruvallúr and Ponnéri taluks of the Chingleput district was also transferred. The total number of engines and pumps which were at work or in course of erection in the last year was 54; and during the year 40 engines were newly installed. The result is extremely satisfactory. Land improvement loans for the purpose of setting up oil-engines and pumps to the value of Rs. 22,000 were paid to 8 individuals against Rs. 19,500 paid to 6 persons in the preceding year. The tables showing the depths at which sub-artesian supply was tapped in wells and the particulars as to the cost of borings at different depths furnished by Mr. Chatterton are full of interest. The Board hopes to receive from Mr. Chatterton after the end of September next a special report on the boring operations carried on by him.

7. *Meteorology.*—The rainfall registered at the various raingauge stations was tabulated as usual and the results published by the Meteorologist, Madras, and Deputy Director of the Madras Observatory. The total number of stations in the Presidency at the end of the official year 1907–1908 was 470, inclusive of 79 in the Native States, or 5 more than at the end of the previous year and of these, 362 stations were inspected.

8. *Statistics.*—The following returns were published in connection with local enquiries under Provincial direction (1) Monthly season reports in three sections (rainfall, cultivation and prices of food-grains and salt); (2) annual crop forecast reports in respect of cotton, paddy, ground-nut and gingelly and (3) quarterly reports of cattle mortality.

9. *The Madras Agri-Horticultural Society.*—The income of the Society from various sources including the Government grant of Rs. 4,000 amounted to Rupees 16,407-5-0. The annual flower show was held on the 25th January 1908 at the nursery gardens of the Society.

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9. The Government consider that the Director of Agriculture is to be congratulated on the steady progress shown by the department in all directions throughout the year.

(True Extract.)

A. G. CARDEW,
Secretary to Government.

To the Board of Revenue (Revenue Settlement).
" the Public Department.
" the Educational Department.
" the Local and Municipal Department.
" the Inspector-General of Agriculture.
" the Inspector-General, Civil Veterinary Department.
" the Minister of Agriculture, Argentine Republic.
" the Entomologist to the Government of India.
" the Mycologist to the Government of India.
" Monsieur Chailley Bert.

Copy to the Government of India, Department of Revenue and Agriculture (with C.L.)

Editors' Table.

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