1882.

Board of Revenue,

MADRAS.

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Passing remarks on Government Order reviewing reports on the *Agricultural Department* for 1880-81.

PROCEEDINGS OF THE BOARD OF REVENUE.

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, 14th July 1882, No. 1024 :—

I have the honor to submit the report of the Saidápet Farm for the official year ending the 31st of March last. The General Report is nearly ready for the printer, and will, I trust, be submitted before the close of the present month.

2. I shall feel much obliged if I may be permitted to distribute this report *at once* along with those of the previous two years, which reports have not yet been given to the public. I make this request, in view to the holding of an Agricultural Exhibition in Madras in February next, as some of the points raised in these reports may suggest inquiry, and possibly some of the experiments may be repeated and followed up, the results being utilized either in the essays and reports to be invited in competition for prizes, or in any discussions that may be held at the Agricultural Conference. These reports, it must be remembered, are the only agricultural publications issued in South India.

3. I would point out that the Cawnpore Farm Reports are issued at once, without waiting for review by the controlling authority—a course which is highly advantageous to the interests of the Farm, especially in maintaining public interest in its work.

4. I have quoted briefly in the report from two or three papers I have submitted to the Board during the year. This course was necessary to show the work of the year and to connect together the results in a way to make them intelligible to persons interested and desirous of carrying out the inquiries further.

Enclosure No. 1.

Report on the Saidápet Experimental Farm and Experimental Grounds, for the year ending 31st March 1882.

This report deals only with the operations conducted on the Farm, and Experimental Grounds; the general work of the Department, and that of the School of Agriculture, are as usual reported on in separate reports.

2. Season.—The weather was so unfavorable in May, June and July that no hot-weather crops were sown. The total rainfall from the 1st of April to the 31st of July, 121 days, amounted only to 2·18 inches, and as it fell in very slight showers, it

scarcely had any appreciable effect on the scorched land, while as the temperature in the shade ranged between 95 and 105°, all vegetable growth was stopped excepting on irrigated land, or under very exceptional circumstances. A heavy shower fell on the last day of July. In August, the weather was more favorable for farming operations, not for getting in crops, but for preparing the land for the cold-weather sowings. Favorable weather in this month facilitates greatly the putting in of the cold-weather crop, when the right time comes for this, for as the sowing season is usually such a very short one, the work has to be done with great expedition, thus there is but seldom then an opportunity for working and cleaning the land. In September, the weather was seasonable, the rainfall being slightly above the average. Advantage was taken of these favorable conditions to get a considerable area of land sown, the chief of these crops being maize, cotton, and sorghum of different varieties. In October, the weather was highly unfavorable to the young crops sown in the previous month. From the 5th to the end of the month there was only one slight shower, ·05 of an inch, while the total fall of the month was less than 3 inches. The average fall in this month is, 12 inches. The drought, of course, checked the growth of young plants, while those more advanced were, under the same influences, prematurely brought into flower. The rainfall in November was above the average; there were several heavy falls in this month which did considerable damage, notably the fall on the 13th, which amounted to 6·80 inches, and the fall on the 20th, 3·40 inches. Young crops sown in October benefited from the wetness of the month, but those more advanced, especially those that were in flower at the beginning of the month and which came into flower during the month, suffered seriously, chiefly from the fertilization processes being interrupted and impeded, by the pollen being washed off the flowers; and crops which gave great promise in the early part of October, yielded fully 30 per cent. less than otherwise they would have done, the grain at harvest having been found small and shrivelled, and very light in weight. It is to be feared this experience will have been very common in this locality, where, from the favorable weather in August and September, a considerable breadth of crop was sown early, which, consequently, was in an advanced state when the heavy rains of November occurred. The fact, that a wet blossoming season, is invariably followed by a poor outturn at harvest, is well known in most countries.

3. The storm which broke over the district on the 12th of November did great damage on the Farm, especially to plantain topes and the more advanced crops, a considerable area having been prostrated by the violence of the storm. The rain, however, contributed towards filling the tanks, which up to this period had remained almost dry. Nothing could previously be done in getting in paddy or other crops, needing frequent irrigation. The rainfall in December was higher than the average, but it was very unevenly distributed. There were showers on each of the first three days in January; but, no more rain fell up to the close of the year; however, during these three months, the weather was unusually cloudy, and the range of temperature low. In the mornings, fogs were experienced almost daily, from the beginning of January up until about the middle of March. They were unusually dense, and continued frequently up to as late in the day as 8 A. M. In no previous year, in the past 13 years, has there been at Saidápet, such an amount of fog as, was experienced in the months under notice. The fogs thus contributed, to a certain extent, to make up for the deficiency of the rainfall; for, on most of the mornings every tree, shrub, and plant, was so heavily laden with moisture that the slightest movement sufficed to precipitate much of it on the ground, and, of course, during the prevalence of such fogs, when the atmosphere is saturated with moisture, plants dissipate but small quantities of water into the air, and therefore need less water. It is to be regretted that there are no convenient means, by which the quantity of water condensed by plants, and soils from fogs and dews, can readily be determined. The quantity of water thus supplied, must be very considerable in some localities, and must compensate, to no inconsiderable extent, for a small rain supply.

4. The following statement exhibits the daily registrations of the rainfall throughout the year. It will be observed that the distribution of the fall was, as usual, very

irregular; while, the total fall was only 44·28 inches, that is, about 8 inches less than the average annual fall, in the previous ten years :—

STATEMENT showing the Daily Registration of Rainfall for 1881-82.

Date.	1881.									1882.		
	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.
1 ..	..	..	..	..	..	·20	..	·10	..	·25	..	..
2 ..	..	..	·10	..	..	1·36	1·75	·40	..	·12	..	..
3 ..	..	..	..	..	..	..	..	·15	..	·20	..	..
4 ..	..	..	..	..	..	..	·05	·30	..	..	..	..
5 ..	..	..	..	..	..	..	1·00	1·10	..	..	..	..
6 ..	..	..	..	..	·07	..	..	..	..	..	..	..
7 ..	..	..	·05	..	·35	..	..	·30	..	..	..	..
8 ..	..	..	..	..	2·95	..	..	·95	..	..	..	..
9 ..	..	..	·31	..	·14	·50	..	·90	..	..	..	..
10 ..	..	..	..	