

1881.
Board of Revenue,
MADRAS.

To
ALL OFFICERS IN
CORRESPONDENCE WITH
THE BOARD,
 &c., &c., &c.

Printed October 17th.

Received

PROCEEDINGS, 10TH OCT. 1881, No. 1935.

COMMUNICATING to all Officers in correspondence with the Board Government Order on the Annual Report of the *Madras Agricultural Department*, and stating that the reports from the Superintendent, Government Farms, which come through the Board will in future be submitted by the Board as Board's Proceedings.

No. 3059.

PROCEEDINGS OF THE BOARD OF REVENUE, dated 5th December 1881.

Read the following Report from W. R. ROBERTSON, Esq., M.R.A.C., Superintendent of Government Farms, to the Secretary to the Board of Revenue, dated Saidápet, 30th July 1881 :—

THE operations conducted on the Saidápet Farm having been so fully noticed in a separate report, it is necessary only to refer briefly to this institution.

2. The weather during the cropping season was, on the whole, favorable. The rainfall of the year was slightly higher than the average fall of the previous ten years, while it was distributed over a longer period than usual. Crops were free from attacks by fungoid diseases and of injurious insects, except late in the season when the cotton crop suffered from “rust,” and, the paddy crop in low-lying, badly-drained situations, from attacks by insects.

Season.

3. In addition to the ordinary indigenous and introduced crops, Planter’s Friend (*Sorghum Kaffrarium*), Chinese sugarcane (*Sorghum saccharatum*) and Madagascar paddy were grown.

4. The ordinary cereal fodder-crops did not yield so well as usual, but the leguminous ones yielded very satisfactorily.

Cereal fodder-crops did not yield well.

5. The summer rains having been deficient in the early part of the season, no summer grain crops were grown.

6. Of cereal irrigated crops, the first crop was good, but the second crop, chiefly ear paddy, was not all brought to maturity under satisfactory conditions, much of the crop being only half-grown when the tank-water became exhausted. However,

over the whole area of irrigable land, in a period of 7 months, the yield obtained was 26,517 lb. of grain and 67,067 lb. of straw, or an average outturn per acre of 1,594 lb. of grain and 4,033 lbs. of straw.

Outturn of paddy crop.

7. The outturn of the cotton crop varied greatly; the greatest produce was gathered in March, April and May. As in former years, the highest percentages of lint were obtained in the produce gathered before the end of June, after which period there was a steady fall in the yield of lint. The yield per acre varied from 363 lb. down to 159 lb. of seed-cotton, but this was in addition to a cereal crop produced on the same land.

Cotton crops.

in lines between the rows of cotton plants. Some modifications were introduced in the method of cropping land with cotton and a cereal crop, which are likely to lead to good results, chiefly by enabling the land under cotton to be kept more thoroughly tilled.

8. The produce of a small plot of sugarcane was crushed by means of the Beehea Sugar Mill newly introduced at Saidápet. The results of its working were very satisfactory. There can be no

New sugar mill. doubt but that, when the merits of this mill are better known in South India, there will be a large demand for it. Some useful experiments were made in the preparation of jaggery from sugarcane, and in determining the crystallizable sugar in the juices of Sorghum and Planter's Friend.

9. Arrowroot was found to grow very readily on the farm; one plot yielded per acre nearly 4,000 lb. of tubers, and another 7,500 lb. A large quantity of arrowroot flour was made; it was found that, on the average, 100 lb. of tubers yielded $12\frac{1}{2}$ lb. of flour. Thus a yield of 7,500 lb. of tubers per acre would represent an outturn of 1,875 lb. of flour, which at only 4 annas a pound would represent upwards of 400 rupees per acre. Seeing how easily the crop is grown and how simply the flour is prepared, it is a matter of surprise that the crop is not more generally cultivated.

Manilla hemp plants thrive.

10. The Manilla hemp plants (*Musa textilis*) are thriving satisfactorily; a number of young shoots have been planted out.

11. Several samples of the farm-grown tobaccos, differently treated in the field and in the processes of curing, have been analysed. Though the analyses show a very marked improvement over those of the tobaccos produced in previous years, the tobaccos nevertheless are, from their poverty in salts of potash, quite unfitted for the European market. It is worthy of note, however, that the tobaccos recently produced contained *eight times* as much carbonate of potash as the tobaccos produced on the farm and analysed in 1872.

Great improvement in tobacco raised on the farm.

12. Several experiments were made with manures of different kinds on a set of experimental plots specially set apart for this purpose; the experiments are to be conducted over a series of years. And, a set of experiments were instituted to determine the comparative manurial value of cattle-dung and cattle-dung ashes, which experiments will also require several years to complete.

Manure experiments.

13. The Aden stock continues to merit the high opinion expressed of the breed in former reports. Arrangements have been made to procure some fresh stock from Aden. Some experiments were made with Punganur cows, an indigenous breed having a local reputation; but the results of the experiments proved that the cows are far inferior milkers to those of the Aden breed.

Cattle-breeding experiments.

14. The sheep breeding experiment continues to make satisfactory progress. In view to hasten the work of improvement, some half-bred Southdowns rams have been procured. A number of rams of the Saidápet breed were distributed to flock owners in the Chingleput, Bellary, and Tinnevely Districts.

Sheep-breeding experiment.

15. The Implement Workshops having been closed until late in the year, but little was done in the manufacture of implements and machines.

THE GOVERNMENT SCHOOL OF AGRICULTURE.

16. As usual a separate report will be prepared, showing, in full detail, the work of this institution. The following brief remarks must therefore suffice.

There were in the year 34 students under training. Of these, 7 were paid stipends, provided as below :—

Travancore State	...	...	...	...	...	2
Holkar State	...	...	...	...	...	1
Wadhwan State	...	...	...	...	...	1
Nariad Agricultural Association	...	...	...	...	...	3

and 12 were supported by their friends; the other students held Government stipendiaryships.

17. It was found impossible to arrange for the delivery of a course of Agricultural lectures at the Government Normal School, and, unfortunately, arrangements could not conveniently be made by the school authorities to enable the students of that institution to attend the Agricultural lectures in the School of Agriculture. This is much to be regretted, for even though the knowledge gained by attendance at a short course of Agricultural lectures cannot but be slight, it must be of some service to men who, in after life, will be employed in teaching in country schools, attended chiefly by youths of the agricultural classes, and especially now that an Agricultural textbook is in use in most of these schools.

18. The usual courses of lectures were delivered on the following subjects:
 Agriculture, Veterinary Surgery, Chemistry, Botany, Mechanics, Meteorology, Physical Geography, Arithmetic, Book-keeping, Mensuration, &c.; while numerous out-of-door classes were held for practical instruction in Agriculture, Botany, Surveying, &c., and in the Chemical Laboratory frequent classes were held of the more advanced students for practice in chemical manipulation, the physical analysis of soils, the qualitative examination of substances, &c. The ordinary Gymnastic classes were maintained. The results of this training were very marked, and must have contributed largely to the good health which the students generally enjoyed. At the ploughing examinations which every student must pass, some very creditable work was done.

19. Considerable progress has recently been made in providing the permanent buildings for the College. The Veterinary Hospital buildings have been completed, but the institution cannot be opened until the quarters for the Hospital Keeper are available.

20. The Botanical grounds have been maintained in good order, and further efforts made to collect those specimens of the various trees, shrubs and plants with which it is desirable the students should become acquainted. These grounds are useful also for making experiments on a small scale with different agricultural plants, while the gardens supply fresh specimens for illustrating the Botanical lectures.

21. A number of books were added to the Library, and the Reading-room was supplied with various agricultural periodicals. Both the Library and Reading-room have been made good use of by the students.

22. The system of paying the Lecturers by fees still continues in operation. The arrangement is a convenient one, but not so economical or efficient as is desirable.

AGRICULTURAL TOURS.

23. The only tour made by an officer of this department was one made in Bellary by Mr. Benson during the month of August last. His report on this tour has been submitted.

AGRICULTURAL EXHIBITIONS.

24. None were held during the year, it having been thought that the country had not sufficiently recovered from the effects of the recent famine to render it advisable to hold any agricultural exhibitions. Proposals, however, are under consideration for organising a scheme of agricultural shows, to be held in various parts of the Presidency.

SEED DISTRIBUTION AND DISTRICT EXPERIMENTS.

25. The undermentioned seeds were distributed, and in most instances delivered free of charge, for experimental cultivation:—

	LB.
Reana luxurians	34
Planter's Friend (<i>Sorghum Kaffrarium</i>)	126
Chinese Sugarcane (<i>Sorghum saccharatum</i>)	161
Yellow Cholum (<i>Sorghum vulgare</i>)	37
Maize (<i>Zea mays</i>)	
Madagascar Paddy	40
Carolina Paddy	
New Orleans Cotton-seed	87
Tobacco-seeds	4
Indigo-seed	68
Oil-seed	
Miscellaneous seeds	

It is to be regretted that the distribution was on such a very small scale.

Seed distribution on larger scale necessary.

This part of our work, the usefulness of which is obvious, needs much greater attention than at present it receives. Government have occasionally in previous years distributed seed on a large scale, not always with the best results, but generally with as good result as could be expected. In the absence of any private enterprise in the production or importation of good seed, this matter must receive attention by the State. In some portions of the Presidency very good seed is obtainable, while in other portions the seed only procurable is of a very poor description. This department might act, to some extent, as an agency for bringing the good seed to localities where it is needed. This subject, however, will be dealt with separately.

26. *Sorghum Saccharatum*.—Information regarding the results of the experiments made with this crop has been received from three districts—Tinnevely, Coimbatore and North Arcot. From the first mentioned district it was reported that the experiments had been on the whole satisfactory, and that the ryots apparently appreciate the crop, because it was found to yield a larger quantity of fodder and of a more excellent quality than indigenous cholum. From Coimbatore the reports were less satisfactory, as regards the yield obtained from many of the experimental plots. One very successful experiment was conducted in that district by the Vice-President of the Coimbatore Municipality, in which he obtained 1,700 lb. of grain and 9,000 lb. of straw per acre, an outturn which would have been even larger had the crop not been sown at an unfavorable season of the year. Regarding his experience in feeding stock with this fodder, he reported that he had no doubt whatever as to the great superiority of *Sorghum* over indigenous cholum as fodder for cattle; the former he said they ate up with avidity, while of the latter some portions were rejected. Another very successful experiment was made in the Coimbatore Division, in which an outturn of grain amounting to 2,583 lb. per acre was obtained. In the North Arcot District the results were but poor, and the grain was said not to be appreciated as a food-grain, because of the bitter taste it was said to possess. In none of these districts does there appear to have been any attempt to extract the saccharine juices of the plant to which the value of the crop is chiefly due. The general results were as recorded on the next page:—

Sorghum Saccharatum.

No.	General Nature of Soil.	Area of Land sown.	Kind and Quantity of Manure used.	Pounds of Seed sown.	Date of Sowing.	Cultivation during growth of Crop.	Number of times irrigated.	Number of Inches of Rainfall and Number of Wet Days recorded at nearest Station during growth of Crops.		Data when Crop harvested.	Duration of growth.	Outturn per Acre.		
								Wet Days.	Inches.			Green Fodder.	Grain.	Dry Straw.
Tinnevely District.														
1	Sandy red soil ...	ACRE. '08	10 cart-loads of ashes, dung, &c.	17½	1st Nov. 1879.	Once weeded by hand.	Not irrigated ...	5	...	10th Jan. 1880.	DAYS. 70	LB. 6,000	LB. ...	LB. ...
2	Black soil ...	'15	Sheep dung, sheep penned (1,000 sheep) one night.	17½	10th do. ...	Do. ...	Once watered by haling.	7	...	25th do. ...	76	5,200	...	...
3	Red soil ...	'12	10 cart-loads of dry dung and ashes. ...	15	10th do. ...	Do. ...	Not irrigated ...	7	...	31st do. ...	82	2,500	...	...
4	Do. ...	'13	Do.	15	10th do. ...	Do. ...	Do. ...	7	...	31st do. ...	82	2,677	...	...
Coimbatore District.														
1	Black loam ...	'50	5,000 lb. of poor manure formed of street rubbish or sweepings.	12	1st Mar. 1880.	...	7 times ...	27	5.13	8th June 1880.	99	...	1,716	9,000
2	Red soil ...	'25	Sheep dung (sheep were penned for 3 months).	2	20th Nov. 1879.	Once weeded ...	10 do. ...	5	.49	25th Feb. 1880.	97	...	720	60
3	Red loam ...	'25	Cow and sheep dung, 40 maunds.	3½	10th do. ...	None ...	5 do. ...	6	1.19	28th do. ...	110	...	180	1,000
4	Red soil ...	'30	Sheep dung (sheep penned for 30 days).	5	17th Mar. 1880.	Once weeded ...	2 do. ...	10	2.00	2nd July 1880.	107	...	145	771
5	Black soil ...	'24	2 cart-loads of cow-dung and 2 cart-loads of ash.	5	18th do. ...	Do. ...	4 do. ...	10	2.00	6th do. ...	110	...	375	1,485
6	Red soil ...	'50	40 bandy-loads of cattle dung and ashes of town sweepings.	5	5th do. ...	Do. ...	7 do. ...	20	4.00	13th June 1880.	100	...	1,680	3,525
7	Black soil ...	1.00	24 do. do. ...	10	10th do. ...	Do. ...	4 do. ...	20	4.00	12th do. ...	94	...	814	2,125
8	Mixed soil ...	'50	2 do. do. ...	5	14th do. ...	Do. ...	4 do. ...	20	4.00	16th do. ...	94	...	1,037	3,425
9	Black soil ...	'25	2 do. do. ...	2½	20th do. ...	Do. ...	5 do. ...	20	4.00	24th do. ...	96	...	230	1,650
10	Do. ...	1.00	12 do. do. ...	10	5th do. ...	Do. ...	3 do. ...	20	4.00	21st do. ...	108	...	2,584	5,000
11	Do. ...	'50	4 do. do. ...	5	10th do. ...	Do. ...	6 do. ...	20	4.00	15th do. ...	97	...	648	2,675

27. *Planter's Friend*.—This crop was experimented with in Tinnevely and the Coimbatore Districts. The opinions expressed of it differed but little from those expressed regarding the previous mentioned crop. The crop appears to have been grown chiefly as a grain crop. It is, however, to be recommended more as a sugar and fodder producer. No trials appear to have been made to determine the amount of saccharine juices present in the plant. The general results of the experiments are as follow :—

Planter's Friend.

No.	General Nature of Soil.	Area of Land sown.	Kind and Quantity of Manure used.	Pounds of Seed sown.	Date of Sowing.	Cultivation during growth of Crop.	Number of times irrigated.	Number of Inches of Rainfall and Number of Wet Days recorded at nearest Station during growth of Crop.		Date when Crop harvested.	Duration of Growth.	Outturn per Acre.		
								Wet Days.	Inches.			Green Fodder.	Grain.	Dry Straw.
Tinnevely District.														
1	Black soil ...	·07	Sheep dung, sheep penned (100 sheep) one night.	17½	1st Sept. 1879.	Once weeded by hand.	Thrice watered by baling from well.	9	...	10th Dec. 1879.	100	LB. ...	LB. 714	LB. 17,714
2	Do. ...	·15	Do. ...	17½	10th Nov. 1879.	Do. ...	Twice watered by baling from well.	7	...	25th Jan. 1880.	76	4,400	...	...
Coimbatore District.														
1	Red soil ...	·37	4 handy-loads of manure and cattle were penned for 3 days.	11	26th Mar. 1880.	Twice weed- ed.	13 times	5	1	31st Aug. 1880.	158	...	176	676
2	Black soil ...	·10	Sheep were penned for 5 days.	13	20th Feb. 1880.	Once weeded.	4 do. ...	20	4	31st July 1880.	162	...	288	938
3	Red soil ...	·40	Sweepings, 4 cart-loads.	7	1st Mar. 1880.	Do. ...	5 do. ...	15	3	17th June 1880.	108	...	540	1,875
4	Do. ...	·50	Manure worth Rs. 6.	5	5th Mar. 1880.	Twice weed- ed.	7 do. ...	20	4	20th do. ...	107	...	2,761	...
5	Black soil ...	1·00	Do. Rs. 4.	10	10th do. ...	Do. ...	4 do. ...	20	4	12th do. ...	94	...	4,324	...
6	Mixed soil ...	·50	.....	5	14th do. ...	Do. ...	6 do. ...	20	4	26th do. ...	104	...	432	...
7	Black soil ...	·25	.....	2½	20th do. ...	Do. ...	5 do. ...	20	4	24th do. ...	96	...	720	...
8	Mixed soil ...	·50	Manure valued at Rs. 6.	5	11th do. ...	Do. ...	6 do. ...	20	4	21st do. ...	102	...	374	1,450

28. *Reana Luxurians*.—Reports, on experiments made with this new crop have been received from the Chingleput and the Coimbatore Districts. In the former district from a quarter pound of seed Major Richardson, R.A., obtained an outturn of upwards of 6,000 lb. of green fodder equal to about 20 tons per acre. The ground was highly cultivated and was freely watered. He gave the fodder to the horses of his battery, and all, with two exceptions, ate it freely; but, as regards the nourishing properties of the fodder in feeding horses, Major Richardson's experience was unfavourable. However, instead of giving a small quantity of it in substitution, for a portion, or, in addition to, the daily allowance of grass, he attempted to substitute the *Reana* fodder for the grass, and, of course, being so very succulent and watery, the fodder produced ill consequences, specially when eaten too rapidly. In another experiment, made in the same district, also with a quarter pound of seed, the produce was 21 Madras measures of grain, and a cart-load (probably 800 lb.) of straw. The following details show the results of the experiment made in the Coimbatore District :—

Reana Luxurians.

Number.	General Nature of Soil.	Area of Land sown.	Kind and Quantity of Manure used.	Pounds of Seed sown.	Date of Sowing.	Cultivation during growth of Crop.	Number of times irrigated.	No. of Inches of Rainfall and No. of Wet Days recorded at nearest Station during growth of Crop.		Date when Crop harvested.	Duration of Growth.	Outturn per Acre.		
								Wet Days.	Inches.			Green Fodder.	Grain.	Dry Straw.
Coimbatore.														
1	Sandy.	ACRE. ·02	No manure was used as the land had been lying fallow for a long time, and was therefore fertile.	1	18th September 1880; date of transplanting 20th October 1880.	Weeds were removed on the 19th November 1880. After the planting there were frequent rains; the land being close to a nullah it was always wet and hence no special watering took place.	20	18 ⁷ / ₈	28th Feb. 1881.	DAYS. 163	LB. ...	LB. 994	LB. 2,150	

DISTRICT PLOUGHING TRIALS.

29. The only district in which any demonstrations in ploughing occurred with improved ploughs was Bellary, in which the Assistant Collector, H. A. Sim, Esq., conducted a number of successful experiments. He refers to them thus :—

“The ploughs were used on all sorts of land, both black and red, and hard and soft, and the exhibition was, I consider, a great success. The ryots seemed struck from the first with the ease and thoroughness with which the plough did its work; and, although at first there was some cavilling and the usual objections were made, this died out later on, and the superiority of the English plough was admitted by all, not only for the softer red soils, but also for the hard black cotton ‘regada.’ In one case black cotton soil, which had lain fallow for thirty years, and to plough which a native plough would have required six or eight pairs of bullocks, was turned up by the English plough with two pairs only.”

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“The native blacksmiths assert their ability to mend the English if broken.

“Fifteen ryots put down their names for ploughs, similar to the 15-rupee oak-handled one generally used by the Saidápet ploughman.”

30. The ploughs used in the experiment were sent from Saidápet in charge of a ploughman who worked them during their experimental trials. The following extracts from the Tahsildar's notes on these trials are well worth perusal by all interested in the improvement of native husbandry :—

Result of Ploughing on 21st June 1880.

1. *Date*.—21st June 1880.

2. *Area ploughed*.—One-fourth of an acre.

3. *Nature of land.*—Sandu land, containing saline matters.

4. *Time.*—2 hours, 25 minutes.

5. *Time per acre.*—9 hours, 40 minutes.

6. *Kind of bullocks and plough.*—Four common Bellary bullocks. The oak-handled plough.

7. *Impressions of ryots, objections, &c.*—The ryots said that our plough did not go so deep as theirs did, and produced a stick 7 inches long to show the depth of their furrows. I went with them and measured their furrows in several places, and found a depth of only 5 inches on the average. I pointed out that our furrows were quite as deep and that, owing to the breadth of our furrow at bottom, the quantity of earth raised was more than twice as great as theirs. A ryot named Chinnappa wants the loan of one of our ploughs for 2 or 3 days, in order that he may give it a thorough trial. No other objections were advanced.

BELLARY,
21st June 1880.

(Signed) J. G. FIRTH,
Tahsildar.

Results of Ploughing on 22nd June 1880.

1. *Date.*—22nd June 1880.

2. *Area ploughed.*—One-eighth of an acre.

4. *Time.*—One hour.

5. *Time per acre.*—Eight hours.

3. *Nature of land.*—Mosaba inclining to red soil. A little more than half of the land was extremely hard. In this portion the furrows cut by our plough were not more than 3 inches deep. In the softer portion (which was lower and had absorbed the rain) the furrows were 7 inches deep and the earth was turned up in a style that called forth the admiration of those looking on. One-eighth of an acre was marked out alongside of the piece we ploughed for the owner of the field to try his plough upon. The results of their ploughing proved much inferior to ours. They finished only one-third of $\frac{1}{8}$ th acre in one hour, in which time ours was finished, and when the owner of the field said that our plough was superior to the "Madaka," he was asked whether it accomplished twice as much work as the Madaka, and he replied "three times as much." It was remarkable that the sharp snout of the "Madaka" made less impression on the hard soil than our ploughshare did. But when I removed the plough to a bit of red land close by, which I should have chosen for this morning's experiment only I had been told that it had been already ploughed this year, whereas it proved on inquiry to have been only harrowed with the "Guntaka" (flat iron bar $2\frac{1}{2}$ feet long and about $3\frac{1}{4}$ inches broad) and furrows of red earth 8 and $8\frac{1}{2}$ inches deep were turned up with ease by a pair of small-sized Bellary bullocks, the ryots became quite enthusiastic in their praises, crying "Wah! Wah!" in regular Hindustani fashion; and six of them asked me to put down the names for a 15-rupee plough each. They asked very particularly after a plough for deep ploughing in Regada land which is done with the "Pedda Madaka." The Madras ploughman said that such were used at the Saidápet Farm. I think that ploughs strong enough to take the place of the "Pedda Madaka" would be greatly appreciated by the ryots. Day after to-morrow morning I have promised to try what we can do with our plough on some Regada land belonging to the same ryot. (To-morrow no bullocks can be had, as it is a bullocks' feast-day.)

6. *Bullocks.*—Four ordinary Bellary bullocks were used, as the ryots said the ground was very hard and would require four bullocks. They also used four.

BELLARY,
22nd June 1880.

(Signed) J. G. FIRTH,
Tahsildar.

Results of Ploughing on 24th June 1880.

Area ploughed.—One-eighth acre.

Time occupied in ploughing.—56 minutes.

Time per acre.—7 hours, 28 minutes.

Nature of land.—Regada that had been ploughed with the great plough (Pedda Madaka) ten years ago, with the ordinary plough two years ago, and harrowed with the Guntaka (flat iron bar) last year. Owing to light showers yesterday and the day before, ground moist for about 3 inches.

Kind of bullocks and plough.—Four small Bellary bullocks. *Plough.*—The one with the bent oak handles, which the Saidápet ploughman seems to prefer to all the others.

The ploughing this morning was very satisfactory. Two separate portions of land, $\frac{1}{8}$ th acre each, were measured out. We commenced ploughing with four small Bellary bullocks in one piece, and the owner of the land with four large bullocks and the ordinary Madaka in the other

piece. To my surprise our plough turned up the Regada with nearly as much ease as it did the "Yerra bhumi" (red soil) the day before yesterday. Our bullocks pulled steadily and without any visible strain or stress, while our competitor's bullocks tugged and jucked along with considerable difficulty, the Madaka sticking now and again, and having to be lifted to lessen the resistance. As our bullocks gained rapidly on the other four bullocks, Malyali Bhimanna, the owner of the field, grew quite excited, and crying out to his men "They beat us day before yesterday and they are going to beat us again"! He ordered another pair of bullocks to be attached to his Madaka, and, with six men to urge and whip them on, did his best to beat us in the ploughing match. But they failed. We finished our $\frac{1}{4}$ th acre in 56 minutes, and they had still about $\frac{1}{4}$ th of theirs to finish besides leaving about $\frac{2}{3}$ ds of the land untouched in the ridges between the furrows. Chinnamma a ryot came out to see the ploughing and expressed herself as being pleased with it, but said she was disappointed as she had expected to see the plough work without any bullocks at all like "Poga bundi" (railway locomotive). After the match was over, the ryots asked us to plough across our $\frac{1}{4}$ th acre, and to please them we ploughed a few cross furrows which astonished them by going down about a foot in depth and turning up a large quantity of earth. Afterwards on some fresh ground we put six bullocks on to our plough and turned up the earth to a depth of 9 inches with ease. I promised the ryots to try to-morrow some Regada land that has not been ploughed for twenty years.

Our ploughing to-day has been a grand success I am glad to say.

BELLARY,
24th June 1881.

(Signed) J. G. FIRTH,
Tahsildar.

To-morrow's ploughing north of the jail near the small hamlet called Mhanandi Kottam.

(Signed) J. G. F.

Ploughing Report, 25th June 1880.

Area ploughed.—One-eighth of an acre.

Nature of land.—Regada that had lain fallow for 30 years.

Time.—One hour.

Time per acre.—Eight hours.

Bullocks.—Four ordinary Bellary bullocks.

Plough.—The oak-handled plough.

To-day a ploughing match again took place in which our plough was beaten, the native plough having finished the $\frac{1}{4}$ th acre in 45 minutes. But we were not beaten fairly. In his eagerness to reanguish us Bhimanna used a light plough which only penetrated about $4\frac{1}{2}$ to 5 inches, and his furrows were wider apart than usual. His four bullocks also appeared to be stronger than ours. The ryots all admitted that the work performed by their plough would bear no comparison with ours.

This experiment was very satisfactory, as the natives doubted very much the suitability of our ploughs for breaking up fresh Regada land. Indeed the Saidapet ploughman, who had been sent to inspect this very land, had reported that our plough could not plough it, and it would require a heavier and stronger plough. But this morning's experiment satisfied the ryots that our ploughs could turn up Regada as well as other land. The piece of ground selected had two patches of Nutt grass, and the roots of the grass came to the surface freely, showing that with a larger and heavier plough we could plough deep enough to thoroughly eradicate the Nutt and Hurriali roots which give so much trouble to the ryots. No objections were made to-day.

(Signed) J. G. FIRTH,
Tahsildar.

Ploughing on the 26th June 1880.

Area ploughed.—One-eighth acre.

Time.—57 minutes.

Nature of land.—Red soil, light, and friable.

One acre.—7 hours, 36 minutes.

Bullocks.—Two good Bellary bullocks.

Plough.—The oak-handled plough.

The land was ploughed up with ease. After the $\frac{1}{4}$ th acre was ploughed, tried the English harrow with which the ryots seemed pleased. No objection was made against the plough except the stock one of the difficulty of repairing it if broken or injured. While the ploughing was going on I overheard the Reddi of Horgandoni say to another ryot that the work done by the two bullocks was as good as could be got out of six bullocks with the native plough.

In conclusion I would earnestly request that a large plough capable of turning up the land to a depth of 15 inches, if not at the first ploughing at least at the second or cross-ploughing, may be sent to Bellary. The ryots are very anxious to see one; and if an efficient plough of this kind could be had for about 30 rupees, I think a large number would be applied for and would prove a great boon to the ryots, as it is stated to cost 5 to 10 rupees per acre to break up and prepare for sowing fresh Regada land.

26th June 1880.

(Signed) J. G. FIRTH,
Tahsildar.

THE MADRAS ANNUAL PLOUGHING MATCH.

31. This was held on a piece of ground situated within the Municipal limits of Madras. The land was covered by grass, the soil, a stiff one, not having been tilled for a dozen years or more, was hard and compact, and therefore well suited for testing the capabilities of the ploughs. There were 26 competitors of whom 19 used native ploughs, the remainder ploughs of the European pattern. The native ploughs generally failed to do more in one operation, than to stir the surface of the ground to a depth of 2 or 3 inches; they occupied on the average about 2 hours in going over each plot, measuring one-tenth of an acre, and the judges awarded very low marks. The ploughs of the European make performed very good work indeed. One competitor with one of these ploughs was awarded by the judges 97 per cent. of the full marks; he, when ploughing to a depth of 6 inches, completed his plot, also a tenth of an acre in extent, in one-and-a-half hours. The general opinion of those who attended the match was, that native ploughs had not the least chance in competition with European ploughs, in turning over such hard grass covered soil as that, on which the match was held. Much interest was taken in the match by the general public. A separate detailed report having been published, further remarks seem unnecessary.

EFFORTS IN IMPROVING NATIVE HUSBANDRY, BY A MIRASIDAR OF TANJORE.

32. The following interesting report, which is well worth perusal, has been sent to me by M.R.Ry. C. Kristnasawmy Mudaliar, a Mirasidar of the Tanjore District. The report explains very fully the difficulties he has encountered in his efforts to better matters. He is to be congratulated on the large measure of success he has secured. I am convinced that, the efforts of Government to improve native husbandry, would be attended with very much greater success than they have hitherto had if, the large landed proprietors of the Presidency could but be interested in the work, and induced to do their part, towards securing the improvement, so greatly to be desired :—

From C. KRISTNASAWMY MUDALIAR, Shiyáli, to W. R. ROBERTSON, Esq., M.R.A.C., Superintendent, Government Farms, Saidápet, Madras, dated 8th July 1881.

At about 3 miles from Shiyáli there are two villages called Aroor and Thathangoody. In these villages my father purchased 15 years ago 144½ acres of land for Rupees 15,000, of which 85 acres are in Aroor and 59½ acres in Thathangoody.

The village Aroor consists of 193½ acres in extent, whereof 180 acres are wet lands, while the remaining 13½ acres consist of 2 or 3 elevated patches taken up for habitation, &c.

And the village Thathangoody consists of 135 acres, of which 130 acres are wet lands and the remaining 5 acres being taken up for habitations, &c.

The village Aroor is somewhat better irrigated by a channel branching from the river Coleroon than the village Thathangoody which has only very precarious and uncertain supply of water from a channel branching from a drainage river Palanar.

The soil in both the villages from the surface to a depth of 4 or 5 feet is of a dense clay and the soil below is sandy. A thin flow of subterranean water in the sand below a depth of 7 or 8 feet from the surface is obtainable during the hot season.

These lands came under my management about five years ago, and from the time of purchase they yielded hardly any profit.

As many other villages are laboring under similar disadvantages, and reference to the accounts of the past years show that the yield has been gradually declining, I determined to take up the cultivation of the Aror and Thathangoody lands under my direct management, and ascertain experimentally what should be done to remedy the evils.

I herein give the routine practices of agriculture followed in the villages of this taluk.

The wet lands as a rule are given to the under-tenants or Parakudies, who cultivate for varum (a share in the produce), and the varum in these villages is 30 per cent. of the produce.

In addition to the above-mentioned varum, they also enjoy a piece of land as Inam, and hold punja or dry lands, if there be any, on a low rent.

During the season of cultivation a premium of paddy for seeds and wages is given to the under-tenants or Parakudies, and the amount of these items is deducted from their varum payable on the outturn.

Some servants as thotti, waterman, carpenter, blacksmith, &c., and the Pagoda Brahmin priesthood, &c., are maintained both by Inam and also a share in the produce.

From the month of August the supply of water is obtained from the river, and the Parakudies or undertenants after a period of rest during the hot season get a loan from the Mirasidar to purchase the cattle lost by disease, &c., in the previous year, and to get some wood and purchase mammatte-blades from the bazaar, and carry them to the carpenter and blacksmith who make and give them mammatte and plough.

In the month of August the seed-beds of kar varieties are sown, and in September the seed-beds of sumba varieties are sown, and kar varieties are transplanted. Kar fields form only $\frac{1}{4}$ th or $\frac{1}{3}$ th of the extent of the wet lands in the village, and the rest are transplanted with sumba varieties, and the sumba transplantation extends over October, November, and sometimes even December.

In November and December the kar varieties are harvested, and in February and March the sumba varieties are harvested.

Four to five ploughings are given for the puddling, and no manuring is practised, and the paddy plants are weeded once.

This system has long been followed and has produced several evils.

The Parakudies and servants who were almost slaves in former days have gradually grown idle by the abolition of slavery by the British Government, and neglected their duties because they have no corporal punishment as they had before.

The yield of the land became gradually reduced, and it now ranges only in such amounts that it is scarcely possible for a Parakudi even to pay back the stipulated advances they obtain from the Mirasidar during the cultivation.

The following account of a Parakudi shows the condition in which the agricultural laborers in this taluk stand:—

A Parakudi cultivates with a pair of cattle 4 acres of wet lands, and the yield of 4 acres now ranges on average from 80 to 90 kulums. Therefore the share or varum of the Parakudi ranges from 25 to 30 kulums.

For this the items of advances they get are as follow:—

	Kulums.
Seed at 2 $\frac{1}{2}$ kulums an acre	10
Cultivation expenses at 2 kulums an acre	8
New Year's day and other festivals, &c.	3
Total	21

The remaining 5 or 10 kulums he gets at the harvest time, which together with 5 to 10 kulums which he gets from the Inam lands, is recklessly spent at the very harvest season.

Thus he miserably exists for more than five or six months in the year, and feasts sumptuously in one or two months.

But if the account of the Parakudi were to be settled, taking the loans they get for cattle purchase, marriage, &c., together with the cultivation premium, it would leave no margin of profit, but only leave an addition to their old debt.

Therefore the annual income of a Parakudi, including the Inam and wages, will never exceed 30 or 35 kulums, unless they obtain by petty thefts and pilfering something more. Consequently the Parakudies are in no way better than the cattle, and they really starve bitterly for many months as they recklessly consume away the little stock they secure during the harvest season.

Thus in the whole of my estate I can find only a very few Parakudies who are not indebted to me in hundreds of rupees.

I find it universal custom with the Parakudies to appropriate for their own private use a portion of the seed and the cattle purchase money in collusion with the village agents and purchase worthless cattle, unfit for work, which scarcely last for a single year, and the death of the cattle consequently comes up every year to awful percentage, and thus I am obliged to spend annually a large sum of money in cattle purchase.

Therefore the Parakudi system rendered the working class ignorant, negligent, and untrustworthy paupers, and I find it totally impossible to attempt at any improvement without altering the present system.

In the year 1879, I attempted to abolish the Parakudi system in the Aroor and Thathan-goody villages, as they situate at a convenient distance from my place of residence, and at the same time as they are not in the centre of my villages to apprehend the creation of any unpleasant feeling on the part of the laborers likely to lead to a general confusion in other villages at the outset.

I relieved the working class from the worthless contract and brought them as daily laborers, allowing them the enjoyment of the Inam lands.

I withdrew the Inam of the servants and the pagoda and other institutions, and made them to receive the monthly payment.

I took a few worthless cattle left with the Parakudies, crediting their value to their account, and purchased a number of good country cattle, constructed and purchased ploughs and other implements, and appointed trustworthy agents to conduct the process of cultivation operations under my direct supervision.

I built cattle-sheds and other necessary buildings, regulated myself the food for the cattle, and made arrangement for their sanitation, treatment, &c.

I now find all the cattle, with the exception of those taken from the Parakudies, fit to work with light improved ploughs and with carts, and the great percentage of their mortality is not felt for the last two years.

The following table shows the total outturn and the cultivation expense of the Aroor and Thathangoody villages for the past fifteen years:—

Year.	The Total Produce.					The Total Cultivation Expense.					Profit and Loss.
	Paddy in Kulums of 24 Madras Measures.	Market Rate.	Money Value.	Value of the Straw and Manure, &c.	Total.	Seeds and Wages in Kulums.	Money Value.	Expense in Cattle-keep, &c.	Kist.	Total.	
1866	3,198½	1 7 0	4,297 10 0	150 0 0	4,447 10 0	1,403½	2,017 8 6	600 0 0	688 8 7	3,301 1 5	+ 1,146 8 7
1867	3,431½	1 0 0	3,431 10 0	160 13 6	3,592 7 6	1,559⅞	1,559 6 0	610 13 6	696 1 1	2,865 14 7	+ 726 8 11
1868	1,968⅞	1 5 0	2,584 10 6	92 4 7	2,676 15 1	1,305⅞	1,713 10 1½	392 4 7	710 0 0	2,815 14 8½	- 138 15 7½
1869	3,157¼	0 15 6	3,058 9 4½	128 0 0	3,206 9 4½	1,648¼	1,596 11 10½	428 0 0	710 0 0	2,784 11 10½	+ 491 13 6
1870	2,718½	0 12 3	2,081 5 7½	127 6 11½	2,208 12 7	1,373⅞	1,051 12 6	427 6 4½	710 0 0	2,189 2 10½	+ 19 9 5½
1871	2,539¾	0 15 9	2,500 1 0	119 1 0	2,619 2 0	1,402⅞	1,380 7 6	419 1 0	710 0 0	2,509 8 6	+ 109 9 6
1872	2,687⅞	0 15 10½	2,666 10 0	125 15 6	2,792 9 6	1,370⅞	1,359 14 9	425 15 6	710 0 0	2,495 14 3	+ 296 11 3
1873	2,603½	1 1 9½	2,895 0 7½	122 0 7½	3,017 1 3	1,231	1,368 13 6½	422 0 7½	710 0 0	2,500 14 2	+ 516 3 1
1874	2,266	1 0 0	2,266 0 0	106 4 0	2,772 4 0	1,228	1,228 0 0	406 4 0	710 0 0	2,244 4 0	+ 528 0 0
1875	...	...	...	...	...	...	...	...	...	...	...
1876	2,345½	1 12 7	4,190 0 2½	109 15 0	4,299 15 2½	1,072½	1,294 9 11½	409 15 0	710 0 0	2,414 8 11½	+ 1,775 7 0½
1877	1,969	1 15 0	3,804 15 0	92 4 9	3,897 3 9	1,322½	2,727 10 6	392 4 9	710 7 0	3,880 6 3	+ 66 3 0
1878	2,666½	1 12 6	4,749 11 3	125 0 0	4,874 11 3	1,297⅞	2,370 7 1	425 0 0	710 0 0	3,445 7 1	+ 1,304 4 2
1879	2,423¼	1 3 1	3,041 10 11¼	113 9 6	3,155 4 5¼	1,303½	1,736 2 7½	324 13 4	719 5 5	2,780 5 4½	+ 375 15 1½
1880	2,762	1 0 0	2,762 0 0	222 10 0	2,984 10 0	1,317	1,317 0 0	606 2 10	728 2 0	2,651 5 10	+ 338 5 2

As both the villages Aroor and Thathangoody situate close together, the cultivation operations are carried on as if they are one and the same village.

In 1880 the village Thathangoody, as almost in every year, suffered severely from want of water during September and the early part of October just at the time of the transplantation, and the fields transplanted as well as those to be transplanted became thoroughly dried and cracked, so as to be worked again and transplanted.

The surface-dried clay did not come again to the soft condition, and the seedlings became too aged and noddled, and consequently the yield was very low.

Thus the average yield per acre in the village Aroor is $27\frac{3}{5}$ kulums of paddy and 27 loads of straw worth Rs. 28-14-0, and the average yield per acre in the village Thathangoody is $12\frac{1}{2}$ kulums of paddy and $9\frac{1}{2}$ loads of straw worth Rs. 13-1-6. The cultivation expenses, inclusive of kist in both the villages, is Rs. 20-0-3. Therefore the loss per acre in the Thathangoody village is Rs. 6-14-9, and the profit per acre in the Aroor village is Rs. 7-2-9. Therefore the profit on the whole for both of the villages per acre is Rs. 2-7-10 $\frac{1}{2}$.

The Field Experiments.—The experiments conducted this year include the determination on the effect of—

- (1) Deep cultivation and inversion of soil.
- (2) Farm yard manure.
- (3) Bone ash.

The paddy in the wet lands is the crop on which the experiments were made.

I was able to conduct only a very few experiments this year, because—

- (1) Much of the time and attention I was able to devote in agricultural improvements was spent in bringing the laborers in the experimental village to proper order who totally disliked their idle system to be altered and substituted.
- (2) The wet lands in the experimental villages, as all other villages in the taluk, suffered severely both from drought during September and submersion during December owing to the imperfect arrangement of irrigation and total absence of drainage.

None of the fields experimented were manured in the previous years.

The Cost of Cultivation.—The data given below concerning the cost of cultivation have been determined by actual measurement and represents the cost per acre of each operation carried on by hired labor under supervision not of a very strict nature.

<i>Cost of Operations.</i>						<i>Per Acre.</i>		
						RS.	A.	P.
Ploughing by light improved iron ploughs	...	...	...	...	...	1	12	0
Do. by the country plough for the 1st ploughing	...	...	...	...	...	1	11	0
Do. by the country plough for the 2nd, 3rd, and 4th ploughing	...	...	...	...	...	0	12	0
Raising the seedlings	...	...	...	...	...	0	8	4
Digging and bordering	...	...	...	...	...	0	6	4
Transplantation	...	...	...	...	...	0	7	9
Weeding	...	...	...	...	...	0	4	7
Irrigation	...	...	...	...	...	0	4	5
Harvest	...	...	...	...	...	2	6	0
Inam	...	...	...	...	...	0	14	0
Static Works	...	...	...	...	...	0	10	1
Superintendence	...	...	...	...	...	2	1	9

<i>Cost of Manures.</i>						<i>Per Cart-load.</i>		
						RS.	A.	P.
Farm yard manure	...	...	...	...	...	0	5	0
						<i>Per Candy.</i>		
						RS.	A.	P.
Bone ash	...	...	...	...	...	2	8	0

<i>Cost of Seeds.</i>						<i>Per Kulum.</i>		
						RS.	A.	P.
Kar Seeds	...	...	...	...	...	1	4	0
Sumba	...	...	...	...	...	1	10	0

Experiment on the Effect of Deep Cultivation and Inversion of Soil.

Plot.	Area.	Treatment of the Crop.					Previous Treatment.	Outturn.				Cost of Cultivation including Kist per Acre.	Value of Produce according to Market Rate per Acre.	Profit per Acre.
		Ploughing.	Manuring.	Transplantation.	Irrigation.	Miscellaneous.		Actual.		Rate per Acre.				
								Grain in 24 Madras Measures.	Straw in loads of 82 lbs.	Paddy.	Straw.			
1.—Experimental Field.	6½ ACRES.	In August watered and ploughed once by the iron plough to a depth of 7 inches, and in September again ploughed once by the country plough.	Not manured.	In September transplanted with seedlings raised from 10 kulums of seeds.	The field was watered before ploughing and kept under water up to harvest.	Weeded once in November.	Not manured and Samba paddy grown as usual.	190	160	23½	24	RS. A. P. 18 10 3	30 0 0	11 5 9
2.—Thread-joining Field.	3½	In August watered and ploughed by the country plough twice, and again in September twice by the same plough.	Not manured.	In September transplanted with seedlings raised from 5 kulums of seeds.	The field was watered before ploughing and kept under water up to harvest.	Weeded once in November.	Not manured and Samba paddy grown as usual.	75	57	22½	17	20 0 3	23 9 0	3 8 9
Percentage of Increase							In Grain.	In Straw.	In Profit.					
...							266	41	220					

II.
On the Effect of Farm-yard Manure.

Plot.	Area	Treatment of the Crop.					Previous Treatment.	Outturn.			Cost of Cultivation including Kist per Acre.	Value of Produce according to Market Rate per Acre.	Profit.
		Ploughing.	Manuring.	Transplantation.	Irrigation.	Miscellaneous.		Actual.		Rate per Acre.			
								Paddy in Kulums of 24 Madras Measures.	Straw in Loads of 82 lb.					Paddy Straw.
I.—Experimental Field.	3½ Acres.	Watered and ploughed twice in August by the country plough, and again twice in September by the same plough.	100 cart loads of pitmanure were applied just before the field was flooded.	* In September transplanted with sunba seedlings raised from 5 kulums of seeds.	Watered in August before ploughing and kept under water up to harvest.	Wheeled once.	100	150	30	45	RS. A. P. 23 12 3	RS. A. P. 32 13 0	RS. A. P. 9 0 9
II.—Adjoining field.	3½ Acres.	Do.	Not manured.	Do.	Do.	Do.	75	57	23½	17	20 0 3	23 9 0	3 8 9
* The seedlings being planted too close.													
Percentage of Increase ...				In Grain. ...	33.3	In Straw. 164.6	In Profit. 255	As is usual in this tank it yielded much straw and little grain.					

III.

On the Effect of Bone Ash.

Plot.	Area.	Treatment of the Crop.					Outturn.				Value of Produce according to Market Rate per Acre.	Profit per Acre.			
		Ploughing.	Manuring.	Transplantation.	Irrigation.	Miscellaneous.	Previous Treatment.	Actual.		Rate per Acre.					
								Grain in 24 kulums of Madras Measures.	Straw in Loads of 84 lbs.						
I.—Experimental Field.	½ Acre.	In July watered and ploughed 3 times by the country plough, and in August twice by the same plough.	375 lb. of bone ash applied at the time of transplantation.	In August transplanted with kulumi seedlings raised from 3 kulums or 18 Madras measures of seeds.	Watered in July and kept under water up to harvest.	Wheeled once in September.	Not manured and kar paddy as usual.	30	15	60	30	RS. A. P. 22 0 3	RS. A. P. 61 14 0	RS. A. P. 38 13 9	
II.—Adjoining Field.	1 Acre.	Do.	Not manured.	In August transplanted with seedlings raised 14 kulums of the same seeds.	Do.	Do.	Do.	34½	28	34½	28	20 0 3	36 4 0	16 3 9	
Percentage of Increase															
				In Grain.		In Straw.		In Profit.							
				71		71		39.3							

EXPERIMENTS TOWARDS THE INTRODUCTION OF IMPROVED IMPLEMENTS.

I. *Ploughs*.—I have purchased this year from the Madras and Cawnpore Government Farms a number of ploughs and experimented both in wet and dry lands towards their introduction in this locality.

(1) *Nawab plough*.—This plough I purchased from the Cawnpore Government Farm; it resembles the country plough, consists of working parts made of iron in the improved fashion having mould-board and share, so as to loosen and at the same time invert the soil, and to this working part an upright handle and a rigid beam to which the cattle is yoked. This plough is very light, weighs 20 lb., costs Rupees 6. It can be conveniently carried on the shoulders; moreover the management of this plough requires only a little more intelligence and special instructions on the part of the ploughman. It ploughs in the wet land about one-third of an acre to a depth of 4 to 5 inches in a day of six hours.

This plough I think can be best substituted for the country plough in the wet lands.

(2) *Kuizan plough*.—I have purchased this plough also from the Cawnpore Government Farm; it is constructed after the model of the light American combined plough, has no wheel or coulter, and is attached to the yoke by a rope fastened to the ring at the end of the beam is very light, weighing only 28 lb., and costs Rupees 6. The adjustment of this plough is rather difficult on the part of the ploughman here. It ploughs about one-third of an acre in loose friable soils, but in clayey wet lands fails to work.

(3) *Light American combined plough*.—I have purchased two samples of this plough from the Madras Government Farm, one of which is with an upright mould-board and the other with an elongated mould-board.

The one with an upright mould-board weighs 45 lbs., costs Rupees 9. Fails to work in clayey wet lands, but works well in loose friable soil.

The other weighs 52 lbs., costs Rupees 12. Works tolerably well with the ordinary cattle in wet lands, as well as in dry lands; but however the draught is not less than that of the light iron plough and at the same time the work done is not so good as that done by the light iron ploughs.

(4) *Light Swedish iron plough with one stilt*.—This plough is an iron plough manufactured in the Madras Government Farm after the Swedish model, weighs 70 lb., costs Rupees 20. This plough works well with somewhat better breeds of cattle both in dry and wet lands. It ploughs in wet lands one-third of an acre to the depth of 6 to 8 inches, and in dry lands more than half of an acre in a day of six hours.

I have also purchased three more ploughs from the Madras Government Farms, one of which is a large Swedish plough and the other two B. F. I. of Ransomes Head and Jefferies, but as I received them after the ploughing season, I have not experimented them as to their utility in this locality.

Reaping knife.—The reaping knife used here in cutting down the ripe paddy plants, &c., is in the form of a semi-circular; it has serrated edges; it is very light, weighing only $\frac{3}{4}$ lb. with the handle.

Therefore the plants are cut down by the expense of much force aided by the serration in the edge; moreover the knife in cutting the plants jerks and cuts high and catches only a very few plants. A large portion of the straw is thus wasted, left in the field in the form of stubbles.

I purchased from the Madras Government Farm a sample knife which has the form of a curve at the base and lengthened at the end. This knife is weightier, weighing $1\frac{1}{2}$ lb. It catches more plants and cuts closer to the ground.

I have made some knives here of this sample and experimented with them.

A man with this knife cuts down paddy plants in an area of one-third of an acre, leaving the stubble only to the height of 2 to 3 inches, whereas with the ordinary knife cuts down the same extent, leaving the stubble to the height of 6 to 12 inches.

Coolies not being trained to handle this improved knife, some of them sometimes stupidly jerk the knife as they do with the ordinary knife and cut their left hands, but I think if the coolies become accustomed they won't be liable to such mistakes and the work will be facilitated.

III. *Winnowing machine*.—Cleaning the seed from the admixture of unfertile grains, chaff, dirt, &c., and selecting the good ones for seeding purposes, seems to be very essential, because owing to the drought, submersion and imperfect cultivation a larger percentage of the grain in the produce are only imperfectly developed ones, and these, when sown without separation, only the plants of a like nature germinate which die sooner or later from casualties or yield a very inferior crop.

The ordinary process of winnowing followed here is exposing the seeds to the wind, which operation effects only a very imperfect separation and is very precarious.

The process of separation by moram and salladai, made of bamboo, clean the seeds well from the admixture dirt, unfertile grains, &c.

This process, however, being very slow and tedious, is only used by women with paddy for husking.

In the last May I applied to the Madras Government Farms for a sample of winnowing machine; the then Superintendent replied that the Government did not allow the manufacture and sale of the implements and tools in the Government Farm. I then applied to the Cawnpore Government Farm for a sample of winnowing machine, and obtained from them a machine at a cost of Rupees 30.

I experimented and found that by the assistance of this machine three men clean about 30 kulums of paddy-seeds in a day of eight hours' work, but a complete separation of the seeds from the impurities is not effected in a single process, and it requires to repeat the process more than once. Moreover the working of this machine requires the application of great force on the part of the workmen.

In the last January I purchased from the Madras Government Farms a winnowing machine of Dray, Taylor, and Co., London, for Rupees 80.

I experimented and found that by this machine three men clean about 80 kulums of paddy-seeds in a day of eight hours' work.

A complete separation from the impurities is effected in a single process.

As to the amount of advantage in the selection of seeds for sowing purposes, I have not experimented this year, as I have received this machine after the sowing season.

CATTLE.

I am thoroughly convinced as to the vital importance of keeping the cattle under my direct management by the results of the experiments I have made in my experimental village.

Throughout the year, a regular shed against the inclemencies of the weather, good and wholesome food containing all the essential ingredients, sanitary arrangement and medical assistance are all indispensable requisites for the well-being of the cattle.

Under the present state of circumstances none of these the cattle could get from the hands of the Parakudies.

(1.) The Mirasidars invariably employ other coolies in conducting the harvest, who cut the ripe paddy plants close to the ear, leaving large portion of the straw in the form of stubbles. Again, these Parakudies during the period of their own starvation sell for their food whatever they have in their hand, and leave the cattle miserably to starve and die.

(2.) The Parakudies who are so ignorant as not to feel the want of proper sheds for themselves can never be expected to provide sheds for the cattle under their charge.

(3.) It is impossible to inculcate the principles of sanitation and proper medical aid to the Parakudies, and I think if the Mirasidars could restrain themselves from giving cattle to the Parakudies, it will materially improve the sanitation of the huts of the miserable Parakudies themselves.

Therefore if the Mirasidars pay a little attention at the time of harvest and cut the plants closer to the ground, leaving only 1 or 2 inches of stubble and preserve it without giving into the hands of the Parakudies sufficiency of straw can be had throughout the year.

A little additional expense in purchasing the oil-cake, bran, or inferior food-grains, &c., to add to the general food the paddy straw, will not come even to one-fourth the sum of money, which the Mirasidars do annually give for the purchase of cattle or *Mattoo Varagum*.

The erection of permanent sheds for the cattle of course involves considerable expense on the part of the Mirasidars, but however this will never exceed two years' cattle purchase money, and the Mirasidars can conveniently afford to have a portion of their capital laid out in the construction of permanent buildings for the cattle.

The following table shows the account of the cattle for the villages of Aroor and Thathan-goody for the year 1880-81 :—

The Number and Valuation of the Cattle on 30th June 1880.			The Number and Valuation of the Cattle died during the Year.			The Number and Valuation of the Cattle purchased during the Year.			The Total Cost of the Food and Attendance, &c., of the Cattle during the Year.			The Number and Valuation of the Cattle sold during the Year.			The Number and Valuation of the Cattle on 30th June 1881.		
NO.	RS.	A. P.	NO.	RS.	A. P.	NO.	RS.	A. P.	RS.	A. P.	...	NO.	RS.	A. P.	NO.	RS.	A. P.
37	625	0 0	7	78	12 0	12	250	4 0	536	1 0	...	42	640	0 0			

Reference into the accounts of the past fifteen years shows that the total expense of the cattle keep per year under the Parakudi system never goes below Rs. 450.

This year in these villages the expense is only Rs. 536-1-0, a little more than the average rate of expense under the Parakudi system.

Out of 42 bullocks 12 bullocks are employed in ploughing with light improved ploughs, carting, and other purposes, and their extended labor throughout the year have greatly reduced the cost of keep.

In the Arachoor Bisgah of my estate which consists of four full villages extending about 1,000 acres, I refused to sanction money for cattle purchase since the year 1879, and purchased the cattle myself to make up the number lost by death and kept a portion of the cattle purchased under my direct management and gave the rest to the Parakudies.

I allowed those Parakudies whom I permitted to carry on the cultivation operations with the cattle under my management all their inams and wages as usual in the Parakudi system excluding only the straw.

Thus for the year 1879 I had about 150 cattle under my management, and for the year 1880 their number increased to about 200, and as the consequent result the mortality in the cattle under the direct management is greatly reduced, while those of the Parakudies ranged in the usual percentage. Moreover the working capability and valuation increased in the same way while in those of the Parakudies decreased.

The chief difficulty in bringing about changes in the agricultural practices of the country lies in the unwillingness of the under-tenants or Parakudies.

One object of rational agriculture being to economize labor, the Parakudies or under-tenants are afraid that they will be thrown out of service and oppose the introduction of salutary changes.

In such cases the Mirasidars or the land-owners are obliged to dismiss them and also to eject them, which however they cannot do without the intervention of the Civil Courts. The procedure is costly and the delay long and unavoidable.

EXCHANGES.

33. The following publications were received in exchange for those of this department during the year :—

- Records of the Geological Survey of India.
- Proceedings of the Horticultural Society of India, Calcutta.
- Proceedings of the Horticultural Society, Madras.
- Report of the Department of Agriculture and Commerce, North-West Provinces and Oudh.
- Report on the Cawnpore Experimental Farm ; Rabi Season 1879-80.
- Report on the Arboricultural Operations in the North-West Provinces and Oudh, 1880.
- Report on the Horticultural Garden, Lucknow.
- Annual Report on the Government Experimental Farm, Cawnpore, for 1878-79.
- Journal of the Royal Society of Edinburgh.
- Journal of the Highland and Agricultural Society of Scotland, Edinburgh.
- Journal of the Royal Agricultural Society of England.
- Journals of the Society of Arts, London.
- Annual Report of the Commissioner of Agriculture, United States, America.
- Report of the Acclimatization Society of Queensland, Brisbane, 1880.
- Report of the Botanical Garden, Brisbane.
- Report on the Progress and Condition of the Botanical Garden and Government Plantation during the year 1879, Adelaide.
- Agricultural Statistical Reports from the Department of Agriculture, Italy.

DEPARTMENTAL.

34. During the greater part of the year under report the charge of the department was in the hands of Mr. Benson, who had been appointed to officiate for me during my absence on furlough in England. The general work of the department has been carried on on the same system as during previous years. Mr. Benson has

adhered generally to the plans I had in view regarding the general direction of our work, and has successfully performed the duties entrusted to him, which, at times, have been difficult and arduous, arising to a considerable extent from the absence of efficient assistance, Mr. Schiffmayer having been absent for a considerable time on sick leave ; while Mr. Benson himself suffered from ill-health during a considerable part of the year. I returned from furlough on the 29th of November last when I took over charge from Mr. Benson, and he took charge of the farm for a few weeks, when he again gave over charge to me on his being granted two months' leave of absence. On the expiration of his leave, Mr. Benson again resumed charge of the farm. During the year Mr. Schiffmayer continued to suffer from ill-health. He was absent 5 months on sick leave.

The office-work continues to demand a considerable amount of attention. During the year upwards 1,500 letters were issued. The office arrangements are not as satisfactory as they might be ; too great a proportion of my time and of that of my Assistants being absorbed in office-work of an unimportant character ; but I shall submit separately some suggestions in view to obviate or lessen this evil, for the management of the School of Agriculture, the duties of the Agricultural Lectureship in that Institution, the time absorbed in conducting out-of-door classes of students has, together, formed a large addition to our work, while, no additional assistance has been granted.

35. *Finances.*—The following abstract statement shows the income of the department and the expenditure on various objects during the year ; details are given in the Appendix :—

	RS.	A.	P.		RS.	A.	P.
Balance on the 1st April 1880.	2,39,112	9	8	<i>Expenditure.</i>			
<i>Receipts.</i>				General Supervision	17,195	8	0
Provincial Grant	20,000	0	0	Saidâpet Experimental Farm.	7,637	6	0
Surplus Pound Fund	40,923	14	1	School of Agriculture	15,401	2	1
Saidâpet Experimental Farm.	3,824	11	5	Estate Charges and Improve-			
School of Agriculture (Rents,				ments	3,531	4	7
sale of Class Books)	177	15	5	Balance in favor of the De-			
Total ...	3,04,039	2	7	partment on the 1st of April			
				1881	2,60,273	13	11
				Total ...	3,04,039	2	7

(Signed)

WILLIAM R. ROBERTSON, M.R.A.C.,
Superintendent, Govt. Farms, Madras.

SAIDAPET,
July 30th, 1881.

APPENDIX.

STATEMENT OF THE ACCOUNTS OF THE MADRAS AGRICULTURAL
DEPARTMENT, FOR THE YEAR 1880-81.*Expenditure—*

	RS.	A.	P.	RS.	A.	P.
I. General Supervision—						
Establishment	14,786	11	0			
Travelling charges	290	2	4			
Stationery	315	10	0			
Exhibition of Improved Ploughs	28	3	7			
Ploughing Competition	328	2	3			
Contingencies	1,246	0	6			
Surgeon for Medical Charge	200	10	4			
				17,195	8	0
II. Saidápet Experimental Farm ... ..	...			7,637	6	0
III. Educational (School of Agriculture)—						
Establishment	3,908	6	0			
Stipends and Scholarships	2,495	7	1			
Lecture Fees	6,980	0	0			
Books	191	4	1			
Prizes	63	8	0			
Gymnastic Instructor	240	0	0			
Chemicals and Laboratory Apparatus	162	8	3			
Botanical Garden	752	6	4			
Contingencies	476	3	10			
Maintenance of Buildings	131	6	6			
				15,401	2	1
IV. Estate Charges and Improvements—						
Repairs to Buildings	941	9	8			
Trees and Planting	201	8	6			
Manufacture of Drain Pipes and Subsoil Drainage	57	13	6			
Brick and Mortar Bridges	307	14	2			
Extension to Water Channels	302	5	3			
Repairs to Roads	238	6	6			
Sundry work and alterations	384	1	2			
Maintenance of Superintendent's Quarters	229	0	5			
Alterations to Farm Bangalow	316	1	10			
Repair of Western Channel Bridge	552	7	7			
				3,531	4	7
				43,765	4	8
Adjusted balance at the beginning of the year	2,39,112	9	8			
<i>Income—</i>						
Provincial Grant	20,000	0	0			
Receipts from the Surplus Pound Fund during the year 1880-81	40,923	14	1			
Saidápet Experimental Farm as per Statement given in Appendix	3,824	11	5			
School of Agriculture (Rents and sale of Class Books	177	15	5			
				3,04,039	2	7
Balance in favor of the Department on the 1st of April 1881.	2,60,273	13	11			

(Signed) WILLIAM R. ROBERTSON, M.R.A.C.,
Superintendent, Govt. Farms, Madras.

THE Board submit to Government their general report of the operations conducted by the Superintendent of Government Farms for the year 1880-81, in accordance with G.O., dated 30th April 1879, No. 663, Public.

2. The weather at the Saidápet farm during the cropping season was, on the whole, favorable. In addition to the ordinary crops, Planter's Friend, Chinese sugar-cane, and Madagascar paddy were grown. The ordinary cereal fodder crops did not yield well, but leguminous crops gave satisfactory results. The first crop of irrigated cereals was good, but the second ("Car" paddy) suffered from insufficiency of water. On the whole an average outturn of 1,594 lb. of grain and 4,033 lb. of straw were secured to each acre. The yield of cotton crops varied from 363 lb. down to 159 lb. of seed-cotton, the crops being grown with a cereal crop interspersed. Modifications were effected in this latter practice. Arrow-root was grown and the yield was from 4,000 lb. to 7,500 lb. of tubers per acre; the latter rate represents a value of Rs. 400 per acre. Sugar-cane grown on a plot was crushed by means of the Beehea Sugar Mill newly introduced at the farm with satisfactory results. Experiments were made in growing and curing tobacco, but, though the article produced showed much improvement over what had been effected in previous years, it was still, owing to its poverty in salts of potash, unfitted for the European market. Experiments in manures have been begun at Saidápet on a set of plots set apart for the purpose. The Aden cows continued to give good results as to the yield of milk. The Punganúr cows, which have a local reputation, were found by the Superintendent to be unable to compete with the Aden cows. Sheep-breeding experiments progressed satisfactorily, and some half-breed Southdown rams were introduced. A considerable number of rams of the Saidápet breed were distributed for breeding purposes in the Chingleput, Bellary and Tinnevely Districts. The implement workshop on the estate was reopened this year, but so late that little work was done.

3. In the School of Agriculture thirty-four students were under training, of whom fifteen held stipends from Government and seven held stipends from the Native States of Travancore, Holkar and Wadhwan, and the Nariad Agricultural Association. Twelve were supported by their friends. Lectures were delivered on the usual subjects and gymnastic classes were maintained. The permanent buildings designed for the use of the school have made considerable progress.

4. Mr. Benson, Assistant Superintendent on the Farm, made an agricultural tour in Bellary. He was struck by the abundance and efficiency of the implements of cultivation in use. The Board note that the present report is rendered incomplete by the absence of any abstract of the tour report.

5. It was not considered desirable to hold any Agricultural Exhibitions so soon after the famine, and these were consequently pretermitted. On the other hand ploughing trials of an important nature were held in Bellary. Previous efforts of the same nature in Trichinopoly had been from one cause or another unsuccessful, and it was highly satisfactory to be able at length to convince the ryots of the superior efficacy of the European plough-share. From subsequent correspondence the Board think there can be little doubt that the impression made in Bellary is of a permanent nature.

6. The total expenditure on Government agricultural operations was Rs. 43,765, departmental receipts being Rs. 4,003. The excess was met from the half of the Surplus Pound Fund collections, amounting to Rs. 40,924, and from the Provincial grant of Rs. 20,000. The accounts show an accumulated balance of Rs. 2,60,274. The Superintendent should in future show comparative results for a term of years.

7. The Superintendent will observe that his report should in future go out in the form of Board's Proceedings. It can be submitted to the Board in print, but the copies should be proof copies.

(A true Copy and Extract.)

(Signed) E. GIBSON,
Acting Sub-Secretary.

To the Secretary to Government, Revenue Department.
„ the Superintendent, Government Farms.
„ all Collectors.

PROCEEDINGS OF THE BOARD OF REVENUE, dated 10th December 1881.

Read again Proceedings of the Board of Revenue, dated 12th November 1881, No. 9854, Miscellaneous.

Read the following letter from W. R. ROBERTSON, Esq., M.R.A.C., Superintendent of Government Farms, to the Secretary to the Board of Revenue, dated Saidápet 29th June 1881 :—

THIS report, refers to the Saidápet Farm only; a separate report will be submitted showing the work of the School of Agriculture, and another, in which the general operations of the department will be detailed.

Season.—On the whole the year was a favorable one. The total rainfall was 57·18 inches, registered on 95 days; the average of the previous ten years having been 52·75 inches, precipitated in 62 days.

3. The weather in April was, as usual, very dry, there having been only one slight shower in the month. Unfortunately there was no rain in May; though, in this month, the rainfall cannot be relied on here, the average monthly fall in the past ten years was 4·13 inches, but this average was made up largely by heavy cyclonic rains which, in some years, fall in this month. Rain is especially valuable in May, as it facilitates the preparation of the ground for the hot-weather crops.

Absence of May showers.

4. The fall in June was below the average, though there were more wet days than usual. These light showers were utilized, a considerable breadth of land having been ploughed, and sown with horse-gram, for fodder and green manure. In July the fall was slightly above the average; the rain was well distributed over the month in moderate showers. During August the amount of rain was slightly below the average; in the yearly part of the month it was too slight to admit of the proper performance of the tillages for the cold-weather crops that, at this time, are usually carried on.

5. In September there was twice as much rain as usual, but it fell chiefly in the early part of the month, and in heavy showers. On the 2nd, 3½ inches were registered, on the 10th the fall was nearly similar; while, two days afterwards, there was a further fall of 2 inches. The land became so saturated that tillage operations were stopped for some days, an unfortunate occurrence at this season of the year, when the whole available force of the farm should be uninterruptedly employed in preparing the soil for sowing, and in getting in the seed. The drought, during the latter half of the month, facilitated seed-sowing, but proved very injurious to the young crops then just appearing above ground; the maize crop suffered greatly. In October, there was nearly the average quantity of rain, but most of it fell in the latter half of the month.

6. The rainfall registered in November was about 7 inches above the average. On the 7th of the month, at about 3 in the morning, a heavy storm broke over the farm and neighbourhood, which did great damage; in three hours 4 inches of rain were registered.

Severe storm.

7. The early part of December was unusually wet, and the land being then saturated from the heavy rains in the latter part of the previous month, young crops suffered severely, while the more advanced crops flowering at the time were also damaged. The middle of the month was dry; there were several beneficial showers in the latter portion.

8. It is worthy of note that from the 31st October to the 3rd of December inclusive there were only 7 dry days, while the fall amounted to 23·86 inches.

9. A good shower fell in the middle of January, but, the ground being so dry, it produced no marked effect. This was the only rain that fell in the month; there was no rain in February or March.

10. The weather during January was unusually dull, cold and foggy; crops made but little progress, but there was a marked absence of fungoid diseases and of injurious insects. Cotton, however, suffered from "rust." In February the

Failure of Mango crop. weather was much the same; early in the month the mango trees were heavily covered with blossom, but it was destroyed by the dense fogs which prevailed in the early mornings. A considerable breadth

Injury to Paddy. of paddy crop at the farm and in its neighbourhood, was attacked and much damaged by insects in this month. It was observed that the attacks were more severe on crops growing on low land on which the irrigation water accumulated. By running off the water and drying the land for a few days the damage was arrested and renewed vigor given to the plants. The foggy weather which characterized the two previous months continued up to about the middle of March, when the southerly winds began to blow and the atmosphere became clear and the temperature high.

11. In the following statement the daily rainfall registration of the year are given; and, in Appendix I, statements of the monthly and weekly rainfall, compared with the averages of the past eleven years, during which the rainfall has been registered on the farm:—

Date.	1880.									1881.		
	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.
1st	45	117	220	...	...	...
2nd	10	05	350	...	122	82	...	...	...
3rd	03	35	35	...	...	...
4th	110	08	...	...	55	...	...	...	...
5th	05	...	...	...
6th	95	...	...	...	...	...	...
7th	20	10	...	...	385	05	...	...	...
8th	15	53	...	...	...	...	...	...	...
9th	26	...	10	...	...	...	...
10th ...	02	...	...	09	...	345	...	130	...	...	...	...
11th	52	22	50	...	...	...	...
12th	08	07	170	...	80	...	75	...	...
13th	55	...	10	05	12	15	...	...	...	...
14th	09	16	...	02	...	10	...	...	...	...
15th	02	...	01	05	...	...	...	...
16th	25	...	124	...	...	19	...	...	...	...
17th	20	34	...	...	...	...
18th	44	...	14	15	...	...	...	...
19th	35	...	...	...	...	...
20th	146	...	...	133	...	...	...	...	...
21st	20	...	...	...	100	95	95	...	...	...
22nd	02	...	...	...	22	75	75	...	...	...
23rd	30	10	...	...	456	42	...	...	...	...
24th	66	84	16	...	...	...
25th	25	...	83	...	...	...
26th	02	...	31	...	01	...	...	...
27th	60	12	...	02	140	...	...	...	...
28th	16	...	18	...	...	210	...	...	...	...
29th	12	40	...	120	...	...	...	...
30th	01	...	05	14	...	114	...	...	...	...
31st	15	...	...	87	...	...	...	...	...
Total ...	02	...	158	419	312	1099	1074	1962	617	75	...	...

CROPS.

12. The total area under crop during the year was 121·94 acres ; of this, 27·95 acres were under crop which stood throughout the year. Crops were raised on 33·51 acres for use as green manure.

13. *Fodder crops* were raised on an area of 36·65 acres, of which 6·28 acres were sown before the commencement of the year under report, and 1·21 acres were standing at the close of the year. Besides the crops recorded, 17·98 acres were under Guinea grass throughout the year, and this afforded pasture for the stock ; besides this there were 4·23 acres of land planted with Hurriali grass, which also was pastured. The next statement shows the fodder crops harvested in the year, with particulars referring thereto :—

No.	Description of Crop.	Number of Field and Plot.	Area of Plot.	Sowing.		Details of Harvesting.			Rainfall.		Remarks.
				Date of.	Seed Sown.				Inches.	Wet Days.	
					Total.	Per Acre.	Date.	Outturn.			
					LBS.	LBS.	D. M. Y.	Fodder.	Per Acre.	DAYS.	
1	Yellow Cholum	4 V	ACRES.	D. M. Y.	LBS.	LBS.	D. M. Y.	LBS.	LBS.	DAYS.	
2	Do.	4 VIII.	.47	26 4 80	12	25.5	10 6 80	1,233	2,623	44	...
3	Do.	12 IV	.29	13 4 80	40	137.2	12 6 80	1,456	5,021	60	...
4	Do.	20	.66	10 4 80	25	37.9	26 6 80	938	1,421	77	1.43
5	Do.	4 VI	1.48	15 1 81	67.5	45.6	...	...	...	...	...
6	Do.	29 II	.43	25 14 80	20	46.5	10 6 80	408	949	45	...
7	Planter's Friend	13	.79	4 9 80	50	63.3	12 11 80	2,018	1,696	69	28.07
8	Cumboo and Horse-gram	15 I	1.36	9 1 80	18.3	13.4	19 5 80	2,800	2,051	131	35
9	Do.	20	4.17	6 7 80	75	17.9	26 8 80	13,296	3,188	52	4.82
10	Do.	35 VI	1.48	23 6 80	50	33.7	31 8 80	2,523	1,705	69	5.64
11	Do.	4 IV	.50	29 6 80	11	22	27 8 80	2,583	5,166	59	7.78
12	Cumboo and Yellow Cholum.	27 II	.99	14 6 80	50	50.5	21 8 80	2,813	2,841	68	7.15
13	Horse-gram and Planter's Friend.	34 I	2.05	31 8 80	80	39.0	23 11 80	6,639	3,239	84	7.76
14	Do.	34 II	1.38	26 6 80	32	23.2	30 8 80	1,740	1,261	65	34.67
15	Do.	19	.77	26 6 80	28	36.3	28 8 80	5,544	7,200	63	27
16	Do.	21	3.79	29 12 80	80	21.1	31 8 81	4,138	1,092	92	25
17	Do.	12 IV	3.07	8 2 81	40	13.0	27 5 81	2,735	890	108	1
18	Guinea Grass	2	.66	7 7 80	25	37.9	13 9 80	3,759	5,695	70	1
19	Do.	22	1.62	...	...	...	15 11 80	1,983	1,224	...	30
20	Do.	16	4.66	...	...	...	...	15,201	3263	...	...
21	Car Paddy	28 I	4.82	30 11 80	Planted.	...	4 3 81	3,611	749	94	...
22	Sumba Paddy (60 days)	28 III-C.	.51	24 12 80	100	200	12 4 81	1,464	2,928	109	12
23	Do.	28 II-A...	.20	4 12 80	Planted.	...	23 4 81	522	1,024	140	2
				27 12 80	80	150	22 4 81	731	8,655	116	1

Part of this crop was ploughed in.

One cutting only; field also grazed.
First cutting; also irrigated; also thinned for seedlings.

14. The cereal fodder crops were light for such a good growing season, but the gram fodder crops were good. It will be observed that, with one exception, the whole of these crops are indigenous ones. Further experience confirms the opinion long ago expressed, that South India is remarkably rich in the possession of fodder crops suited to the different soils and the widely differing conditions of climate which characterise the cropping seasons. It is worthy of notice that, in so short a growing period as six weeks, fair crops of fodder were produced. The outturns per acre differ widely; this must be attributed chiefly to the great differences in the soils of the farm. As a rule, the better soils are reserved for other crops than fodder.

15. *Food-grain crops* were raised on about 40 acres of land. In addition to the ordinary indigenous crops, *Sorghum saccharatum*, *Sorghum Kaffrarium*, and Madagascar paddy were grown as field crops.

16. *Unirrigated cereals* occupied 13.62 acres of land; they were all raised during the cold season, the summer rains not having commenced sufficiently early to admit of cumboo being sown as a hot-weather grain crop. The following statement gives full particulars regarding these crops:—

No.	Description of Crop.	Number of Field and Plot.	Area of Plot.	Sowing.			Details of Harvesting.				Rainfall.		Remarks.
				Date of.	Seed Sown.		Date.	Outturn.			Inches.	Wet Days.	
						Per Acre.		Grain.	Straw.	Grain per Acre.	Straw per Acre.		
			ACRES.	D. M. Y.	LBS.	LBS.	D. M. Y.	LBS.	LBS.	LBS.	DAYS.		
1	Regi	1	.595	2 10 80	28	47.0	27 1 81	408	1,197	636	2,012	117	36.84 50
2	Maize	1	.595	2 10 80	28.5	47.9	8 1 81	443	418	745	703	98	36.08 49
3	Sorghum saccharatum	3	1.78	12 10 80	33	18.5	19 2 81	422	3,373	237	1,895	130	36.53 43
4	White Cholm	8	2.00	15 11 80	55	27.5	16 3 81	1,109	5,688	555	2,844	122	16.40 22
5	Ragi	14	2.31	5 10 80	45	19.5	22 1 81	1,729	2,352	748	1,018	109	36.80 49
6	Do.	33	2.36	28 9 80	46	19.5	4 1 81	{ 280 561	{ 1,050 1,301	{ 356 951	{ 996 5,484	98	36.71 52
7	Planter's Friend	18	3.06	16 9 80	101	33	22 1 81	2,910	16,782	951	5,484	123	37.46 53
8	Yellow Cholm	34 I	.92	15 9 80	30	32.6	31 12 80	605	5,096	655	5,539	107	36.71 52

Not threshed until May 31st.

The second entry of receipt refers to part of the crop stacked and threshed on May 21st.

17. It will be seen that, excluding crop No. 2, which was harvested in the cob, there were 13.02 acres under crop which yielded an average of 599 lbs. of grain and 2,827 lbs. of straw per acre. The *Sorghum saccharatum* was a poor crop, and this brought down considerably the average outturn per acre: this crop does not thrive well when the weather is unusually wet, and the temperature low. On the other hand the Planter's Friend, which is closely allied to the *Sorghum saccharatum*, did remarkably well. Further experience with this crop has shown that it is a hardy one, and capable of withstanding adverse conditions that would prove disastrous to a crop of *Sorghum saccharatum*.

18. *Irrigated Cereal Food crops* were raised on an area of 16.63 acres of land irrigable from the Mylapore tank. On most of the land two crops were raised, the latter ones being watered in the later stages of their growth, by baling, the tank water not then being available at a sufficient height to admit of it flowing on the land. For some of these second crops sufficient water could not be got, and the outturn from them was accordingly considerably lessened. The total area of crop raised to maturity was 26.82 acres, the particulars of which are shown in the following statement:—

No.	Description of Crop.	Number of Field and Plot.	Area of Plot.	Sowing.			Details of Harvesting.					Rainfall.		Remarks.		
				Date of.	Seed Sown.		Date.	Outturn.			Duration of Growth.	Inches.	Wet Days.			
					Total.	Per Acre.		Grain.	Straw.	Grain per Acre.					Straw per Acre.	
<i>Irrigated Cereals.</i>																
9	Madagascar Paddy ...	29 I	1.04	D. M. Y.	LBS.	LBS.	D. M. Y.	LBS.	LBS.	LBS.	DAYS.	37.46	53	Has been followed by horse-gram.		
10	Do.	35 I	.31	15 9 80	20	64.5	20 1 81	280	896	903	127	36.71	52	Followed by No. 51.		
11	Seromoney Paddy	30 Ia	1.8	28 8 80	75	41.7	19 2 81	2,912	8,430	1,618	175	48.62	64	Do. by No. 50.		
12	Sumba Paddy (60 days)	29 II	.74	20 9 80	80	108.1	7 12 80	866	1,932	1,170	78	34.01	47	Do. by No. 31.		
13	Do.	28 IIIa	.24	2 11 80	160	41.7	27 1 81	226	768	942	86	24.15	32			
14	Do.	35 II	.61	14 9 80	40	65.6	4 12 80	450	902	788	81	34.27	45	Do. by No. 32.		
15	Do.	35 IV	.35	11 9 80	25	71.4	4 12 80	184	483	526	84	36.04	47	Do. by No. 33.		
16	Do.	36 II	.46	10 9 80	5	10.0	3 12 80	134	266	291	84	36.56	48	Do. by No. 34.		
17	Do.	36 III	.90	11 9 80	100	111.1	3 12 80	682	1,302	758	83	36.04	47	Do. by No. 35.		
18	Do.	37 II	.82	7 10 80	Planted.		17 12 80	861	1,945	1,050	77	33.85	42	Do. by No. 37.		
19	Do.	37 III	.46	7 10 80	Do.		15 12 80	602	1,382	1,309	69	33.35	42	Do. by No. 38.		
20	Do.	37 IV	.52	6 10 80	Do.		11 12 80	630	1,152	1,212	66	33.35	42	Do. by No. 39.		
21	Do.	37 V	.67	6 10 80	Do.		11 12 80	521	980	778	78	35.50	43	Do. by No. 40.		
22	Car Paddy	37 I	.45	17 10 80	Do.		3 1 81	652	1,700	1,449	67	37.07	51	Do. by No. 46.		
23	Do.	36 I	1.58	15 9 80	100	63.3	31 12 80	1,070	2,408	677	107	37.07	51	Do.		
24	Do.	35 III	.57	14 9 80	40	70.2	31 12 80	478	996	839	108	35.71	45			
25	Do.	30 IIa	.66	23 9 80	60	90.9	7 1 81	704	1,218	1,067	106	36.71	52			
26	Do.	28 I	.28	6 11 80	Planted.		22 1 81	261	458	932	77	23.25	30			
27	Mananthu Paddy	30 IIb	1.33	22 9 80	123.5	92.8	5 1 81	1,262	2,192	949	105	36.71	52	Do.		
28	Do.	28 I	.31	8 11 80	Planted.		2 2 81	108	256	348	86	19.40	29			
29	Gondoo Sumba Paddy.	35 V	.79	11 9 80	45.5	57.6	19 2 81	1,446	3,892	1,830	161	39.59	55			
30	Car Paddy	28 II	.40	4 12 80	40	100.0	6 4 81	172	934	430	123	3.55	8			
31	Do.	29 IV	.74	17 12 80	Bundles.		31 3 81	1,225	2,587	1,655	104	3.45	6			
32	Do.	35 II	.61	13 12 80	550	901.6	7 4 81	624	1,692	1,023	115	3.45	6			
33	Do.	35 IV	.35	14 12 80	250	714.3	31 3 81	349	541	997	107	3.45	6			
34	Do.	36 II	.46	15 12 80	300	652	31 3 81	632	1,338	1,374	106	3.45	6			
35	Do.	36 III	.90	16 12 80	650	620.2	23 4 81	1,006	2,650	1,118	128	3.45	6			
36	Do.	37 I	.45	11 1 81	320	711	23 4 81	370	1,326	822	102	.75	1			
37	Do.	37 II	.82	3 1 81	650	792.7	23 4 81	612	1,616	746	110	.75	1			

No.	Description of Crop.	Number of Field and Plot.	Area of Plot.	Sowing.			Details of Harvesting.				Rainfall.		Remarks.	
				Date of.	Seed Sown.		Date.	Outturn.			Duration of Growth.	Inches.		
					Total.	Per Acre.		Grain.	Straw.	Grain per Acre.		Straw per Acre.		Wet Days.
<i>Irrigated Cereals—</i> (Contd.)														
38	Car Paddy	...	...	D. M. Y. Planted.	Bundles.		D. M. Y.	LBS.	LBS.	LBS.	DAYS.			
39	Do.	...	...	22 12 80	500	961.5	21 4 81	870	1,736	1,891	120	1.75	4	
40	Do.	...	...	21 12 80	450	865.4	23 4 81	945	1,823	1,817	122	2.50	5	
		...	...	18 12 80	420	626.9	20 4 81	1,028	2,350	1,534	123	3.45	6	
41	Do.	...	...		lbs.									
42	Do.	...	...	17 11 80	40.5	109.5	6 4 81	532	1,141	1,438	140	15.87	20	
43	White Car Paddy	...	...	24 12 80	30	125	28 4 81	165	1,665	688	125	1.75	3	
44	Sumba Paddy (60 days)	...	...	16 11 80	24	150	6 4 81	209	603	1,306	122	16.40	22	
45	Do	...	...	21 12 80	40	70.2	31 3 81	423	1,122	742	98	.75	1	
46	Madagascar Paddy	...	...	13 1 81	150	112.8	23 4 81	736	4,370	553	98	...	...
47	Do.	...	...	31 12 80	15	79.0	14 5 81	64	366	337	134	.75	1	
		...	...	31 12 80	15	79.0	14 5 81	60	362	316	134	.75	1	
48	Carolina Paddy	...	...	2 12 80	Planted.		31 3 81	{ 22 *50 210}	60}	382	119	4.72	10	* Sample much mixed. Second entry Car Paddy picked out.
49	Sumba Paddy	...	...	27 12 80	Do.		6 4 81	172	321	860	100	.75	1	
50	Ragi	...	...	5 3 81	Bundles.		18 5 81	361	2,108	200	74	...	...
51	Do.	...	...	2 3 81	210	677.4	21 5 81	78	157	251	80	...	...

* Sample much mixed.
Second entry Car
Paddy picked out.

19. It will be seen that 26,517 lbs. of grain and 67,067 lbs. of straw were in a period of 7 months produced on 16·63 acres; the average outturn per acre being thus grain, 1,594 lbs. and straw 4,033 lbs. As has already been noticed, much of this crop was second crop, which, from unavoidable circumstances, did not receive as good treatment as was desirable. Field 34 II, on which the Carolina paddy and Madagascar paddy were sown, was but recently levelled, much of the poor subsoil being exposed, hence the partial failure of these crops in this field.

20. *Industrial Crops.*—Of these crops the produce of 31·87 acres was harvested in the year; of this 23·66 acres were standing at the commencement of the year. At the close of the year there were 20·81 acres under these crops that were sown during the year, and the produce of which will not be harvested until next year; these were—

	ACRES.
Cotton	10·22
Indigo	8·08
Oil-seeds	1·19
Sugar-cane	1·32
Total	20·81

Casuarina trees for fuel, and to afford protection for fruit trees, to be afterwards planted, were planted out on 5·63 acres of poor land. Industrial and miscellaneous crops occupied 36·12 acres as below:—

Number.	Description of Crops.	Number of Field and Plot.	Area of Plot.	Sowing.				Details of Harvesting.				Duration of Growth.	Rainfall.		
				Date of.	Seed Sown.		Date.	Outturn.		Inches.	Wet Days.				
					Total.	Per Acre.		Gross.	Per Acre.						
1	Sugar-cane ...	12 I ...	ACS. 82	D. M. Y. 21 12 79	LBS. .	LBS. ...	D. M. Y. 26 11 80	Number of Canes.			Days.				
								8,738	...	10,656	...	340	52-07	85	
2	Cotton ...	11 ...	2-96	22 8 79	30	10-1	31 7 80	Seed cotton, lbs.							
3	Do. ...	32 ...	4-76	3 9 79	45	9-4	6 8 80	1073-5	...	363	...	343	52-52	69	
4	Do. ...	1 ...	2-38	1 9 79	24	10-0	18 8 80	689-5	...	145	...	334	48-43	64	
5	Do. ...	27 II ...	2-05	26 8 79	20	9-7	24 8 80	365-75	...	157	...	346	49-17	67	
6	Do. ...	16 ...	4-82	6 9 79	12	2-4	27 8 80	403-00	...	197	...	363	54-93	76	
								765-25	...	159	...	355	51-07	71	
7	Indigo ...	3 ...	1-78	21 1 80	43	24-1	Last cutting.		Seed.		Bundles.		Seed.		
8	Do. ...	36 II & III.	1-36	23 3 80	15	9-5	5 10 80	...	216	...	121	257	25-18	50	
9	Do. ...	37 I ...	·62	16 4 80	20	32-2	19 8 80	185	...	136	...	149	8-42	29	
10	Do. ...	37 II ...	·45	25 3 80	12	26-6	22 7 80	...	8	...	13	97	4-94	17	
11	Do. ...	37 III ...	·50	1 4 80	12	24-0	22 7 80	...	27	...	60	119	4-94	17	
12	Do. ...	32 ...	4-76	30 8 80	50	10-0	22 7 80	...	12-5	...	25	112	4-94	17	
13	Do. ...	11 ...	1-88	30 8 80	104	55-3	20 1 81	...	141-5	...	30	143	51-04	66	
							19 2 81	205-5	12	109	6	173	48-27	60	
14	Castor Beans.	13 ...	2-73	22 11 79	32-5	11-9	Up to								
							22 11 80	1,248	...	457	...	365	53-22	89	
Miscellaneous Crops.															
1	Plantains ...	4-B I ...	·93	15 3 78	...	...	During the year.	Bunches.		Bunches.		365	57-16	94
2	Do. ...	4-B II ...	1-25	6 6 79	...	...	Will shortly be available.	293	...	315	...			
3	Tapioca ...	4-B III ...	·80	18 8 80		Bunches.							
4	Plantains ...			30 11 80									
5	Do. ...	12 II ...	·87	19 9 76	...	...	During the year.	157	...	180	...	365	57-16	94
6	Do. ...	12 III ...	·85	26 12 78	...	...	Do.	227	...	267	...	365	57-16	94
7	Arrowroot ...	4-A II ...	·25	20 10 79	...	...	29 1 81	986	...	3,944	...	466	98-49	33
8	Bendacoy ...	4-A III ...	·10	2 10 80	7	70	21 12 80	68	...	680	...	80	45-77	56	

21. *Sugar-cane.*—The plot occupied by this crop at the beginning of the year, referred to in paragraph 60 of the last report, was planted with cane on the 21st

December 1879. The land had previously carried plantains, and during their growth had been brought into a fair condition. The soil however, like the soils of the farm generally, is naturally poor. The land can be watered from a well close by, which contains a good supply of water about 20 feet below the surface. The plantains were removed in June 1879, and the land ploughed and harrowed frequently during the ensuing months. On December 9th 18 cwts. of powdered bones were applied broadcast to the plot; these were ploughed in just before trenching for planting. One-half of the plot was trenched 3 feet apart, and the other 6 feet, and the canes were planted in the bottom of the trenches after watering. After planting, the land was occasionally watered to sprout the canes, and ashes were applied to check the ravages of the white-ants. The canes sprouted fairly, although a good many blanks were caused by the white-ants; and the crop continued healthy and to make good progress until the middle of March, when 3 tons of poudrette was applied. The progress of the crop, except on a portion of the part planted in rows 6 feet apart, which never did well, continued to be good. At the end of April, 23 loads of slaughter-house refuse was applied. A few rows (four) of the closely planted crop, received a further application of manure at the end of May, and the crop continued to progress fairly until the middle of June, when it received a check, but soon recovered and continued healthy throughout the remainder of its growth. In August (1,270) canes were taken out for use as seed-cane in another field of the farm, and again in November 304 canes were removed for the same purpose. By the end of December last the canes were fit to cut. Some of the canes were sold standing; a row 80 yards long being sold for Rs. 2-4-0, or at the rate of Rs. 136-2-0 per acre. During January and the early part of February the whole crop was removed and the greater part crushed in one of Thomson and Mylne's Beheea Sugar-mills, and the juice boiled down into jaggery. Canes weighing 12,383 lbs. were crushed and the juice boiled down into

jaggery, and yielded $780\frac{1}{4}$ lbs., which sold for Rs. 46-9-0. The yield of jaggery from an average row of canes was about 34 lbs., worth Rs. 2-0-4. The total outturn of canes was not recorded, but in the following table some results obtained from part of the different plots are given.

Plot planted.	Number of Rows.	Area.	Weight of Canes crushed.	Weight per Acre of Canes.	Jaggery made.	Jaggery per Acre made.	Jaggery per 100 lbs. of Canes.
		SQ. YDS.	LBS.	LBS.	LBS.	LBS.	LBS.
3 feet apart ...	16	1,280	7,642	28,896	485 $\frac{1}{4}$	1,836-7	6-36
6 " " ...	8	1,280	4,741	8,555	294 $\frac{1}{2}$	1,113-5	6-2

22. These results show that it is more profitable here to sell the canes standing for retail sale in the bazaar, and that, on soil of the nature of that in the field where this crop was raised, the crop does better in every way if planted in rows only 3 feet and not 6 feet apart.

23. At the time of crushing the cane an experiment was made to compare its sugar-producing quality with that of cane raised in the neighbourhood, for which purpose some canes were purchased. The results were as follow:—

—	Weight crushed.	Juice extracted.	Percentage of Juice extracted.	Jaggery produced.	Jaggery to 100 lbs. of Cane.	Jaggery made from 100 lbs. Juice.	Remarks.
	LBS.	LBS.		LBS.	LBS.	LBS.	
Purchased Canes.	59	31	52-5	3	5-1	9-7	The farm canes only averaged 4 feet in length, whilst those purchased averaged 5 $\frac{1}{2}$ feet in length.
Farm-grown Canes ...	40-75	26-25	64-4	3 $\frac{1}{2}$	8-6	13-3	

24. There is nothing to show how the purchased canes had been treated during their growth, but the results are satisfactory, especially when the poverty of the farm-soil is considered. The proportion of jaggery obtained in this case was higher than the general average with farm-grown canes, but this may have been due to several causes, more efficient extraction, less concentration, &c.

25. At the time the crushing referred to was going on, an experiment was made to test the sugar-producing qualities of Planter's Friend and Sorghum stalks. Unfortunately no perfectly fresh stalks of Planter's Friend were available at the time, and it is probable that all the sugar of the sample experimented with was not extracted. The following are the results of an examination made by Mr. Hamilton, Chemical Lecturer in the School of Agriculture, of the juices expressed; the juice of some ordinary sugar-cane having also been tested at the same time;—

Plant extracted from.	Specific Gravity.	Crystallizable Sugar.	Uncrystallizable Sugar.
		Per cent.	Per cent.
Sugar-cane	1065	15·07	8·42
Sorghum	1061	9·03	5·68
Planter's Friend	1064	5·101	3·83

26. These results, as far as they go, show that both the Sorghum and Planter's Friend cultivated here are rich in sugar, but it will be necessary to devote attention to the best time for cutting, for crushing, and also the treatment of the juice afterwards. The large amount of uncrystallizable sugar in the juices may have been partly due to the time at which the crops were cut, and also to their being stored.

27. Regarding *Sorghum saccharatum* Mr. Hamilton afforded the following information: "The stems of some Sorghum plants with the seeds ripening, were cut into segments and split, and 2 lbs. of the stems so prepared, were put into a clean screw-press. Eleven ounces of juice were expressed, beautifully clear, and having a fine olive-green color." This juice gave the following results:—

Specific gravity	10·59
Crystallizable sugar	10·32 per cent.
Uncrystallizable sugar	1·79 do.

These results, owing to the care in expressing the juice, the freshness of the sample, and the avoidance of delay in determining the sugar, are more reliable than those before given.

28. In crushing, by means of the mill before referred to, 100 stalks of each crop, and making the juice into jaggery, the following results were obtained:—

Plant.	Weight of Cane crushed.	Weight of Juice extracted.	Percentage of Juice extracted.	Jaggery made.	Jaggery made for 100 lbs. Canes	Jaggery made for 100 lbs. Juice.
	LBS.	LBS.		LBS.	LBS.	LBS.
Planter's Friend	24	10·75	44·8	1·25	5·2	11·6
Sorghum	29·5	10·50	35·6	1·875	4·7	13·1

29. The stalks were stripped before being crushed, and, compared with the yield obtained in America, the percentage of juice is low, but it should be remembered that the canes were not in the best state for crushing. It is believed also that in stripping the canes there is a loss of juice. If further experience shows that the removal of the stem leaves when clean is unnecessary, as there is reason to

believe, there will be a considerable saving in the cost of making jaggery, as stripping the canes is costly.

30. The *Cotton crops* of the season 1879-80, referred to in paragraph 51 of the last report, gave the results mentioned in the table below :—

Months.	Field No. 1.			Field No. 11.			Field No. 16.			Field No. 27.			Field No. 32.			Total.			
	Cotton in Seed.	Lint.	Percentage.	Cotton in Seed.	Lint.	Percentage.	Cotton in Seed.	Lint.	Percentage.	Cotton in Seed.	Lint.	Percentage.	Cotton in Seed.	Lint.	Percentage.	Cotton in Seed.	Lint.	Percentage of Lint.	Percentage of Total Crop in Month.
January ...	LBS. 29½	LBS. 9½	31·9	LBS. 33½	LBS. 10	30·0	LBS. 121½	LBS. 32½	27·0	LBS. 11½	LBS. 3½	33·3	LBS. 6½	LBS. 2	29·6	LBS. 202½	LBS. 58	28·7	4·68
February ...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
March ...	137	43½	31·7	211	65	30·8	111	36	32·4	140½	42	29·9	257½	86	33·3	857½	272½	31·8	21·80
April ...	334	106	31·0	130	42	32·3	148	47	31·7	87½	26	29·8	61½	19	30·9	761	240	31·5	19·20
May ...	349½	115	32·8	407½	131½	32·1	227	74½	32·8	68½	21	30·6	132	42	31·8	1,185	383½	32·4	30·71
June ...	166½	50	30·0	160	48	30·0	127	38	29·9	33½	10	29·6	186	42	30·9	623	188	30·2	15·12
July ...	56	15	26·7	53½	14	26·0	...	...	...	61½	17½	29·2	95½	26½	27·7	266½	73	27·4	5·83
August...																			
Total ...	1,072½	339	...	1,073½	334½	...	765½	238½	...	403	120½	...	689½	217½	...	4,004	1,249½	...	100·00
Average per Acre.	450·7	142·9	31·6	362·7	112·9	31·1	158·8	49·4	31·1	158	47·2	30·5	144·8	45·7	31·5	229·2	71·9	31·2	...

31. Taking the results generally, the yield was rather low, but that may be chiefly explained by the poverty of several of the fields, particularly Nos. 16 and 27. The yield of lint was satisfactory, the largest proportion being obtained in May during the driest weather; when the cotton is picked in the driest state. The crop began to bear late in the season, the greatest produce was obtained during the three months of March, April and May. The results here recorded, taken in conjunction with those obtained in previous years, point decidedly to the advisability of removing cotton at the end of June, and also of sowing the crop as early in August as may be practicable.

32. The crop in No. 1 field followed cotton on the eastern and poorer portion of the field, and sugar-cane on the western; it was sown on September 1st in alternate ridges with Planter's Friend. The seed germinated well and the plants grew vigorously, whilst the crop of Planter's Friend was a very fine one. Throughout the year the plants were in a flourishing condition. The value and the cost of producing the cotton and Planter's Friend crops are shown in a table at paragraph 37.

33. In No. 11 field the crop followed indigo, the soil being a sandy loam in good manurial condition. It was grown on the ridge system in alternate lines with yellow cholum, being sown at the end of August. It grew well on the whole area, and the plants attained a considerable height. The cost and value of these crops are also shown below.

34. The crop raised in No. 16 field is referred to in paragraph 35 of the report for 1879-80, where it is stated that the crop had suffered greatly during the early stages of its growth. This field was before preparation for sowing, divided into two portions, and one-half was manured with box-manure broadcasted and then ploughed in before ridging, whilst the other half was manured in the ordinary way by spreading the manure between the ridges and then splitting the soil over it. The cotton crop was, during a considerable portion of the year, collected from each part of the field separately, with the following results :—

Collected from		Broadcast portion, Area 2'41.		Ridged portion, Area 2'41.	
December to March ...		Gathered together. Cotton in seed = 176 lbs. ; yielded 57 $\frac{3}{4}$ lbs. lint.			
—		Cotton in Seed.	Yield of Lint.	Cotton in Seed.	Yield of Lint.
March to June		LBS. 322 $\frac{1}{2}$	LBS. 96	LBS. 255	LBS. 80 $\frac{1}{2}$

35. The soil of field No. 27 is of most uneven character; in some places it is a clay and extremely cohesive, in others sandy or a sandy loam. The crop of cotton, with one of Planter's Friend grown on the ridge system in alternate lines with it, was the first that has given a satisfactory return, and, considering the nature of the land, is fair. The financial results are shown further on.

36. In No. 32 field the soil is a sandy loam, well drained and in fair condition. The crop, which followed horse-gram preceded by white cholum, was sown at the beginning of September on ridges in alternate lines with black cholum; it grew well at first, but received a check during the dry weather at the end of the month and never recovered. The low yield may be partly attributed to the fact that a portion of the field was sown with new unacclimatised Upland cotton, which crop did very badly.

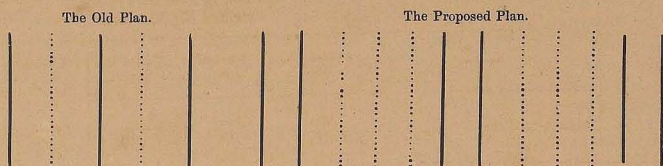
37. In the table below the cost of growing and the value of the produce received from each of these crops is shown;—

Description of Crop.	Number of Field and Plot.	Value of unexhausted Manure brought forward.			Cost of Preparation of Land.			Cost of Seed and Sowing.			Cost of after-culti- vation.			Cost of Harvesting and securing Produce.		
		RS.	A.	P.	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.
N. O. Cotton and Planter's Friend	1 ...	36	15	0	18	6	0	3	12	0	21	15	0	8	13	0
Do. and Yellow Cholum.	11 ...	18	12	9	18	2	0	6	4	0	27	11	0	13	11	0
Do. and Maize	16 ...	...	...	...	50	4	0	7	6	0	20	11	0	7	11	0
Do. and Planter's Friend.	27-B ...	...	...	...	12	12	0	3	7	0	15	4	0	3	4	0
Do. and Black Cholum...	32 ...	...	...	...	18	1	0	8	15	0	41	3	0	7	2	0

Description of Crop.	Number of Field and Plot.	Value of Manure applied.			Total Expenditure on Crop.			Value of unexhausted Manure carried forward.			Net Cost of Crop.			Value of Produce.		
		RS.	A.	P.	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.
N. O. Cotton and Planter's Friend	1 ...	19	6	0	109	3	0	28	2	0	81	1	0	120	4	2
Do. and Yellow Cholum.	11 ...	22	8	0	107	0	9	20	10	0	86	6	9	199	4	5
Do. and Maize	16 ...	55	8	0	141	8	0	27	12	0	113	12	0	80	0	10
Do. and Planter's Friend.	27-B ...	55	2	9	89	13	9	27	13	0	62	0	9	81	10	2
Do. and Black Cholum...	32 ...	44	0	0	119	5	0	22	0	0	97	5	0	223	4	2

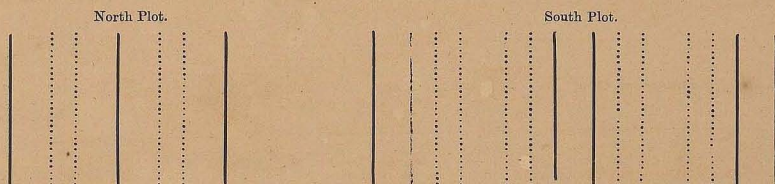
38. In field No. 18 an experiment in altering the arrangement heretofore adopted for sowing cotton was made during the current season. It has been usual to sow cotton on ridges regularly in alternate lines with a cereal—maize, cholum, &c.; but it appeared likely to be more convenient if the cotton plants were grown more closely together, but with greater intervals between the rows; thus in the diagram

below, the dotted lines indicate the rows of the cereal crop and the plain ones the cotton plants :—



The distance in the old plan between the rows of cotton being 4 feet, and in the proposed alternately 2 feet and 6 feet, so that the same number of rows would be sown on either system in a given area. The presumed advantages in favor of the new system were, that it would render the work of keeping the cotton-field clean, after the removal of the cereal, cheaper and more easy, and that both the cotton and the cereal would thrive better.

39. No. 18 field was manured heavily last June with village sweepings, at the rate of about 50 loads per acre; the manure was of poor quality, but not costly. Horse-grass was then sown, which was ploughed in green at the end of August, the crop being a small one. The field was then prepared for sowing, and cotton and Planter's Friend were sown on September 16th on the flat in two plots on the system shown below, the lines being used to designate the different crops as has been done above :—



40. In the north plot the lines of cotton were regularly 4 feet apart, with a double row of Planter's Friend between each; the two rows of the cereal being 5 inches apart. In the south plot the lines of cotton were alternately $5\frac{3}{4}$ feet and 2 feet apart, and the cereal in two double rows between the double rows of cotton with a space of 33 inches between them. It will be noticed that there is a slight variation from the proposals before sketched; that regarding the position of the cotton rows, was made for convenience in sowing, our seed-drill being 5 feet 9 inches wide, and that regarding the cereal, from an error on the part of the officer in charge of the farm at the time; the variations, however, cannot materially affect the results.

41. The outturn from the Planter's Friend only has as yet been recorded; that from the cotton cannot be given till next year. The results from the Planter's Friend were as follows :—

—	Area in Acres.	Outturn of		Outturn per Acre.	
		Straw.	Grain.	Straw.	Grain.
North side	1.12	56.98	894	5,087	798
South side	1.12	36.92	514	3,296	459

42. It is scarcely possible that the different systems of sowing can have caused the whole of the great variation in the outturn from the cereal crop. The north

side of the field is better drained, and in the southern plot there is a large mango tree, which interferes considerably with the growth of the crops near it, especially with cereals. The crop on the two plots was harvested in different manners; that from the northern plot was reaped bodily on January 15th, and the ears were cut off afterwards in the yard; from the southern plot the ears were first cut off and the straw was reaped on January 20th. These facts, and the possibility of the straw of the two plots having been in different degrees of dryness when weighed, may to some extent account for the difference of yield.

43. In No. 10-A a similar experiment was commenced; cotton having been sown in the same way as denoted above in two parts of the eastern side of the field with maize between the rows; the maize crop was a failure, and the results of the cotton crop cannot be given until next year. All the other cotton crops of the year were sown on the flat in double lines 2 feet apart, with two double rows of cereal between them; and judging from the results, so far the system is much cheaper and more convenient than that of sowing cotton in single alternate lines with a cereal on ridges.

Improved method of cotton culture.

44. Of the *Indigo* crop harvested in 1880, that grown in No. 3 field will be referred to under head "Rotations." The remaining crops were not of much importance; they were all catch-crops, grown on the land irrigated from the Mylapore tank after harvesting, the paddy crop being sown at various dates from April 23rd to May 25th. These crops were not successful, but it must be remembered that they were not regular crops. Those grown in fields No. 36 II and III and No. 37 II and III yielded fairly; that raised in No. 36 was a seed crop. Of the crops sown during the season of 1880-81, only one appears in the table and is that raised for seed in No. 11 field. It was sown on August 30th in rows alternately 6 inches and 18 inches apart, but germinated unevenly over the surface, probably partly owing to the excessive rainfall on September 2nd; and, although the blanks were resown, it was not considered advisable to retain the whole crop, so a portion on the poorer part of the field was taken out and the remainder retained for seed, of which 182½ lbs. were obtained. The results obtained from the remaining fields sown with indigo this year will be dealt with in the next report.

45. The *Oil-seed* crop, referred to at paragraph 53 of the last report, grew very well throughout the year, and was not removed until January last. The field, which measures 2·73 acres, was sown with several varieties raised from some castor beans obtained from Italy, and the results in several cases were very good. A full record is not available, but the general results were as follow:—

Plot	...	...	1	2	3	4	5	6
Area in Acres	...	...	·57	·57	·42	·41	·41	·25
			LBS.	LBS.	LBS.	LBS.	LBS.	LBS.
Seed sown	...	...	7	6	4	2·5	2	1
Seed per Acre	...	...	12·5	10·5	9·5	6	5	4
Yield	...	...	161	489	125	260	195	18
Yield per Acre	...	...	282	858	293	634	475	72

The outturn from the last plots was affected by the inferiority of the soil of the field where they were situated.

46. The season was not a favorable one for the growth of oil-seeds. No summer crops of gingelly were raised, and the only cold weather one sown did not succeed. A crop of castor beans, occupying one acre, was standing at the end of the year and the results will be given hereafter.

Season not a good one for oil-seeds.

47. *Plantains*.—Regarding the plantains there is nothing worthy of remark, except as regards crop No. 4 in the statement, which was planted between rows of tapioca (*Jamipha manihot*) plants purposely put in to afford shade, and to occupy the ground during the first portion of the growth of the plantains. Owing, however, to the tapioca having been planted too closely together, the plantains have made

very little progress. The Manilla hemp (*Musa textilis*) plants referred to in paragraph 66 of the last report as having been put down amongst the plantains in No. 4 field, continue to grow well in that position, and although none have yet reached that stage of maturity when it is advisable to prepare fibre from them, some are already very fine trees.

48. *Arrowroot* (*Curcuma augustifolia*).—A plot measuring .25 acres was planted with this crop at the end of 1879, and remained down during the year under report. It was taken up at the end of January last and yielded 986 lbs. of tubers, or at the

rate of 3,944 lbs. per acre. The yield of flour obtained has generally been about $12\frac{1}{2}$ lbs. from 100 lbs. of tubers, so that

the above yield would represent an outturn of 493 lbs. of flour per acre. In another case in the College Experimental Garden, a plot measuring 1,160 square yards planted with this crop yielded 1,798 lbs., or at the rate of 7,500 lbs. per acre. The culture of this crop is very simple: it is only necessary to plant the sets in properly-prepared soil, and to water them occasionally during the dry season. The removal of the crop is tedious unless the tubers can be ploughed out, as potatoes are done in England, which is seldom possible owing to the dryness of the soil, so that the

tubers have to be dug up. The preparation of the flour is also very simple and easy. The tubers have only to be reduced to pulp on a grater, after being well washed to remove soil

and dirt, and then the pulp is mixed thoroughly with water so as to separate the starch completely from the fibrous matters. The whole is afterwards strained through cloth, through which the starch and water passes, and the fibre left behind. After this the starch has only to be thoroughly washed by decantation with clean water, and dried in the sun. It is then rolled on a table to break it up thoroughly into fine flour and is ready for sale. The flour can be produced at a very low price; it could be sold profitably at 4 annas per pound.

49. *Tobacco*.—As mentioned in paragraph 59 of last year's report, samples of the leaf grown in the Botanical Gardens under experimental treatment as regards manure, and of that grown in No. 4 field, were submitted for chemical analysis; the results were as shown in the table below.

No.	Growth and treatment.	Analysis.		
		Percentage of Ash.	Percentage of Carbonate of Potash in Ash.	Percentage of Nicotine.
1	Grown in Botanical Garden, manured with horse manure at the rate of 20 tons per acre, occasionally irrigated and cured after American fashion ...	20.5	4.916	1.57
2	Grown in Botanical Garden, manured with lime at the rate of 8 tons per acre, cured like No. 1 ...	19.40	3.323	1.62
3	Grown in Botanical Garden, manured with bone-charcoal at the rate of 6 tons per acre, cured like No. 1.	22.85	4.938	4.08
4	Grown in Botanical Garden, manured with ashes at the rate of 21 tons per acre, cured like No. 1 ...	21.60	3.083	2.26
5	Grown in field No. 4, raised without manure and irrigation, cured like No. 1 ...	19.65	3.395	2.31
6	Grown in field No. 4; grown without manure and without irrigation, cured according to country fashion ...	20.60	3.802	1.94
7	Tobacco, 20 plants raised in field No. 4 without manure and without irrigation, cured according to American fashion by simply hanging the same on sticks to dry, but not stripped as yet, therefore not completely cured ...	24.00	4.169	1.5
8	Grown in field No. 8, previous year, cured like No. 1...	21.75	3.433	2.04
9	Grown in field No. 8, previous year, cured like No. 1, but afterwards steeped in diluted H.Cl and jaggery water at the rate of 8 oz. of H.Cl and $1\frac{1}{4}$ vias of jaggery per 100 lbs. of tobacco ...	22.85	4.808	3.12

50. These results afford a great contrast to those obtained from the analysis of the tobacco raised on the farm, reported in 1872, when the percentage of carbonate of potash in the ash, was found to be only .6 in one and .67 in another case, and show how much the farm soils have been improved by careful cultivation. But still, notwithstanding this improvement, the figures given show that on our soils it will be almost impossible to raise tobacco fit for the European market profitably. On the proportion of organic salts of potash in the leaf the "whiteness and permanency of the ash of a cigar depend;" and their presence also "modifies the burning of tobacco in a peculiar way, to the improvement of its flavour, and also positively facilitates burning." In real Manilla tobacco the amount of this substance is above 9 per cent., whilst the ash of the best American tobaccos often contains from 25 to 35 per cent. It will be noticed that, even where a very large quantity of ashes, which would contain a large proportion of potash salts, were applied, the percentage of carbonate of potash in the ash of the tobacco was under 4 per cent. It is a matter of surprise that horse-manure should not have produced a leaf containing more nicotine; probably, however, much of the nitrogenous matter of the manure had been lost; it was old manure from the Artillery stables; the bone-charcoal used, contained when analyzed 57.5 per cent. of phosphate of lime.

51. The *Casuarina trees* planted in 1878-79 continued to progress well during the year, many of them making a great growth; they are now nearly safe from the effects of bad seasons. Those planted in 1879-80 have also done very well on the whole, most of them having been manured early in the year. The watering required was but little, owing to the shade and protection afforded by the dholl sown between the lines for the purpose. One large plot (5 acres) was planted in three portions; in one portion the rows of trees were 4 feet apart and the trees 3 feet apart in the rows; in another the rows were 4 feet and the trees $4\frac{1}{2}$ feet apart; and in the third the rows were 6 feet and the trees 6 feet apart. Of these, the first portion have done much the best, and the last much the worst; but the latter portion is situated on the poorest portion of the field, and many blanks occurred from deaths, which had to be replanted during the year. In the season under report 5.63 acres of poor land were planted out, but the trees have not done well on the whole, chiefly owing to the seedlings being small when planted out, and from not having received adequate attention during the early months of the year. It was not possible to clear and plant much of the remaining waste land during the past year, as the necessary supervision could not be given to it. It is hoped, however, that during the current year the work referred to in paragraph 61 of the last report will be carried out.

52. The *Rotations* commenced in fields Nos. 3 and 16 in 1877-78 were continued during the year. The indigo crop in field No. 3, referred to in paragraph 34 of last year's report, yielded in all 266 bundles of indigo in three cuttings, or at the rate of 149 bundles per acre. The first cutting on April 12th—14th yielded 75 bundles, weighing 6,644 lbs. of plant; the second cut on July 20th gave $26\frac{1}{2}$ bundles, weighing 636 lbs., a part having been cut in June, but rejected, and the third cut on October 2nd—6th yielded $164\frac{1}{2}$ bundles, weighing 10,462 lbs., making a total weight of 17,742 lbs. of green plant. After harvesting the last cutting of indigo, the land was ploughed up immediately and prepared for sowing the next crop in the rotation. *Sorghum saccharatum* was sown on October 12th, 33 lbs. of seed being used; it did not germinate evenly at first, and suffered very severely from the excessive wetness of the weather in November, which prevented the field being properly hoed and cultivated, whilst, at the same time, large portions of it became thoroughly water-logged. The crop was harvested on the 20th February and yielded an outturn of 422 lbs. of grain and 3,373 lbs. of straw.

53. The cotton crop in field No. 16, mentioned in paragraph 35 of the last report, will be found fully dealt with at paragraph 35 in the review of the cotton crops of the year. It gave but a poor yield, partly owing to the circumstances detailed last year,

and partly from the natural poverty of the soil. The cotton plants were taken up at the end of August; but little could be done to the field towards preparation for the next crop until two months later. It was then rapidly ploughed and ridged up for planting Guinea grass; the roots were put in in the usual manner between the 18th and 30th of November, the work being done when the land was too wet to attempt other descriptions of labor on the rest of the farm. The heavy rains at the end of the month were on the whole favorable to this crop, although the extreme wetness of the land, without doubt retarded the first growth of the shoots after planting. At the end of December a portion of the field was manured with certain special manures. The crop grew fairly and remained healthy, and the first cutting, obtained between February 19th and March 4th, yielded 3,616 lbs. of green fodder. The crop still continues to do well, and to look as promising as can be expected on such poor land.

Rotation in Field No. 3.

- 1st year (1877-78)—Maize and Cotton (manured).
 2nd „ (1878-79)—Indigo (limed).
 3rd „ (1879-80)— { Yellow Cholom or Sorghum.
 { Gingelly.
 4th „ (1880-81)—Guinea grass (manured).

Rotation in Field No. 16.

- 1st year (1877-78)—Castor-oil and Raggi.
 2nd „ (1878-79)—Maize and Cotton (manured).
 3rd „ (1879-80)—Guinea grass.
 4th „ (1880-81)— Do.

MANURES.

54. The manures used during the year were very similar to those used in 1879-80; horse-manure was purchased, also a large quantity of village sweepings were obtained from the Saidapet Local Fund Board, at a charge of one rupee per 12 loads. Besides this, about 8 tons of oil-cake and paddy husk were purchased. Box-manure, sheep-manure, slaughter-house refuse, were also made use of. In the case of sheep-manure, it was possible to make a better use of what was available, as the farm is now supplied with hurdles for use in folding the sheep on the land. A considerable area, 33·37 acres, of horse-gram was also raised and ploughed in as green manure.

55. No. 8 field was selected for a manuring experiment. This field is about $2\frac{1}{2}$ acres in extent, and has been laid out with a view to carrying on continuous manuring experiments for a series of years. The field was levelled some years ago and has a surface fall of about 1 in 300. It is fairly well drained, but surface water does not get off very rapidly. The soil is sandy, but of fair quality, easy to work, and not of too fine or too coarse a texture. Previous to the season of 1879-80 the field was chiefly used for the growth of a variety of crops, and in December 1879 it was sown down with yellow cholom, which yielded in April 1880 a crop at the rate of 547 lbs. of grain and 5,557 lbs. of straw per acre. After this it was laid out in two divisions, each one acre in extent, with a roadway all round and between them. They were then sown at the end of June with horse-gram, which produced a very good crop, estimated at about 14,000 lbs., and was ploughed in at the end of September as green manure. The field was cross-ploughed on October 2nd, and after this the two divisions (A on the north, B on the south) were each sub-divided into ten plots measuring one-tenth of an acre, the divisions being 2 chains in length by $\frac{1}{2}$ chain in width. Between each plot a pathway $1\frac{1}{2}$ feet wide was left in order to mark them clearly, and to prevent, as far as possible, mixture of the soil of adjoining plots. The size and shape of the plots has been found convenient. On the 6th

Experimental plots, great care in laying out.

November each plot was ploughed (gathered) separately, and again on the 15th idem (split) after the application of manures. After harrowing down the furrows, white cholom (*Sorghum vulgäre*) was sown across the plots in lines 1 foot apart. This crop was selected owing to the lateness of the season, but even it suffered considerably in point of outturn from being put in so late; it was first checked in growth by the extremely heavy rain at the end of November and beginning of December, and afterwards from the dry weather which set in. The field would have been sown earlier but the work of attending to the careful laying out of the plots and applying the manures was more than the state of Mr. Schiffmayer's health at the time allowed him to do. The crop appeared above ground on the 19th November very evenly over the whole field, but owing to the heavy rains mentioned above, part of that growing in plot A-10 died off from water lodging on the surface. This bed is a little too low and will require raising. As soon as the plants could be seen, those growing in the pathways between the plots were removed. The crop was twice bullock-hoed during December and once hand-hoed in January. During the latter month it made very little progress, and almost appeared as if it would fail, but recovered after the shower that fell on the 12th. During February it commenced to mature, but, so irregularly did it do this, that even by March 16th, when it was harvested, a considerable number of the ears were still unripe, whilst others were more than dead ripe. The straw was short and the sample of grain small; the latter weighed 2.9 lbs. to a Madras measure (100 cubic inches). The crop on one set of plots was so much injured that the results must be left out of consideration as regards this year; excluding these, the general results may be summarised as below.

Manures applied per Acre.	Average Produce per Acre.		Value of Produce per Acre.		Total.
	Grain.	Straw.	Grain.	Straw.	
	LBS.	LBS.	RS.	RS.	RS.
10 tons Box-manure	810	4,270	16.2	14.23	30.43
Rs. 5 worth Ashes (lbs. 28,600) ...	462.5	2,327.5	9.25	7.76	17.01
Rs. 5 worth Lime (lbs. 2,110) ...	667.5	2,742.5	13.35	9.14	22.49
Rs. 5 worth Cake (lbs. 500) ...	832.5	3,967.5	16.65	13.22	29.87
None	519.2	2,588	10.384	8.62	19.004

56. It is proposed at the close of every second year to publish the returns of each plot and review the general results. The oil-cake used was decorticated castor-cake in a very fine friable state, purchased here at the rate of 100 lbs. a rupee, and is probably a quick-acting and not a lasting manure. The lime was ordinary shell-lime, in powder after slaking. The box-manure was the ordinary manure made in the cattle boxes under the draught cattle. The ashes were village ashes, such as are easily obtainable; they were said to be chiefly the ashes of paddy husk, but, having been stored without any protection from the weather, must be poor in manurial matter of a soluble nature. The effects of these manures need to be watched for several years. When the outturn from the next crop has been received, it may be possible to make a partial estimate of the value of good box-manure compared with other manurial substances easily procurable in this country.

57. Some experiments have been commenced with a view to demonstrate the relative values of box-manure, cattle-dung and cattle-dung ashes. This is an experiment which will require several years to work out; and, as owing to an error made in conducting the experiment last year, in the manner of collecting box-manure, the results obtained from the use of that manure cannot fairly be compared, with those obtained from cattle-manure in other forms. Only a summary of the results can now be given. In February 1880 three pairs of cattle were set aside and their manure was collected and treated in different ways, the cattle in all cases being fed alike. From one pair the manure was collected on the box system;

from another the solid excrements were collected and thrown into a heap in the open, in the usual manner; and from the third pair the solid excrement, after being made into cakes (bratties), was burnt and the ashes preserved. The manures thus collected were applied to a series of plots in the Experimental Gardens, which were afterwards sown with Planter's Friend, which crop grew well, and the following average results were obtained:—

Plots.	Manure applied.	Outturn.		Comparative Outturn.	
		Grain.	Straw.	Grain.	Straw.
		LBS.	LBS.	LBS.	LBS.
3 and 10 ...	Solid excrements	28.25	191.5	187	121
5 and 8 ...	Cow-dung ashes	21.125	199.5	139	126
2, 4, 7, 9 & 11	None	15.2	158	100	100

58. Four plots in Division E of the Botanical Garden, were manured as shown below and sown with horse-gram (*Dolichos uniflorus*) with the results recorded.

Plot.	Manure.	Outturn of Seed.	Outturn Proportional.
		GRAMMES.	
7	60 lbs. Bone-charcoal ...	285	356
13	3 parabs Village ashes ...	315	393
14	2 do. do. ...	275	343
15	1 do. do. ...	125	100

A parah (4,000 cubic inches) of ashes weighs about 80 lbs. when air-dry, and ashes generally contain considerable quantities of lime in various forms. The farm soils generally are incapable of producing good crops of pulses, probably owing to their containing a very small amount of lime; and the results given above tend to confirm this, as the result of applying lime in considerable quantity caused the production to be very good; that from plot 9 F being at the rate of 892 lbs. per acre, and that from 13 E at the rate of 839 lbs. per acre.

59. Field No. 10-B was divided into two equal sized plots, and one was manured with 8 tons of box-manure and the other with 8 tons of slaughter-house refuse, both manures being spread broadcast and ploughed in. The field was sown on October 1st with maize and cotton, but the maize failed. The cotton was sown in lines alternately 1 foot and $5\frac{3}{4}$ feet apart. The comparative effects of the manures applied on the cotton crop will be shown in the next report.

LIVE STOCK.

60. No progress has been made in the proposed stock-breeding experiment, as the Commissariat slaughter-yards have not yet been removed from the farm. While they remain there, the risk is too great to justify an experiment of the kind with valuable stock, as the facts detailed below fully prove.

61. The *cattle* stock suffered from disease. Early in the year three bullocks died of rinderpest, evidently introduced on the farm through the agency of the cattle going to the slaughter-yards. In December foot-and-mouth disease broke out amongst the cattle; it attacked in all 10 head, of which 7 were of the Aden breed, one a Nellore cow which had been tied up in the same byre as the Aden cattle, and two of the working bullocks. As soon as the disease declared itself, the animals were separated from the other stock and carefully tended by themselves. No fatal results occurred, but the cattle which were attacked were all much weakened. It is worthy of note that this outbreak did not spread to the sheep, and that the outbreak amongst the sheep in the previous year did not spread to cattle.

62. The *Aden cow*, a record of whose milking appeared in paragraph 77 of the last report, continued to give milk up to 26th June last, and thus the total produce received from her during this milking period was as follows :—

						Quantity.	Value.
						MEAS. OLLS.	RS. A. P.
September 1879	...	...	...	...	...	122 $1\frac{3}{4}$	20 5 11
October	..	...	...	...	...	112 4	18 12 0
November	..	...	...	...	...	117 $1\frac{1}{2}$	19 8 6
December	..	...	...	...	...	81 $6\frac{1}{2}$	13 10 2
January 1880	...	...	...	...	...	104 $2\frac{1}{2}$	17 6 2
February	..	...	...	...	...	82 2	13 11 4
March	..	...	...	...	...	81 $4\frac{1}{2}$	13 9 6
April	..	...	...	...	...	78 $5\frac{1}{2}$	13 1 10
May	..	...	...	...	...	36 $7\frac{1}{2}$	6 2 6
June up to 26th, 1880	...	...	...	...	...	13 $5\frac{1}{4}$	2 4 5
Total ...						831 1	138 8 4

The charges for maintaining her during the milking period and up to the birth of her next calf in July last, were as stated below, no charge being made for bedding, as the value of the manure would be equal at least to its cost.

	RS. A. P.
8,970 lbs. Fodder	29 14 5
647 lbs. Ground-nut cake	12 7 2
26 lbs. Cocanut cake	2 13 9
208 lbs. Grains of sorts	4 2 7
570 lbs. Bran	11 6 5
518 lbs. Tour	3 13 0
101 lbs. Dholi husk	2 0 4
26 lbs. Salt	0 13 6
Attendance and Sundries	16 7 3
Total ...	83 14 5

Besides yielding the milk mentioned above, she also reared a calf worth about Rs. 20 at the end of the milking period, so that the cost of $831\frac{1}{8}$ Madras measures of milk was Rs. 83-14-5, or 1 anna and 7 pies per measure. The cow had thus from May 1877, previous to which no record of her milking was kept, up to July 1880 yielded as follows :—

				Yield.	
				MEAS.	OLLS.
First period; calved May 1877 ...	...	...	...	832	3
Second do.; do. June 1878 ...	...	...	...	694	1
Third do.; do. August 1879 ...	...	...	...	831	1
Total for 30·5 Months ...				2,357	5
Average Monthly yield ...				77	3
				GALLONS, 28·4	

It would be, however, more accurate to take the average of the first and third periods, as, owing to the circumstances mentioned in paragraph 99 of the report for 1878-79, the cow did not yield well during the second period; excluding this period, the average monthly yield of the cow was 81 Madras measures, or 29·3 gallons. This cow calved again on July 19th last, giving birth to another heifer calf, and milking was again begun on the 23rd of that month. She continued to yield milk during the remainder of the year. From December 31st to February 15th she suffered from foot-and-mouth disease, when the milk was not measured, but was thrown away, it being then unfitted for human food. The amount of milk received from the cow during this milking period was as follows :—

				Quantity.		Value.		
				MEAS.	OLLS.	RS.	A.	P.
July, from 23rd, 1880 ...	...	...	...	30	7	5	2	4
August ...	...	...	...	130	0	21	10	8
September ...	...	...	...	133	0½	22	2	9
October ...	...	...	...	151	1¼	25	3	1
November ...	...	...	...	140	2	23	6	0
December, to 30th ...	...	...	...	140	2	23	6	0
January 1881 ...	...	...	...	Sick.				
February, from 16th, ...	...	...	...	28	7½	4	13	2
March ...	...	...	...	90	6½	15	2	2
Total ...				845	2½	140	14	2

These figures show that even the good milk-producing powers of the cow, as shown by the records of her previous milking periods, have been excelled. In the five months from August to December she yielded 694½ Madras measures of milk, or an average monthly yield of 139 Madras measures, or 50·3 gallons. The average monthly yield during the first five months of three previous milking periods was 88·5 Madras measures, or 32 gallons.

63. *Punganūr Cattle*.—In paragraph 79 of the last report it was mentioned that three cows of this breed, with their calves, had been obtained with a view to a trial of their milking capacity being made. The breed has a considerable reputation for milking purposes in the Presidency; but it is stated by some that none of the pure-bred cattle are now to be found. The animals obtained except one, all however appeared to have characteristics distinct from the common small breed of cattle of Southern India. Besides being obtained for the purpose of trial, it was considered advisable to obtain some animals of this breed in order to keep before the students in the Agricultural College, specimens of the different breeds common in the Presidency, and it was hoped that, by crossing it with the Aden breed, it would be possible to effect an improvement, for it was soon found that as regards milking capacity the breed is very poor. In the following table the produce received from these cows from the time they reached the farm until they ceased to yield milk is shown :—

Months.				No. 1.		No. 2.		No. 3.	
				MEAS.	OLLS.	MEAS.	OLLS.	MEAS.	OLLS.
December 1879	...	...	...	27	4 $\frac{1}{2}$	31	4	...	...
January 1880	...	...	...	35	2 $\frac{1}{2}$	37	4 $\frac{3}{4}$	...	...
February	...	...	...	32	4 $\frac{1}{2}$	33	5 $\frac{1}{2}$	25	7
March	...	...	...	32	4 $\frac{1}{2}$	33	5	39	5
April	...	...	...	35	3 $\frac{1}{2}$	37	6 $\frac{1}{2}$	39	4
May	...	...	...	40	2 $\frac{1}{2}$	41	0 $\frac{1}{2}$	37	4 $\frac{1}{2}$
June	...	...	...	38	1 $\frac{1}{2}$	39	7	37	1
July	...	...	...	29	5	26	2 $\frac{1}{2}$	33	2 $\frac{1}{2}$
August	...	...	...	32	0 $\frac{1}{2}$	7	3	33	6
September	...	...	...	27	0	...	...	26	6 $\frac{1}{2}$
October	...	...	...	20	7 $\frac{1}{2}$	...	...	21	1
November	...	...	...	7	2 $\frac{1}{2}$	...	...	9	5 $\frac{1}{2}$
Total ...				358	7 $\frac{1}{4}$	288	5 $\frac{3}{4}$	305	3

This shows that the average monthly yield from these cows during the periods they were yielding milk was 30 measures 6 olocks or 10·9 gallons, or about one-third of that yielded by the Aden cow. All the cows were crossed with the Aden bull, but, seeing the pooriness of the breed, it was determined only to retain one No. 2, and to sell the others as soon as they calved. No. 2 cow calved in November last, dropping a promising calf by the Aden bull imported in June 1874, and No. 1 also calved at the end of February. At the beginning of March, however, an offer having been made to purchase all the cows and calves together, they were sold; it being determined that, when proper facilities for carrying on breeding operations are available, it would be better to obtain fresh stock. During the period after calving in November, cow No. 2 yielded milk as follows:—

				Quantity.		Value.		
				MEAS.	OLLS.	RS.	A.	P.
November, from 10th, 1880	...	...	...	51	2	8	8	8
December 1880	...	...	...	75	4	12	9	4
January 1881	...	...	...	75	2	12	8	8
February	...	...	...	61	4	10	4	0
Total ...				263	4	43	14	8

These figures are more satisfactory than those obtained in the previous year, but it must be remembered that, they refer to the period immediately after calving, and that, the cow had been for a year under a course of good feeding and treatment. The cost of keeping this cow from August, up to the end of February, was as follows:—

				RS.	A.	P.
3,330 lbs. Fodder	...	...	...	11	1	7
398 $\frac{1}{2}$ lbs. Ground-nut Cake	...	...	...	6	3	8
253 lbs. Tour	...	...	...	1	14	8
62 $\frac{3}{4}$ lbs. Bran	...	...	...	1	5	4
453 lbs. Dholl husk	...	...	...	9	1	0
144 lbs. Grain	...	...	...	2	14	1
9 $\frac{1}{2}$ lbs. Salt	...	...	...	0	5	0
Attendance and Sundries	...	...	...	9	4	3
Total ...				42	1	7

64. *Sheep*.—The outbreak of sheep-pox, which committed great havoc amongst the sheep in the latter part of the last official year, continued during the early part

of the present year. There were three distinct outbreaks, as is usual in that disease the total losses during the year under report were 99 head, but many more suffered severely from the disease. As the farm sheep never leave the farm, and are never near any public road, the disease could have been brought to the farm only by means of sheep on their way to the Commissariat slaughter-house.

65. In order to push on the work of improving the breed more rapidly, two half-bred Southdown-Mysore rams were in August purchased from the Mysore Stud Farm at Kunigal. They are well-made animals, with a good deal of the characteristics of the Southdown, and although their wool is far superior to that of our sheep, still a certain amount of hair is mixed with the fleece. It would be advantageous if a few Merino sheep were imported from Australia for the purpose of improving our sheep. A suggestion of this kind was made by James Caird, Esq., C.B., late Famine Commissioner. The lambs from the half-bred Southdown rams are a promising lot, and their wool is decidedly better than that of the lambs of the Saidápet breed. After the disappearance of disease from the flock, 19 rams were sent out into the districts, as shown below :—

Chingleput	...	...	...	...	...	...	2 Rams.
Bellary	...	...	...	...	...	...	10 do.
Tinnevely	...	...	...	...	...	...	7 do.

Although the distribution of rams in this manner will lead to some results in improving the breed of indigenous sheep, from the absence of proper supervision, the experiments will not, it is to be feared, be attended with the success desirable. When Agricultural Stations have been established in the districts under competent instructors, it will be possible to do a good deal in the direction of improving the live stock of the country, as good sires can then be looked after properly.

66. In the following table the strength of the flock during the year and the number of deaths are shown, together with similar figures for the past seven years. The abnormal death-rate has been explained above. If the deaths from sheep-pox are excluded the death-rate is 37 per cent., and is even then very high and is attributable to the after-effects of the sheep-pox :—

—	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.
Average number of flock	207	221	237	275	295	274	251	137
Number of deaths	16	24	21	11	31	34	55	*136
Percentage of deaths	7.73	10.9	8.9	4	10.5	13.14	21.9	*99.2
Rainfall in inches	48.07	68.98	38.14	20.88	65.55	33.16	56.95	57.16

67. In Appendix II of this report the usual statements of stock maintained and the artificial food supplied to them are given, whilst in the following table several interesting particulars regarding them are shown :—

—	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.
Live Stock maintained calculated as country cattle	132	135	123	125	102
Stock, as country cattle, per 100 acres of cultivable land	82.5	84.375	84.24	88	83.65
Percentage of deaths	7.6	12.9	8.9	8.8	16.2
Cost of purchased food a head per mensem	A. P. 8 6	A. P. 10 6	A. P. 14 5	A. P. 12 1	A. P. 12 6

* The death-rate calculated on the stock at the beginning of the year was 53.23 per cent., of which 40 per cent. was from sheep-pox, and the remainder from other causes.

IMPLEMENTS AND MACHINES.

Workshops re-opened
late in year.

68. The Workshops not having been re-opened until late in the year, little was done in the manufacture of implements and machines for sale.

Plough trials.

69. On the 18th December some experiments were made in field No. 27 with the undermentioned ploughs, with the results recorded :—

Ploughs.	Furrow.		Cubic Yards of Soil moved in each 100 Yards run.	Draught.
	Depth.	Width.		
	INCHES.	INCHES.		LBS.
1. Ransomes'	3-60	10-30	3-00	277
2. American	3-60	8-50	2-36	289
3. Saidapet	4-50	9-60	3-33	271
4. Cawnpore, without a wheel ...	4-40	6-75	2-29	228
5. Benares Jail	4-20	5-30	1-72	209

70. Ransomes' plough is the usual standard plough employed at the farm during plough trials. It is a wheel plough, made entirely of iron, and has been referred to in previous reports. The American plough was introduced

American plough.

on the farm about seven years ago ; it also has been noticed in previous reports. This plough is made of wood, and its working parts are of cast-iron. The great fault in the plough is the abruptness of the mould-board, which, unless the soil is very free and open, causes the draught to be heavy. The weight of this plough is about 34 lbs. The price in Boston was 3 dollars and 38 cents ; delivered in Madras, it cost Rs. 10, but it has since been fitted with a wheel at an additional cost of Rs. 1-12-0. The third plough referred to in the table is a copy of the American plough with some improvements. The price of the plough made up at Saidapet was Rs. 13 ; without a wheel the cost would be Rs. 11½, but the plough does not work well as a "swing" plough. The weight

Cawnpore plough.

of this plough is about 56 lbs. The Cawnpore plough, to test which the trials were specially made, was received from the Cawnpore farm, North-West Provinces, last year ; it is made of wood, and has iron working parts ; it also is a copy of the American plough just noticed, but has nothing to recommend it. It is certainly light, and low-priced, but then the rude native plough may claim to possess these recommendations. The weight of the plough is 34 lbs. and the price, at Cawnpore, was Rs. 5½. The plough is roughly finished, is without a wheel, and is unfitted to undergo the treatment ploughs usually receive in the field, while it does not turn over the furrow slice efficiently,

Benares Jail plough.

from the bad form of the mould-board. The Benares Jail plough was received from the Superintendent of the Central Jail at Benares last year. The plough is constructed entirely of iron, it is compact and fairly well made, but does not work satisfactorily ; while, as the section of its furrow is triangular, the amount of work it performs is but small for the draught employed. The weight of the plough is 44 lbs., and its price was Rs. 12. The soil of the field where the ploughs were tried was, on the occasion of the trial, loose and friable excepting in a few places, but, the ploughs were all tried under similar conditions.

71. The only new implement made, or introduced, on the farm, during the year, was a small iron grubber, made in the Workshops, the cost of which was Rs. 35. It promises to be a useful implement after

New Implement.

undergoing some slight modifications. It is easily drawn by a pair of cattle, and will scarify about $2\frac{1}{2}$ acres a day; a tillage equal, at the least, to that performed by a country plough, which would not perform one-fourth so much work. The implement will be useful on fallow land, and for cleaning the spaces between the rows of cotton plants, plantains, &c.

72. Models of the double-mhote water-lift, which still continues to afford good results, were supplied to a number of applicants resident in remote parts of the country. The difficulty of obtaining a suitable material for use in making the mouth-pieces of the water-buckets has not yet been overcome. Leather, such as is procurable at a sufficiently moderate price, is not durable, and strong canvass has been found no more lasting. If further experience confirms the opinion now held, that the Manilla hemp-plant can be grown in this Presidency wherever the plantain is cultivated, the cost of providing the ropes required for the double mhote could be much lessened, by the ryot himself growing the Manilla hemp-plant and making the ropes.

73. The smaller of the Swedish ploughs received at the farm a few years ago having afforded very satisfactory results, enquiries are being made in Sweden in view to ascertain whether a further supply of these ploughs can be obtained.

74. It is worthy of record here that several of the iron ploughs supplied to the farm more than twelve years ago, and which have been regularly worked, are still in good order. Of course the working parts have been replaced as necessity arose for this, and the ploughs have been always kept in good repair. They were made by Messrs. Ransomes and Sims and Co. of Ipswich, and Messrs. Howard and Co. of Bedford. The great durability of the ploughs of these eminent manufacturers should be taken into account when the prices charged for their ploughs are being considered. The great aim now appears to be, to procure the ryot a plough at the lowest possible price, without reference to the efficiency, or durability, of the implement. It has been repeatedly pointed out in these reports that a low-priced plough is seldom a cheap implement in the long run. It is highly undesirable that ryots should be induced to purchase low-priced, badly constructed ploughs made of inferior material, with which to institute a better system of tillage; the disappointment that would naturally result would retard, rather than hasten, the general use of improved ploughs.

MISCELLANEOUS.

75. *Estate*.—No extensive improvements were carried out during the year; the expenditure incurred on behalf of the estate was chiefly for maintaining the buildings, roads, bridges, water-channels, &c., in good repair. An efficient bridge was constructed over the western channel for the main road to Saidâpet.

76. *Farm Accounts*.—In Appendix III will be found abstract statements of the farm accounts, prepared in the same way as those that were submitted last year. These accounts are incomplete as exhibited. An attempt has been made to show the farm accounts separate from the accounts of the School of Agriculture and those of the department generally. There are several other charges with which the farm might be debited, and there is a good deal which might appear on the credit side of the farm accounts, but this would involve such niceties in accounting, that a large amount of work would be created, for which no corresponding advantage would be gained. Already an annual expenditure of fully 500 rupees is incurred, in keeping the farm accounts, in excess of the cost that would suffice for keeping them if, the farm was an ordinary one; this expense is incurred, in order that the

records may be as complete as possible, and that, the requirements of the Accountant-General's Office, &c., may be complied with; this sum would represent the annual interest on a farming capital of Rupees 10,000 at 5 per cent.

77. It has, again and again, been pointed out in these reports that "mercantile" accounts, showing direct profit or loss, are as unsuited for exhibiting the results of the working of an Experimental Farm as such accounts would be for exhibiting the results of the working of the Educational, or other similar State Departments. To do justice to an Experimental Farm, both the *direct* and the *indirect* results that arise from its working, must be valued, and, shown in a balance sheet; and, where are the data to be obtained for calculating the value of either the direct, or the indirect results, beyond those, that are secured at the farm in the shape of cash for produce sold? It must be obvious to all who have given the matter a moment's thought, that the interest the State has in the working of Experimental Farms, is far greater than is represented by the sum it is possible to obtain by the sale of produce raised thereon; else, it would be far better for the State to refrain from engaging in such undertakings, and to seek other investments for the capital on which a mercantile return is sought. *Experimental* farming, is very different from *ordinary* farming.

78. In other countries the accounts of Experimental Farms are simple debtor and creditor accounts. It is of course obvious that there should be a limit to expenditure on behalf of Experimental Farms, as there is usually for other undertakings of a similar character; and this, has always been prescribed in the case of the Saidápet Experimental Farm. Until recently, the foregoing facts have generally been admitted, and a simple account, showing expenditure and receipts, has been accepted. And unless the working of the farm is to be altogether changed, no more really satisfactory account can be rendered. The cost of the farm might be reduced were the Commissariat slaughter-yards, so frequently complained of, closed and the buildings made available to the farm, as was approved of some years ago. We have shown, again and again, how remunerative dairy farming is here; but we have been unable to undertake this branch of our work, chiefly, because, we do not feel justified in keeping a number of valuable cows at the farm, exposed, as they would be, to frequent attacks of disease brought by the slaughter-house cattle. From our inability to engage in dairy farming and stock-rearing, which would so specially suit our soils and circumstances, with the direct loss, by deaths, of stock during the year, traceable to disease, which could have reached the farm stock only through the medium of the Commissariat stock, our annual loss would represent a sum quite equal to 30 per cent. of the net annual cost of the farm. However, as long as the objects of the farm are, as at present, experimental and educational, its maintenance must necessarily involve some expense to the State.

Commercial accounts are unsuited for experimental farming.

Indirect results should be valued.

Remunerative branches of farming cannot be undertaken.

Great annual loss from slaughter-house on the farm.

79. *Personnel.*—At the commencement of the year Mr. Schiffmayer was in charge of the farm, and continued to be in charge until he proceeded on a month's privilege leave in June, after which he again resumed charge and continued in charge until his health failed in October, when Mr. Benson undertook the duty in addition to his other work until my return at the end of November from furlough. During December Mr. Benson had charge of the farm; towards the end of the month he proceeded on two months' sick leave, when the charge of the farm, along with that of the School of Agriculture, &c., devolved on me. Mr. Benson returned to duty in March, and was in charge of the farm during that month. The health of both Mr. Benson and Mr. Schiffmayer was throughout the year bad; and this, connected with the frequent changes in the direct management, was against the interests of the farm. The results of what was undertaken are, however, as satisfactory as could reasonably have been expected.

80. There is nothing to report regarding the subordinate establishment ; some changes have been suggested in view to securing the more efficient practical training of the students of the School of Agriculture, which, it is hoped, will be carried out in the present year.

SAIDÁPET,
29th June 1881.

(Signed) WILLIAM R. ROBERTSON, M.R.A.C.,
Superintendent of Government Farms.

APPENDICES.

APPENDIX I.

Statement showing the Monthly Rainfall compared with the Average of the previous Eleven Years.

Month.	1880-81.		Average of 11 Years.	
	Rainfall.	Wet Days.	Rainfall.	Wet Days.
April ... ..	...	...	·35	·6
May ... ..	...	...	4·13	2·1
June	1·58	8	2·61	5·8
July	4·19	11	3·68	8·7
August	3·12	14	4·99	9·2
September	10·99	10	5·63	8·3
October	10·74	17	11·21	11·2
November	19·62	23	12·70	11·9
December	6·17	10	3·84	5·4
January	·75	1	·82	1·4
February ... ..	...	...	1·04	·7
March ... ..	...	...	·32	·6
Total ...	57·16	94	51·32	65·9

Statement showing the Weekly Rainfall during 1880-81 with the Average of the previous Eleven Years.

Weeks.	1880-81.		Average of the previous 11 Years.		Weeks.	1880-81.		Average of the previous 11 Years.	
	Rain-fall.	Wet Days.	Rain-fall.	Wet Days.		Rain-fall.	Wet Days.	Rain-fall.	Wet Days.
1st Week ... ..	...	...	·20	·18	27th Week ...	·62	3	2·21	2·63
2nd do. ... ..	...	...	·01	·09	28th do. ...	·34	2	1·51	1·81
3rd do. ... ..	...	...	·05	·18	29th do. ...	2·03	5	3·14	2·81
4th do. ... ..	...	...	·01	·09	30th do. ...	7·02	7	3·13	2·90
5th do. ... ..	...	...	1·40	·54	31st do. ...	3·61	4	2·12	2·54
6th do. ... ..	...	...	·10	·27	32nd do. ...	5·80	4	2·34	2·27
7th do. ... ..	...	...	·15	·54	33rd do. ...	2·13	7	4·01	3·90
8th do. ... ..	...	...	1·19	·55	34th do. ...	3·11	5	2·86	3·09
9th do. ... ..	...	...	·12	·27	35th do. ...	8·04	5	3·04	2·36
10th do. ... ..	...	...	·60	·43	36th do. ...	1·27	4	2·03	1·63
11th do.	·89	3	1·01	1·27	37th do. ...	...	...	·43	1·63
12th do.	·52	3	·31	1·09	38th do. ...	1·70	2	·45	1·18
13th do.	·17	2	·44	1·81	39th do. ...	1·00	3	·39	·72
14th do.	1·40	3	·46	1·27	40th do. ...	...	...	·02	·27
15th do.	·48	4	·84	1·54	41st do. ...	·75	1	...	...
16th do.	1·46	1	·85	2·36	42nd do. ...	...	...	·47	·63
17th do.	·70	2	·69	2·18	43rd do. ...	...	...	·16	·45
18th do.	·28	2	1·35	2·36	44th do. ...	...	...	...	...
19th do.	·63	2	1·19	2·45	45th do. ...	...	...	·62	·45
20th do.	1·87	5	1·29	2·00	46th do. ...	...	...	...	...
21st do. ... ..	...	...	·79	2·00	47th do. ...	...	...	·33	·18
22nd do.	·49	5	1·23	1·81	48th do. ...	...	...	·04	·09
23rd do.	4·45	2	1·72	2·63	49th do. ...	...	...	·14	·36
24th do.	6·00	6	1·15	1·81	50th do. ...	...	...	...	...
25th do. ... ..	...	...	1·44	1·54	51st do. ...	...	...	·27	·18
26th do.	·40	1	1·00	1·03	52nd do. ...	...	...	·05	·09

APPENDIX II.

Statement showing the Number of Stock maintained during the Year 1880-81.

		1880.												1881.			Average.
		April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.				
Cattle	...	43	40	39	38	39	38	38	38	39	35	34	27	37 137 4			
Sheep	...	246	211	159	137	124	116	114	100	103	106	115	113				
Pigs	...	7	5	5	5	4	4	4	4	4	4	3	3				
Equivalent as Country Cattle of 300 lbs. live weight.	...	129	116	111	104	102	100	100	97	100	92	92	78		102		

Statement of Artificial Food, including Grains, supplied to Live Stock during the Year 1880-81.

Description of Cattle Food.	Working Cattle.		Cows and their Calves.		Sheep.		Pigs.		Amount supplied.	Value.
	Amount	Value.	Amount.	Value.	Amount.	Value.	Amount.	Value.		
LBS.	RS. A. P.	LBS.	RS. A. P.	LBS.	RS. A. P.	LBS.	RS. A. P.	LBS.	RS. A. P.	
Ground-nut Cake	*14,916	229 2 2	4,630	71 7 4	25,512	396 14 2	2,863	44 9 0	47,921	742 0 8
Cocoanut Cake	770	77 0 0	212	21 3 2	452	45 3 2	...	...	1,434	143 6 4
Bran	578	12 4 3	734	15 9 4	224	4 12 3	30	0 9 7	1,566	33 3 5
Tour	7,224	54 11 7	3,991	30 3 9	2,080	15 6 1	...	...	13,245	100 5 5
Salt	3844	12 6 4	853	2 12 0	472	15 3 7	83	2 10 10	1,024	33 0 9
Grains	2,556½	51 5 4	2,696	53 14 9	3,795	75 15 1	...	...	9,047½	181 3 2
Arrowroot tubers	525	10 8 0	...	...	...	...	...	...	525	10 8 0
Dholl husk	...	...	3,162	63 3 10	...	...	...	...	3,162	63 3 10
Total Rapeses	...	447 5 8	...	258 6 2	...	553 6 4	...	47 13 5	...	1,306 15 7
Deduct one-third charged to Manure	...	149 1 11	...	+	...	184 7 5	...	15 15 2	...	349 8 6
Net Charge	...	298 3 9	...	258 6 2	...	368 14 11	...	31 14 3	...	957 7 1
Cost per head per mensem	...	0 15 4	...	1 12 9	...	0 3 7	...	0 10 8	...	40 12 6

* Includes 144 lbs. Gingelly cake.

† No deduction made, as cows were giving milk.

‡ Calculated on stock as country cattle.

APPENDIX III.

Statement of the Accounts of the Saidápet Farm for the Year 1880-81.

BALANCE SHEET, 31st MARCH 1881.

<i>Liabilities—</i>				<i>Assets—</i>			
	RS.	A.	P.		RS.	A.	P.
Capital	23,936	1	5	Valuation as per statement ...	24,198	0	0
Due sundry persons	350	8	10	Due by sundry persons	88	10	3
Total ...	24,286	10	3	Total ...	24,286	10	3

CASH ACCOUNT FOR THE YEAR 1880-81.

<i>Receipts—</i>				<i>Expenditure—</i>			
	RS.	A.	P.		RS.	A.	P.
Capital advanced by Govern- ment	3,813	2	7	Livestock	1,202	2	9
Livestock	692	3	1	Seeds	116	2	6
Seeds	1,071	6	10	Manures	382	14	8
Implements	595	12	9	Implements and Machines ...	925	4	8
Fruits, Vegetables and Fodder	1,054	11	4	Sundries	210	2	0
Sundries	410	1	5	Labor	3,000	15	4
Total ...	7,637	6	0	Establishment	1,580	8	0
				Despatching Seeds	219	4	1
				Total ...	7,637	6	0

PROFIT AND LOSS ACCOUNT.

	RS.	A.	P.		RS.	A.	P.
Establishment	1,582	8	0	Crops	364	5	4
Bad Debt	106	8	0	Sundries	172	4	7
Despatching Seeds	219	4	1	Capital for balance, <i>i.e.</i> , cost of the institution	4,310	8	9
Implements and Machines ...	580	5	2				
Labor	495	0	1				
Livestock	1,863	9	4				
Total ...	4,847	2	8	Total ...	4,847	2	8

Valuation of the Saidápet Farm and Estate made on the 31st March 1881, compared with that made on the 31st March 1880.

	Valuation of Stock on the 31st March 1880.			Increase in the Year.			Decrease in the Year.			Valuation of Stock on the 31st March 1881.		
<i>Farm.</i>	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.
Livestock (a)	3,218	0	0	...	...	...	1,106	0	0	2,112	0	0
Crops (b)	15,144	15	0	1,028	1	0	...	...	...	16,173	0	0
Manures	230	0	0	14	0	0	...	...	...	244	0	0
Implements (c)	5,868	13	3	...	...	...	199	13	3	5,669	0	0
	24,461	12	3	...	...	...	263	12	3	24,198	0	0
<i>Estate.</i>												
Land (d)	36,500	0	0	...	...	...	1,500	0	0	35,000	0	0
Buildings (e)	22,000	0	0	2,600	0	0	...	...	...	24,600	0	0
Wells and Channels (f)	7,200	0	0	...	...	...	200	0	0	7,000	0	0
	65,700	0	0	900	0	0	...	...	...	66,600	0	0

(a) Decrease due to sales, deaths, distribution of rams and smaller stock of cattle food.

(b) Increase due to young trees, decrease to smaller stock of grain and area of standing crops.

(c) Decrease due to sales.

(d) Decrease due to land handed over to control of College.

(e) Increase due to old buildings omitted last year and improvements.

(f) Decrease due to wells, the control over which has been handed over to College, and depreciation.

... findings entered in the margin, the Board submitted to Government, with remarks, Mr. Robertson's General Report for 1880-81, and they now offer their observations upon the detailed report of the Saidápet Farm for the same period, premising that the prominent features of the year have already been noticed in their Proceedings quoted.

2. CROPS—*Paragraphs 13-14.*—It is satisfactory to observe that such successful results can be obtained from the cultivation of fodder crops in Southern India; it is, however, to be feared that the smallness of their holdings will generally prevent ryots from profiting from the experience gained in this direction at Saidápet.

3. *Paragraphs 16-17.*—The further experiments made in the cultivation of *black cholum* show that it is less hardy than the Planter's Friend. The outturn per acre of each of these cereals as compared with the previous year was as follows:—

	1880-81.		1879-80.	
	Grain.	Straw.	Grain.	Straw.
	LB.	LB.	LB.	LB.
Black Cholum (<i>Sorghum Saccharatum</i>) ..	237	1,895	1,265	8,869
Planter's Friend (<i>Sorghum Kaffrarium</i>) ...	951	5,484	588	12,023

The variation is remarkable.

4. At *Paragraphs 25 to 29* full particulars are given regarding the value of

* G.O., dated 18th May 1881, No. 73, p. 8. these crops as producing sugar,* the outturn of jaggery being found good.

5. *Paragraph 23.*—The comparison between the sugar-cane grown upon the farm and cane grown elsewhere shows results favorable to the former; but in the absence of information regarding the relative cost of cultivation, the comparison of crops is of no great value.

6. The statement at *paragraph 37* contains full particulars of the cost of raising several crops and the value of the harvest in each case. Information of this very practical kind is valuable, and the Board would be glad to see it afforded more freely in the Superintendent's reports.

7. *Paragraphs 49-50.*—The experiments in growing tobacco, though not attended with very marked success, are not altogether discouraging, and show that, although tobacco grown in this country may never be able to compete with that grown in America, it is nevertheless quite possible, by means of judicious treatment of the soil, to improve the indigenous plant very materially. In some of the experiments under notice the percentage of carbonate of potash in the ash of the leaf was nearly 5 per cent., whereas in the tobacco grown upon the farm some years ago it was only '6 to '67 per cent.

8. MANURES—*Paragraphs 54-59.*—These paragraphs contain further information on the subject of manures, but the Superintendent is not at present in a position to form any decided opinion from the results obtained. He says that it will be necessary to make observations for several years, though it may be possible to draw a partial conclusion regarding the comparative value of good box-manure when the next crop is harvested.

9. *Paragraphs 60 to 67* relate to *Live Stock*. The most noticeable feature in this chapter is the continued success of the Aden breed of cows as milkers. The Board do not quite follow the Superintendent's calculation of profit at *paragraph 62*, the method of which, it is observed, differs from that adopted in the previous year when fodder and bedding were both omitted from the list of charges, the manure produced being taken as a set-off against their cost. In the present report

the price of bedding alone is excluded on that ground while fodder is gain, while mentioning the value of the calf reared during the season now report, the Superintendent has failed to credit it against the cost of maintenance, thus enhancing the cost price of the milk. The general result, however, seems to be that the cow, during the milking period, paid nearly double the cost of her keep. During the current year a fresh consignment of cattle of this breed has been received from Aden.

10. Referring to the remarks at *paragraphs 77 and 78*, the Board observe that in his report for the previous year (paragraph 96), Mr. Benson stated that he proposed to set apart certain fields on the northern side of the farm to be worked as a commercial or model as distinguished from an experimental farm. The present report does not show that this intention has been carried out, and the Board again invite Mr. Robertson's attention to the matter, repeating their opinion regarding the beneficial effect upon ryots of demonstrating to them that our methods of farming are, from a financial point of view, better than theirs.

11. The Board note with satisfaction a marked improvement in the style and size of the report under notice as compared with those of previous years.

(A true Copy and Extract.)

(Signed) E. GIBSON,
Acting Sub-Secretary.

To the Secretary to Government, Revenue Department.
Superintendent, Government Farms.
To all Collectors.

PROCEEDINGS OF THE BOARD OF REVENUE.

Read—the following G.O., dated 28th June 1882, No. 650, Revenue.

Read—the following Proceedings of the Board of Revenue, dated 5th December 1881, No. 3059 :—

ABSTRACT.—Reviewing and submitting to Government the General Report of the operations conducted by the Superintendent of Government Farms for the year 1880-81.

Read—the following Proceedings of the Board of Revenue, dated 10th December 1881, No. 3182 :—

ABSTRACT.—Reviewing the report on the Saidápet Experimental Farm for 1880-81.

Read—the following letter from H. B. GRIGG, Esq., M.A., Director of Public Instruction, Madras, to the Chief Secretary to Government, Fort St. George, dated Ootacamund, 28th October 1881, No. N-601 ; and endorsement by E. S. LAFFAN, Esq., Acting Assistant Secretary to Government, dated 2nd November 1881, No. 1764 :—

I have the honor to submit the report of the School of Agriculture for the year 1880-81.

2. The School was in charge of Mr. Benson until the return of Mr. Robertson at the end of November 1880.

3. The Summer Session commenced on the 1st April and terminated on the 30th June 1880.

4. At the beginning of the Session there were two classes in the School : Class II opened in 1878 with 24 students, and Class I formed at the time with 10 students.

5. Fifteen students were paid by Government, two by the Travancore State, three by the Nariad Agricultural Association, and one each by the Holkar, Wadhwan and Gondal States, and the Zamindars of Kálahasti and Kárvetnagar.

6. In the subjects studied, Class II obtained a percentage of marks ranging from 50 to 75, and Class I from 43 to 68. This is good excepting as regards 43, which appertains to Arithmetic ; Mr. Robertson ascribing it to the defective knowledge of the subject, which five students brought with them, and who passed the Entrance Examination.

7. At the close of the Session twelve students of Class II, so far as their training had gone, were pronounced qualified to receive first-class certificates, and eleven second-class certificates. Two Bombay students head the list, but otherwise success is pretty equally divided between Madras and Bombay. A single student from Ceylon stands low down.

8. Seven students of the Class I obtained first-class certificates and one a second-class certificate. The Madras students were at the bottom of the list.

9. The Lecturers and Masters speak very well on the whole of the industry and conduct of the students.

10. The Winter Session opened on the 1st of September, and of March. The classes were the same, but numbered only thirty, having left, and one having elected to join the class next formed.

11. In the subjects of examination the percentage of marks gained by Class II ranged from 57 to 69, and that in Class I from 53 to 73. The average in Arithmetic of Class I on this occasion was 73. The improvement is ascribed to the withdrawal from the class of two men who invariably stood low at the Arithmetic Examination.

12. There were only 23 students in Class II, and 12 obtained first-class certificates, while the remaining 11 obtained second-class certificates.

13. Of the seven students in Class I, six obtained first-class certificates, and one a second-class certificate.

14. Three sets of prizes, consisting of three in each set, were provided for Class II. The first prize for ploughing was not awarded. All those for the collection, classification, &c., of the weeds on the Farm, and for work in the Laboratory, and the best notes thereon were however given.

15. Three sets of prizes, consisting of three in each set, were provided for Class I, the best lecture notes being the standard. The third prize for Agriculture was not awarded, and there was no competition for the third prize in Chemistry; but all the other prizes, including those for Botany, were taken.

16. Mr. Robertson reports with reference to Class II and to the subject of Agriculture, that progress was but moderate, and that the conduct of two or three of the students was unsatisfactory. With reference to Class I, he says the conduct and progress of the students were very satisfactory.

17. With reference to Class II, Mr. Benson, in connection with the subject of Practical Agriculture, says that training was carried on under great difficulties, the chief being sickness of the staff, which led to frequent change of instructors. The students were examined in ploughing in October, the standard being to plough a given area, the students opening their own furrows and working altogether unaided. Some of the work done was very commendable, but in consideration of the time the students had been under training, the general average was not so high as it should have been, and as none of the work was good enough, the first prize was withheld. In other respects the reports of the Lecturers and Masters are on the whole very favorable.

18. It was found impossible to arrange for the delivery of a course of Agriculture Lectures at the Normal School, and arrangements could not conveniently be made for the attendance of Normal Students at Saidápet. The subject is receiving attention.

19. Physical training was carried out in a fairly effective manner under the instruction of a private soldier from a Battery of Artillery at St. Thomas' Mount. The increase in weight and measurement of the students of Class II was not so great as in the preceding year, but this is put down properly to their average age being 23 years. As regards Class I, the students have all increased in weight, but with one exception they have decreased in measurement. Mr. Robertson thinks that this may be due to greater density of muscle, but he feels unable to decide the point. The students are about four years younger than those in Class II. The Gymnastic Instructor states that during the whole time he has been careful to give such instruction as would tend to properly develop the bodies of the students and not to overtire or injure them by the performance of gymnastic feats.

20. The following remarks by Mr. Robertson show that effective measures are taken to test the thoroughness of the instruction. It does not appear to be generally known that the whole of the examinations is compulsory and that, in a course of training, there are, on the average, about 120 examinations. The marks obtained at every one of these examinations are counted in determining the claim of a student to a certificate. The regulations are, for a first-class certificate, that a student must obtain 60 per cent. of the total full marks, and 33 per cent. of the full marks for

...ts taught; while for a second-class certificate a student
 ...e total marks and 25 per cent. of the full marks for each
 of the subjects. ... these arrangements, the work is *continuous throughout the*
whole period of training, and students have no inducement to cram for any special
 examination.

21. The payment of lecturers by fees was continued as the most convenient arrangement, though it is far from economical and in other respects open to objection.

22. Much progress has been made in the erection of the permanent buildings for the institution.

23. The Museum has had a few additions made to its collections.

24. The Library and Reading-room were well supplied, and the students made a fair use of them.

25. The building for the Veterinary Hospital has been completed, but quarters are wanted for the Hospital-keeper when the hospital may be opened. It will be under the charge of Mr. Western.

26. The Botanical and Experimental grounds have been maintained in fair order, and considerable additions were made to the collection of plants, shrubs, and trees, most of which have been labelled. The proposal to erect a small shed for Meteorological Instruments, and for recording observations, deserves consideration.

27. Mr. Robertson considers that a Field-work Instructor should be appointed. He intends, however, to bring up the matter separately.

28. The general control of the institution has been partially transferred from the Board of Revenue to the Director of Public Instruction, but the results of the change have yet to be recorded. It is extremely questionable whether double system of control is likely to be beneficial. I have therefore recently suggested to the Board the transfer of the entire control of the School and Farm to this Department.

29. Mr. Robertson considers that the work of the institution has been fairly well done considering the inconvenient nature of the arrangements under which it had usually to be performed.

30. The expenditure of the institution amounted to Rs. 15,401-2-1.

31. The results are fairly satisfactory, so far as they go; but much remains to be done before the institution can be considered in a position to do the work for which it was established. The Government have recently sanctioned a revised set of rules of admission by which the School is more or less connected with District administration, and Mr. Robertson is now preparing a revised scheme of administration and of study, and, I trust, when the measure is perfected, that the future of the School may be more assured than it now is. The introduction of an Agricultural Branch into the Special Revenue Test, which is contemplated by Government, will doubtless encourage many candidates for Government employ in the Revenue Department to enter the School.

ENCLOSURE.

From W. R. ROBERTSON, Esq., M.R.A.C., Superintendent, Government Farms, to H. B. GRIGG, Esq., Director of Public Instruction, dated Saidápet, 14th September 1881, No. 921.

I have the honor to submit the Report of the School of Agriculture for the Official year ending 31st March last.

Endorsement—dated 2nd November 1881, No. 1764.

Transferred to the Revenue Department.

(Signed) E. S. LAFFAN,
 Acting Assistant Secretary.

GOVERNMENT SCHOOL OF AGRIC

SUMMER SESSION OF 1880.

This session commenced on the 1st of April and terminated on the 30th of June. At the beginning of the session there were two classes in the institution. Class II opened in 1878, consisting of 24 students; and Class I, just formed, which contained 10 students.

2. Of these students, 15 received small stipends from Government, 10 were paid stipends provided as below :—

Travancore State	...	...	...	...	...	2
Holkar „	...	...	...	...	...	1
Wadhwan „	...	...	...	...	...	1
Gondal „	...	...	...	...	...	1
Kalahasti Zemindari	...	...	...	...	...	1
Karvetnagar „	...	...	...	...	...	1
Nariad Agricultural Association	...	...	...	...	...	3

and 9 were supported by their friends.

3. The following statement shows the subjects of the several courses of lectures, the number of lectures, classes, and examinations, and the average percentage of marks awarded :—

Subjects.	CLASS II.			CLASS I.		
	Lectures and Field Classes.	Examina-tions.	Average Percentage of Marks.	Lectures and Field Classes.	Examina-tions.	Average Percentage of Marks.
Agriculture	28	3	61	27	3	66
Veterinary	23	3	50	7	2	68
Chemistry	33	3	58	6	2	63
Botany	31	3	66	14	2	63
Mechanics	21	2	64	...	...	...
Arithmetic and Book-keeping.	11	2	65	19	2	43
Mensuration and Build- ing.	24	} 3	75 }	20	} 3	64
Field Surveying ...	21			11		
Physical Geography...	...			23	2	62

The low average percentage of marks of Class I for Arithmetic was due to the imperfect knowledge of this subject possessed by three students who gained admission into the class by undergoing the Entrance Examination.

4. The following table shows the marks awarded to the students in Class II in each subject :—

Rank.	Name and Register Number.	Agriculture.	Veterinary.	Chemistry.	Botany.	Mechanics.	Book-keeping.	Building and Surveying.	Total.	Per cent. of Total.	Attendance.	Grand Total.	Examinations passed.
1	33. G. B. Desai ..	447	296	359	332	126	148	190	1,898	83	158	2,056	VI Standard, Bombay.
2	34. S. M. Desai ..	474	235	320	353	136	127	187	1,832	80	166	1,997	Do. do.
3	51. S. A. Bauboo Row ..	352	234	295	308	132	124	175	1,620	70	141	1,761	Matriculation, Madras University, and Method Examination.
4	42. S. Ramaswamy Aiyar ..	377	239	261	314	117	114	176	1,598	69	144	1,742	Matriculation, Madras University.
5	37. M. Bhavay Shanker Row ..	384	195	308	242	96	139	167	1,531	67	161	1,692	Do. do.
6	64. K. Padmanabha ..	390	214	309	222	94	127	160	1,516	66	144	1,660	Entrance Examination, School of Agriculture.
7	35. B. K. Santaya ..	383	240	260	265	94	116	144	1,502	65	151	1,653	Matriculation, Madras University.
8	41. V. Rungaswamy Aiyar ..	379	189	229	279	122	113	176	1,487	65	151	1,638	Do. do.
9	52. M. V. Ramachandra Aiyar ..	353	224	263	256	87	110	154	1,449	63	143	1,592	Do. do.
10	53. S. Coomaraswamy Moodelly ..	386	221	258	240	101	94	175	1,475	64	112	1,587	Do. and Precis Writing, Higher Grade.
11	56. J. M. Chatrapati ..	379	223	216	259	94	46	148	1,365	59	168	1,523	VI Standard, Bombay.
12	46. P. D. Rana ..	388	188	202	261	82	105	138	1,364	59	162	1,516	Do. do.
13	40. M. V. Vandeva Aiyar ..	282	202	256	276	110	106	148	1,380	60	87	1,467	Matriculation, Madras University.
14	43. T. K. Ramen Pillay ..	389	198	178	264	85	72	126	1,312	57	155	1,467	Do. do.
15	66. Y. N. Kristnaswamy Aiyar ..	309	145	209	251	134	109	150	1,307	57	157	1,464	Do. do.
16	61. R. Ramen Pillai ..	351	170	177	300	96	71	132	1,297	56	147	1,444	Do. do.
17	58. J. K. Sethi ..	359	163	211	262	85	48	107	1,245	54	139	1,384	VI Standard, Bombay.
18	57. J. D. Irani ..	324	227	185	204	67	67	133	1,207	52	153	1,360	Do. do.
19	32. H. K. Desai ..	898	176	155	190	49	87	138	1,193	52	158	1,351	V Standard, Bombay.
20	49. P. Ragava Pillay ..	300	166	237	258	70	63	129	1,223	53	118	1,341	Matriculation, Madras University.
21	38. T. Ramanjulu Naidu ..	322	165	147	236	99	92	136	1,187	52	147	1,334	General Test, Madras.
22	50. A. Canthyah Moodelly ..	374	167	152	252	62	51	126	1,184	51	137	1,321	VI Standard, Ceylon.
23	60. M. Jembunatha Sastry ..	321	167	167	277	76	88	116	1,212	53	91	1,303	Entrance Examination, School of Agriculture.
24	39. G. Jagmutham Naidu ..	329	119	136	225	84	99	137	1,129	49	121	1,250	General Test, Madras.
	Full Marks ..	600	400	400	400	150	150	200	2,300	100	167	2,467	

5. The next table affords similar information regarding Class I.

Rank.	Name and Register Number.	Agriculture.	Veterinary.	Chemistry.	Botany.	Physical Geography.	Arithmetic.	Mensuration and Surveying.	Total.	Per cent. of Total.	Attendance.	Grand Total.	Examinations passed.
1	73. M. J. Bharwada	347	231	254	259	120	111	187	1,509	81	87	1,596	Matriculation, Bombay University.
2	74. R. D. Modi	332	242	263	216	122	84	179	1,441	78	85	1,526	Do. do.
3	70. Jodu Nath Biswas	342	263	232	221	115	98	168	1,439	78	83	1,522	Do. Calcutta do.
4	67. Desai Vasoujhi Dayabhai	326	180	256	256	76	80	167	1,341	72	86	1,427	VI Standard, Bombay.
5	71. A. W. Jayewardene	371	251	180	225	130	51	125	1,333	72	73	1,406	Do. Ceylon.
6	80. M. Venkataramana Sastry	284	221	233	172	95	73	137	1,215	66	65	1,280	Entrance Examination, School of Agriculture.
7	68. M. Kuppusawmy Sastry	285	209	266	168	102	88	110	1,228	67	32	1,260	Matriculation, Madras University.
8	78. H. P. D'Vaz	265	247	142	188	78	44	107	1,071	58	83	1,154	Entrance Examination, School of Agriculture.
9	69. S. Samuel Pillay	215	139	62	116	54	3	51	640	35	68	708	Do. do.
10	79. N. Raghavendra Row	187	48	40	122	28	5	43	473	26	57	530	Do. do.
	Full Marks	450	300	300	300	150	150	200	1,850	100	95	1,945	

6. At the close of the session, the undermentioned students of Class II were qualified, as far as their training had gone, for certificates as below :—

1st-Class Certificate.

G. B. Desai.
S. M. Desai.
S. A. Bauboo Row.
S. Ramasawmy Aiyar.
M. Bhavany Shenker Row.
K. Padmanabha.

B. K. Santaya.
V. Rungasawmy Aiyar.
S. Coomarasawmy Moodelly.
M. V. Ramachendra Aiyar.
M. V. Vasudeva Aiyar.
P. D. Rana.

2nd-Class Certificate.

J. M. Chatrapati.
T. K. Ramen Pillay.
V. N. Kristnasamy Aiyer.
R. Raman Pillay.
J. K. Seth.
P. Ragava Pillay.

J. D. Irani.
H. K. Desai.
M. Jembunatha Sastry.
T. Ramanjulu Naidu.
A. Canthyah Moodelly.

7. The students in Class I at the close of the session were, up to that period, qualified for certificates as shown :—

1st-Class Certificate.

M. J. Bharwada.
R. D. Modi.
Jodu Nath Biswas.
Desai Vasoutji Dayabhai.

A. W. Jayewardene.
M. Kuppasawmy Sastry.
M. Venkataramana Sastry.

2nd-Class Certificate.

H. P. D'Vaz.

8. The following extracts from the reports of the Lecturers and Masters afford information regarding the subjects of the lectures and the general conduct of the students :—

C. BENSON, M.R.A.C., (AGRICULTURE).

CLASS II.

"The subjects discussed in the lectures were the growth and cultivation of cereal, pulse and fodder crops, and the production of sugar.

"The conduct of the class was good, and the students, with one or two exceptions, acquitted themselves well in examinations."

CLASS I.

"Lectures for this class did not commence until the end of April, and were confined to the discussion of the origin, formation, and physical characters of soils.

"The class is a very small one, and the students are of very unequal merit, but the whole acquitted themselves fairly and conducted themselves well."

G. WESTERN, M.R.C.V.S., (VETERINARY).

CLASS II.

"My lectures to Class II during the summer sessions just past have been on the subject of Veterinary, Materia Medica, and Therapeutics. The progress made by the students has been on the whole satisfactory."

CLASS I.

"My subject has been Anatomy and Physiology. The students are attentive and appear fairly intelligent. * * * I am satisfied with their progress so far."

W. HAMILTON (CHEMISTRY).

CLASS II.

"The class was instructed in the Metals and in the Chemistry of organic bodies, including Alcohol and its derivatives.

"The students of this class on the whole have worked steadily and well both at Systematic and Practical Chemistry.

"The conduct of the class has been satisfactory."

CLASS I.

"The subjects taught were those included under the head of 'Chemical Physics.'

"With two exceptions the students have been industrious, and their attainments are very creditable to them.

"The conduct of the whole class has been good."

R. WILKINS, F.R.C.S., (BOTANY).

CLASS II.

"The lectures embraced a description of a few of the remaining natural orders which had not been discussed.

"The conduct of the class was satisfactory."

CLASS I.

"The lectures were on Morphological Botany.

"The class gave satisfaction."

A. GANAPATI AIYER, F.A., (BOOK-KEEPING AND MECHANICS).

CLASS II.

"In Book-keeping—Consignment, Bill Transactions and questions bearing on them were taught; and in Mechanics, parallel forces, &c.

"The general conduct of the students was satisfactory."

ARITHMETIC AND PHYSICAL GEOGRAPHY.

CLASS I.

"Arithmetic—Vulgar and Decimal Fractions, Practice, Simple and Compound Proportion.

"Physical Geography—Clouds, rain, dew, springs, rivers, ice and its work.

"Conduct satisfactory."

T. V. SEETHARAM MOODELLY (MENSURATION AND BUILDING).

CLASS II.

"In Levelling—Simple and Compound Levelling.

"In Building—Scantling of roof timbers and the modes of construction of roofs as exhibited in the buildings on the Farm.

"The class, with very few exceptions, have been industrious."

MENSURATION AND SURVEYING.

CLASS I.

"The subjects taught were Principles of Geometry, the measurement of lines and sketching and surveying small fields.

"The conduct of these students has been excellent."

WINTER SESSION OF 1881.

9. This session opened on the 1st of September and ended on the 31st of March. The classes in the institution were the same as in the preceding session; but they contained only 30 students, three having left the institution, and one having withdrawn from his class to join that next formed.

10. The next statement exhibits the subjects of the several courses of lectures, the number of lectures, classes and examinations held during the session, and the average percentage of marks awarded:—

Subject.	CLASS II.			CLASS I.		
	Lectures and Field Classes.	Examinations.	Average Percentage of Marks.	Lectures and Field Classes.	Examinations.	Average Percentage of Marks.
Agriculture	78	5	64	72	5	72
Veterinary	42	4	60	42	4	63
Chemistry	61	4	57	37	4	53
Botany	64	4	59	46	4	70
Mechanics	24	3	69	..	..	..
Arithmetic and Book-keeping	10	1	57	36	3	73
Mensuration, Building, Estimating and Plan-drawing.	33	3	69	64	4	72
Field-surveying	34			21		
Physical Geography and Meteorology .. ..	..	..	..	15	3	72

It will be observed that Class I gained a higher average percentage of marks in Arithmetic than in the preceding session; this must be attributed to the withdrawal from the class of two men who invariably stood low at Arithmetic examinations.

11. The table that follows exhibits the marks awarded to each student in Class II at the examinations in each subject of instruction :—

Rank.	Name and Register Number.	Agriculture.	Veterinary.	Chemistry.	Botany.	Mechanics.	Book-keeping.	Surveying, Estimating and Building.	Total.	Per cent. of Total.	Attendance.	Grand Total.
1	33. G. B. Desai	569	411	410	343	107	35	134	2,009	79	272	2,281
2	42. S. Ramasawmy Aiyer	480	376	339	406	137	30	136	1,904	75	312	2,216
3	37. M. Bhavany Shenker Row	536	369	367	326	115	41	127	1,881	74	292	2,173
4	35. B. K. Santaya	501	334	323	340	113	32	117	1,760	69	280	2,040
5	64. K. Padmanabhya	460	306	373	332	116	32	122	1,741	68	274	2,015
6	34. S. M. Desai	452	310	371	326	127	36	118	1,740	68	264	2,004
7	51. S. A. Baupoo Row	457	364	335	338	128	25	125	1,772	69	220	1,992
8	52. M. V. Ramachendra Aiyer	454	309	314	304	102	32	114	1,629	64	309	1,938
9	46. P. D. Rana	446	337	270	317	108	27	95	1,600	63	286	1,886
10	40. M. V. Vasudeva Aiyer	424	293	300	308	126	39	119	1,609	63	248	1,857
11	61. R. Ramen Pillay	470	336	271	286	88	24	74	1,549	61	270	1,819
12	43. T. K. Ramen Pillay	406	333	293	295	114	15	88	1,544	61	247	1,791
12	41. V. Rungasawmy Aiyer	408	291	261	268	130	42	139	1,539	60	245	1,784
14	57. J. D. Irani	456	353	263	261	67	17	61	1,468	58	282	1,750
15	66. V. N. Kristnasawmy Aiyer	425	241	266	276	127	24	99	1,458	57	286	1,744
16	56. J. M. Chatrapati	461	271	274	250	77	25	91	1,449	57	256	1,705
17	38. T. Ramanjulu Naidu	428	257	223	314	74	27	114	1,437	56	264	1,701
18	49. P. Ragava Pillay	444	208	260	289	77	13	94	1,390	55	250	1,640
19	60. M. Jembunatha Sastry	389	245	257	281	80	19	84	1,355	53	249	1,604
20	58. J. K. Seth	435	240	201	244	84	26	71	1,311	51	245	1,556
21	52. H. K. Desai	443	255	187	258	64	27	81	1,315	52	240	1,555
22	53. S. Coomarasawmy Moodelly	447	302	269	315	96	25	95	1,549	61	..	1,549
23	50. A. Canthyah Moodelly	409	272	200	259	92	31	68	1,331	52	162	1,493
Full Marks ..		700	500	500	500	150	50	150	2,550	100	342	2,892

12. Similar information is afforded in the next table regarding Class I :—

Rank.	Name and Register Number.	Agriculture.	Veterinary.	Chemistry.	Botany.	Physical Geography and Meteorology.	Arithmetic.	Mensuration and Surveying.	Total.	Per cent. of Total.	Attendance.	Grand Total.
1	73. M. J. Bharwada	558	405	366	424	132	136	164	2,185	81	290	2,475
2	74. R. D. Modi	512	341	329	374	111	128	175	1,970	73	287	2,257
3	68. M. Kuppusawmy Sastry	494	301	282	391	124	137	178	1,907	71	299	2,206
4	80. M. Venkataramana Sastry	504	337	235	311	105	116	165	1,773	66	338	2,111
5	70. Jodu Nath Biswas	496	339	242	296	110	94	138	1,715	64	285	2,000
6	67. Desai Vasontji Dayabhai	512	272	248	328	101	82	128	1,671	62	250	1,921
7	78. H. P. D'Vaz	421	205	147	296	73	71	57	1,270	47	227	1,497
Full Marks ..		700	500	500	500	150	150	200	2,700	100	354	3,054

13. At the end of the session, the undermentioned students of Class II had qualified up to date for certificates as below :—

1st-Class Certificate.

G. B. Desai.
S. Ramasawmy Aiyer.
M. Bhavany Shenker Row.
S. A. Baupoo Row.
B. K. Santaya.
K. Padmanabhya.

S. M. Desai.
M. V. Ramachendra Aiyer.
M. V. Vasudeva Aiyer.
P. D. Rana.
S. Coomarasawmy Moodelly.
V. Rungasawmy Aiyer.

2nd-Class Certificate.

R. Ramen Pillay.
T. K. Ramen Pillay.
J. D. Irani.
V. N. Kristnasawmy Aiyer.
J. M. Chatrapati.
T. Ramanjulu Naidu.

P. Ragava Pillay.
M. Jembunatha Sastry.
A. Canthyah Moodelly.
H. K. Desai.
J. K. Seth.

14. In Class I the following students had, as far as their training had proceeded, become qualified for certificates as shown :—

1st-Class Certificate.

M. J. Bharwada.	M. Venkataramana Sastry.
R. D. Modi.	Jodu Nath Biswas.
M. Kuppusawmi Sastry.	Desai Vasoutji Dayabhai.

2nd-Class Certificate.

H. P. D'Vaz.

15. The following prizes were awarded during this session to Class II :—

For ploughing	1st Prize, Not awarded.
	2nd " S. M. Desai.
	3rd " S. A. Baupoo Row.
For collection of weeds of the Farm, named, classified, &c.	1st " K. Padmanabhya.
	2nd " M. Bhavany Shenker Row.
	3rd " Not awarded.
For work in the Laboratory and the best notes thereon.	1st " G. B. Desai.
	2nd " M. Bhavany Shenker Row.
	3rd " S. M. Desai.

16. In Class I the following prizes were awarded for the best lecture notes :—

Agriculture	1st Prize, M. J. Bharwada.
	2nd " Not awarded.
	3rd " { R. D. Modi. M. Kuppusawmi Sastry.
Chemistry	1st " M. J. Bharwada.
	2nd " R. D. Modi.
	3rd " No competition.
Botany	1st " Desai Vasoutji Dayabhai.
	2nd " M. J. Bharwada.
	3rd " R. D. Modi.

17. The following extracts from the reports of the Lecturers and Masters afford information regarding the subjects of the lectures and the general conduct of the students :—

W. R. ROBERTSON, M.R.A.C. (AGRICULTURE).

CLASS II.

"Mr. Benson conducted the class during the early part of the session, after which I took charge of it. The subject of the lectures were Indigo, Tobacco, Coffee, Tea, and other special crops, and the breeding and management of live-stock.

"The progress of the class was but moderate, and the conduct of two or three of its members was unsatisfactory."

CLASS I.

"This class also in the early part of the session was conducted by Mr. Benson, who gave over the charge of it to me on my return from furlough. The subjects of the lectures were soils, their classification and improvement, agricultural implements, &c.

"During a portion of January and February, Mr. Ganapati Aiyer had charge of this class when a portion of the Saidápet Farm Manual was gone through.

"The conduct of these students was very satisfactory, as also was their progress."

C. BENSON, M.R.A.C. (PRACTICAL AGRICULTURE).

CLASS II.

"During the past session, the training of the classes in practical agriculture was carried on under great difficulties owing to various causes, the chief being the sickness of the staff. The instructing officer was frequently changed. During September, in order to obtain closer attention to the subject and no lectures being delivered at the time, I took up the Farm classes of Class II, whilst Mr. Schiffmayer devoted his whole attention to the instruction of Class I; the students in rotation being under his orders daily, in the morning and evening. In the early part of October, Mr. Schiffmayer as usual undertook the Farm classes of both classes; but when his health failed towards the middle of the month, I took up this work in addition to my own, and continued to perform it during November. During December, the Farm classes were my special work until I proceeded on leave, when they were undertaken by you during my absence until the beginning of March, when I resumed the work.

at these classes chiefly referred to the current operations of, and on the Farm, and to the crops growing. The students of this class in October last, the standard set being to plough a given area, the in furrows and working altogether unaided. Some of the work done was not so high as it should have been, and none was good enough to enable me to award the first prize offered at the time.

"In the class the conduct of the students was good."

CLASS I.

"Attention was chiefly given to the methods of using the various implements and tools in use on the Farm, their advantages and disadvantages, and to the operations of cultivation, which were proceeding during the session.

"In the class, the conduct of the students was good, and many of them attained, under the careful individual instruction given them during September, considerable proficiency in various forms of practical work."

G. WESTERN, M.R.C.V.S. (VETERINARY).

CLASS II.

"The subjects of the lectures were Cattle-diseases and their treatment.

"The students of Class II have also continued to give me every satisfaction."

CLASS I.

"The subjects of the lectures were Physiology and Anatomy.

"They are always attentive and, with one exception, have made fair progress in their studies."

W. HAMILTON (CHEMISTRY).

CLASS II.

"The lectures comprised the subjects of Organic Chemistry (the concluding portion), and Agricultural Chemistry.

"The lectures were illustrated by experiments whenever practicable.

"The students of this class are of average ability, and I was fairly satisfied with their conduct, industry and progress.

"In the practical class, the subject of qualitative analysis was taught, with special reference to agricultural substances."

CLASS I.

"The lectures were illustrated by experiments, and the use of apparatus was shown.

"The elements of the non-metallic group constituted the subject of the course.

"The students of this class have, on the whole, been well conducted and, with some exceptions, have been industrious, and have made respectable progress.

R. WILKINS, F.R.C.S. (BOTANY).

CLASS II.

"The lectures embraced Horticultural and Economic Botany. They had practical instruction in the Botanical garden attached to the College.

"The conduct and progress of this class have been good."

CLASS I.

"Most of the students worked very satisfactorily.

"They have had all the subjects connected with Morphology, and at the close of the session they were getting the physiology of plants."

A. GANAPATI AIYER, F.A. (BOOK-KEEPING AND MECHANICS).

CLASS II.

The following subjects were treated of—

"Book-keeping—Making Balance Sheet direct from Trial Balance, Interest and Partnership.

"Mechanics—Levers, Pulleys, Wheel and Axle, Toothed Wheel, Screw, The Wedge, Friction and Dynamometer were referred to in detail.

"The class acquitted itself very well at the examinations held in both sessions.

ARITHMETIC, PHYSICAL GEOGRAPHY AND METEOROLOGY.

CLASS I.

"Arithmetic—Double Proportion, Simple and Compound Interest, Present Worth and Discount, Profit and Loss, Percentage and Proportional Parts were done.

"Physical Geography and Meteorology—The portions taught were Earthquakes and Volcanoes, Formation of Lands, Thermometer, The Barometer and their readings and corrections were explained in detail.

"The class made satisfactory progress in all the above subjects.

"The general conduct of the students in this and Class II was satisfactory."

T. V. SEETHARAM MOODELLY (LEVELLING AND BUILDING).

CLASS II.

"Subjects taught were levelling, drawing and estimating for ordinary estate buildings, mode of laying out roads, also the uses and value of different building materials.

"On the whole the students worked satisfactorily and made good progress."

(MENSURATION AND SURVEYING.)

CLASS I.

"Subjects taught were surveying large areas with chain and plotting and computing mensuration of surfaces.

"The conduct of the class has been good."

18. *Government Normal School*.—It was found impossible to arrange for the delivery of a course of agricultural lectures at the Government Normal School, and, unfortunately, arrangements could not conveniently be made by the authorities of that institution to allow their students to attend lectures at Saidápet. This is much to be regretted, for even though the knowledge gained at a short course of agricultural lectures cannot but be slight, it must be of some service in after-life to teachers employed in rural schools, especially now that an Agricultural Text-book is in use in the schools.

19. *Physical Training*.—Physical training was continued during both sessions; Class II for the whole period, and Class I from 28th October, excepting during vacations.

20. The two classes met together for two hours once a week. At these gatherings, the students were drilled and trained in sub-classes according to their abilities and progress. The general system of training was that laid down in "Dr. MacLaren's Physical Training," chiefly exercises in movements of the body and in the use of dumb-bells, the vaulting-horse, the parallel bars, &c. The Instructor is a Private from a Battery of the Royal Artillery stationed at St. Thomas' Mount; he appears to take much interest in his classes.

21. The next table gives full details of the weighings and measurements of each student in Class II:—

Name and Register Number.	MEASUREMENTS AND WEIGHTS ON THE 1ST APRIL 1880.				MEASUREMENTS AND WEIGHTS ON THE 31ST MARCH 1881.				INCREASE.				DECREASE.				Remarks.
	Age.	Height.	Weight.	Chest.	Fore-arm.	Upper-arm.	Weight.	Chest.	Fore-arm.	Upper-arm.	Weight.	Chest.	Fore-arm.	Upper-arm.			
YEARS.	INCH.	LB.	INCH.	INCH.	INCH.	INCH.	LB.	INCH.	INCH.	INCH.	LB.	INCH.	INCH.	INCH.	INCH.		
32. H. K. Desai	24	64½	132½	32½	10½	11½	132	33	10½	11½	131	33	10½	11½	131		
33. G. B. Desai	19	66	99½	30	9	9	100	30	9	10	100	30	9	10	100		
34. S. M. Desai	19	64½	125	34	10	11	139½	34	10	11	140	34	10	11	140		
35. B. K. Sertaya	21	68	114	31½	9½	10	111	31	9½	10	111	31	9½	10	111		
37. M. Bhayani Shanker Row	21½	68½	114	31½	9½	10	108	30	9	10	108	30	9	10	108		
38. T. Ramajjala Naidu	22	68½	123½	31½	9½	10	125	32½	9½	11	125	32½	9½	11	125		
39. G. Jagannathum Naidu	22	68½	105½	31½	9½	10	121	31½	9½	10	121	31½	9½	10	121		
40. M. V. Vasudeva Aiyer	19	63	60½	29	8	9	92	31	8	9	92	31	8	9	92		
41. V. Rungasawmy Aiyer	23	60	99½	32	9	10	118	30½	9½	10	118	30½	9½	10	118		
42. S. Ramasawmy Aiyer	22	70	124	31½	9½	10	111	30½	9½	10	111	30½	9½	10	111		
43. T. K. Ramen Pillay	24	67	112	31½	9½	10	121	36	11	12	121	36	11	12	121		
46. P. D. Rana	22	64	132	36	10½	12	136	36	11	12	136	36	11	12	136		
49. P. Ragava Pillay	23	63	88	28	8½	9	100	30	8	9	100	30	8	9	100		
50. A. Canthiyah Moodelly	25	69	127½	32½	9½	10	130	33½	9½	10	130	33½	9½	10	130		
51. S. A. Baipoo Row	25	58½	86	30	9½	10	88	30½	9½	10	88	30½	9½	10	88		
52. M. V. Ramachandra Aiyer	23	64½	101	29½	9	10	98	30½	9½	10	98	30½	9½	10	98		
53. S. Coomarasawmy Moodelly	23	65½	106½	29	9	10	110	29½	9	10	110	29½	9	10	110		
56. J. M. Chatrapati	25	68½	127½	36½	10½	12	134	37½	10½	12	134	37½	10½	12	134		
57. J. D. Irani	21	66½	127	36	10½	11	125½	36½	10½	11	125½	36½	10½	11	125½		
58. J. K. Seth	23	65½	138	36	10½	11	138	36½	10½	11	138	36½	10½	11	138		
60. M. Jembunathia Sastri	28½	63	140	36½	10½	11	140	37½	10½	11	140	37½	10½	11	140		
61. R. Rammen Pillay	23	64½	115	32½	10	10	112	31½	9½	10	112	31½	9½	10	112		
64. K. Padmanabha	22	64½	101	30	9	10	96	30	9	10	96	30	9	10	96		
66. V. N. N. Krishnasawmy Iyer	21	62½	113½	31	9½	11	118	31½	9½	11	118	31½	9½	11	118		

22. The following shows the average increase in the weights and measurements of these men :—

					Increase.
Weight	...	...	...	...	1.45 lb.
Chest measurements	...	...	...	...	.30 inches.
Fore-arm	...	...	...	...	.22 "
Upper-arm	...	...	...	...	.19 "

The increases are not so great as in the preceding year, but this only could be expected. The average age of the men in this class was 23 years.

23. The variations in the average weighings and measurements of the students in Class I are shown below :—

					Increase.	Decrease.
					LB.	IN.
Weight	...	...	...	...	4.89	...
Chest	...	...	...	...	...	.86
Fore-arm	...	...	...	...	...	.39
Upper-arm	...	...	...	...	...	.53

Though each student has gained in weight nearly 5 lb., all, with one exception, have decreased in body measurements. I cannot understand this, excepting that it may be due to a greater density in the muscle of their bodies—it having become firmer and more compact under the influences of the training and the out-of-door employment. It must, however, be remembered that, omitting holidays, the class was under training only about 4½ months, so that these youths could not have attended more than 14 practice meetings; while the average age of the members of the class is about 4 years below that of the students in Class II. Perhaps, as their training continues, they will show more satisfactory results in their measurements.

24. The Gymnastic Instructor reports as follows :—

"The students under my charge during the recent sessions have been instructed in the use of dumb-bells, dumb-bars, parallel-bars, horizontal-bar and the vaulting-horse.

"During the whole time, I have been most careful to give such instructions as would tend to properly develop the bodies of the students and not to overtire or injure them by the performance of gymnastic feats."

25. *College Examinations.*—It does not appear to be generally known that the whole of the examinations are compulsory, and that in a course of training there are on the average about 120 examinations. The marks obtained at every one of these examinations are counted in determining the claim of a student to a certificate. The regulations are, for a 1st-class certificate, that a student must obtain 60 per cent. of the total full marks and 33 per cent. of the full marks for each of the various subjects taught in the College; while for a 2nd-class certificate, a student must get 40 per cent. of the total marks and 25 per cent. of the full marks for each of the subjects. Under these arrangements, the work is *continuous throughout the whole period of training* and students have no inducement to cram for any special examinations.

26. *Lecture Fee System.*—This arrangement still continues in force; though convenient, it is far from economical.

27. *Accommodation.*—Much progress has been made in erecting the permanent buildings. It is hoped that two lecture-rooms and three large class-rooms will be available for use early in October when the temporary sheds now in use will be removed.

28. *Museum.*—A few additions have been made to the collections, but nothing worthy of special notice. Efforts will be made when the graduates of the institution are more scattered over the country, to enlist their services in forming more extensive collections of agricultural productions, soils, tools, &c., likely to be of use in illustrating lectures.

29. *Library and Reading Room.*—Eighty-three volumes have been added to the library and the undermentioned periodicals were supplied to the Reading Room during the year :—

"Southern Cultivator."	"Journal of the Society of Arts."
"Agricultural Gazette."	"Ceylon Observer."
"Indian Agriculturist."	"Madras Journal of Education."
"Nature."	

The students made a fair use of the books both of "reference" and those for "circulation."

The following statement shows the number of works in the library and the number taken out to read by students. Works of reference cannot be removed from the library :—

Subject of Works.	NUMBER IN THE LIBRARY.		Number taken out by Students.
	Ordinary.	Reference.	
Agriculture, Horticulture, and Arboriculture	186	133	182
Botany and Vegetable Physiology	36	10	17
Veterinary, Zoology and Animal Physiology	92	15	78
Chemistry and Mineralogy	59	2	57
Geology and Engineering	103	23	25
Other Works	82	95	45
Total	558	278	404

30. *Veterinary Hospital.*—The buildings for this institution have been completed. It is now only necessary to provide the quarters for the hospital-keeper to admit of the institution being opened. Its general charge will be in the hands of G. Western, Esq., M.R.C.V.S., the Veterinary Lecturer in the College.

31. *Botanical and Experimental Grounds.*—These have been maintained in fair order. A number of small experiments have been conducted in these grounds which could not be carried out in the fields. Considerable additions have been made to the collections of plants, shrubs and trees, most of which have been labelled with their scientific and common names. It is proposed to erect a small shed for meteorological instruments and to record such meteorological observations as will prove of use.

32. *Practical Instruction.*—The arrangements for conducting this portion of our work are unsatisfactory at present. It appears to be necessary that a field-work instructor should be appointed, who could always be with the students when they are engaged on farm duty. This matter will, however, be separately dealt with.

33. *Transfer of General Control.*—The general control of the institution has recently been transferred from the Board of Revenue to that of the Director of Public Instruction. It is hoped that the interests of the College will be benefitted by this change.

34. *Management and Teaching Staff.*—The management of the institution was in the hands of C. Benson, Esq., up to the end of November, when I returned from furlough and resumed charge. During my absence, the duties of the agricultural lectureship were performed by Mr. Benson. There was no other change of importance during the year.

35. *Establishment, &c.*—I have nothing to notice regarding the establishment that specially deserves attention. The work has been fairly well done, considering the inconvenient arrangements under which it has usually had to be performed.

36. In the appendix I give the usual statement showing the detailed expenditure on behalf of the institution.

APPENDIX I.

Statement of Expenditure on account of the Madras School of Agriculture during the Year 1880-81.

	1880.												Total.	Grand Total.
	1881.													
	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.		
ORDINARY.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
<i>Lecture Fees.</i>														
Agricultural Lectures	120 0 0	180 0 0	0 260 0 0	260 0 0	..	..	..	280 0 0	320 0 0	320 0 0	200 0 0	360 0 0	2,300 0 0	0 0
Veterinary do.	200 0 0	260 0 0	300 0 0	320 0 0	..	..	..	240 0 0	320 0 0	360 0 0	300 0 0	440 0 0	2,740 0 0	0 0
Chemical do.	120 0 0	180 0 0	200 0 0	240 0 0	..	..	..	200 0 0	240 0 0	220 0 0	200 0 0	280 0 0	1,940 0 0	0 0
<i>Salaries and Wages.</i>														
Masters	250 0 0	250 0 0	250 0 0	250 0 0	250 0 0	250 0 0	250 0 0	250 0 0	250 0 0	250 0 0	250 0 0	250 0 0	3,000 0 0	0 0
Clerk and Inferior-Servants	76 0 0	75 14 0	75 12 0	74 12 0	75 0 0	76 0 0	76 0 0	76 0 0	76 0 0	74 0 0	76 0 0	76 0 0	908 6 0	0 0
Gymnastic Instructor	20 0 0	20 0 0	20 0 0	20 0 0	20 0 0	20 0 0	20 0 0	20 0 0	20 0 0	20 0 0	20 0 0	20 0 0	240 0 0	0 0
<i>Stipends and Scholarships.</i>														
Stipendiary Studentships	180 0 0	180 0 0	180 0 0	180 0 0	180 0 0	180 0 0	112 12 10	189 0 0	189 0 0	189 0 0	189 0 0	186 10 3	2,135 7 1	1 1
Scholarships	30 0 0	30 0 0	30 0 0	30 0 0	30 0 0	30 0 0	30 0 0	30 0 0	30 0 0	30 0 0	30 0 0	30 0 0	360 0 0	0 0
<i>Miscellaneous.</i>														
Prizes	* 21 9 1	..	39 8 0	..	..	..	..	..	..	12 0 0	..	12 0 0	63 8 0	0 0
Books for the Library	35 6 9	30 10 3	155 12 2	37 12 0	2 0 0	90 12 8	* 32 14 4	8 12 0	20 6 2	33 8 3	49 12 7	81 15 0	476 3 10	1 1
Contingencies	2 1 0	4 6 6	131 3 6	0 6 0	..	5 9 3	14 11 5	12 6 0	5 15 0	1 10 9	1 6 6	3 1 0	162 8 3	0 0
Laboratory Charges	37 10 9	42 11 10	53 15 11	39 7 10	37 11 2	41 4 7	68 14 9	39 11 4	39 0 6	39 13 8	47 13 2	264 2 10	752 6 4	0 0
Botanical Grounds	..	..	..	..	..	..	100 0 0	21 0 0	10 6 6	..	..	..	131 6 6	0 0
Maintenance of Buildings	..	..	..	..	..	..	..	..	..	..	..	..	..	0 0
<i>EXTRAORDINARY.</i>														
Veterinary Hospital	..	..	..	..	..	..	..	..	..	..	..	..	..	0 0
School of Agriculture	..	..	..	..	..	..	..	..	..	..	..	..	..	0 0
													Total ..	15,401 2 1

* Charges for Newspapers paid at the Accountant-General's Office.

Order—dated 28th June 1882, No. 650, Revenue.

Miscellaneous.

With the first two papers read above, the Board of Revenue submit, with a full summary, the reports of the Superintendent of Government Farms on the operations of his department generally, and on those at the Saidápet Experimental Farm specially. The Director of Public Instruction submits Mr. Robertson's Report on the School of Agriculture. The Government briefly review in these Proceedings the three reports noted above.

2. *General*.—Mr. Benson's tour in the Bellary District was the only one made by the officers of the Agricultural Department. His interesting report has been separately received and disposed of (G.O., 13th July 1881, No. 1067). The Government have more than once urged the desirability of frequent tours being undertaken. Mr. Robertson's attention will again be directed to the matter.

3. A proposal for holding periodical agricultural exhibitions in several parts of the Presidency has recently been approved (G.O., No. 257, dated 3rd March 1882).

4. Mr. Robertson regrets that seeds for experimental cultivation were not distributed on a larger scale, and suggests that the matter should receive the attention of the State. The separate proposal on the subject promised by Mr. Robertson is awaited. Reports on the experimental cultivation of *Sorghum saccharatum* and "Planter's Friend" are on the whole very satisfactory. Mr. Robertson notes, however, that in none of the districts was any attempt made to extract the most valuable product of the plant, viz., its saccharine juices.

5. The account of the series of ploughing matches held in Bellary is interesting. A proposal for holding similar ploughing exhibitions in Cuddapah and Kurnool has lately been sanctioned by the Board of Revenue, and if the results should be found as satisfactory as those in Bellary, further exhibitions should be held in other districts. The Government have read with much pleasure M.R.Ry. Krishnasawmi Moodelliar's account of his laudable attempts to improve native husbandry, and desire that Mr. Robertson will, at no very distant date, visit this gentleman's estates and report on the results of the improved methods of cultivation which have lately been introduced there.

6. *The Saidápet Experimental Farm*.—The season on the whole was favorable. The rainfall was greater than in the last ten years, and was distributed over a longer period.

7. The Behea Sugar-mill is reported to have worked very satisfactorily. The Government think it desirable that the results of its working as compared with those of the indigenous sugar-mill should be widely published.

8. *Arrow-root* is reported to have succeeded remarkably well, so much so that by selling the flour at 4 annas a pound over 400 rupees per acre could be realized. This is a remarkable return and should also be published for the information of the public.

9. Experiments in growing tobacco have proved that the plant, when grown in this country, cannot compete successfully with American tobacco. Much, however, still remains to be done in the judicious treatment of the soil in which the plant is grown.

10. Experiments were made to ascertain the comparative value of different kinds of manure. But Mr. Robertson is not in a position at present to form any decided opinion on the subject.

11. *Live-stock*.—The Aden cows have maintained their reputation as milkers, and a fresh consignment of cattle has recently been obtained from Aden. The Government regret to learn that the Punganūr cattle have been found, as regard their milking capacity, not to come up to expectations. Attempts might, however, be made to cross this breed with the Aden bull, as it is possible that the cross breed will prove better than the ordinary country breed.

12. Mr. Robertson's proposal to obtain a few Merino sheep from Australia is approved. The removal of the slaughter-house complained of by him has been directed (G.O., No. 122, dated 31st January 1882). Mr. Robertson's particular attention will be drawn to paragraph 10 of the Board's Proceedings of the 10th December last.

13. *The School of Agriculture.*—At the close of the two sessions twelve students are reported to have obtained first-class certificates and eleven second-class certificates. The Examiners speak favorably of the progress and conduct of the students.

14. The Government regret equally with Mr. Robertson that it was not possible to arrange for giving agricultural lectures in the Normal School. The matter, however, must not be lost sight of.

15. Physical training was carried out in a fairly effective manner.

16. The proposal for erecting a shed for meteorological purposes is approved and sanctioned.

17. The Government learn with satisfaction from a subsequent report of Mr. Robertson's, that most of the students who left the school after completing their studies have obtained useful and lucrative employments in different parts of the country.

18. The total cost of the whole Department, including the Saidápet Farm and the School of Agriculture, was Rs. 43,765-4-8.

(True Extract.)

(Signed) E. F. WEBSTER,
Secretary to Government, R.D.

To the Board of Revenue.
„ Educational Department.
„ Accountant-General.

RESOLUTION—dated 11th August 1882, No. 2003.

The attention of the Superintendent is called to paragraph 2 of the Government Order. The Board have long maintained the same views.

2. He is also requested to expedite the submission of his proposals regarding the distribution of seed in districts (paragraph 4).

3. Mr. Robertson should, at an early date, visit the estates of M.R.Ry. Krishnasawmi Mudaliyar (paragraph 5). Such a visit cannot fail to be of use to both parties.

4. A concise statement showing the practical working of the Behea Sugar-mill as compared with the indigenous one should be submitted at an early date for publication in District Gazettes (paragraph 7). Also a brief note on the arrow-root experiment (paragraph 8) for similar publication.

5. Mr. Robertson's attention should be given to the suggestion of Government to, if possible, improve the breed of the Punganúr cattle by crossing them with the Aden bull.

6. The subject alluded to in paragraph 12 should no longer be delayed. Paragraph 16 will also receive attention.

(A true Copy and Extract.)

(Signed) E. GIBSON,
Acting Secretary.

(True Copy.)

(Signed) S. SRINIVASA RAGHAVAIYANGAR,
First Assistant.

To all Collectors.
„ the Secretary to Government, Revenue Department.
„ the Chief Secretary to Government, Public Department,
with copy of Board's Proceedings, 5th December 1881, No. 3059.
„ the Superintendent of Government Farms.
Exd. W. H. French.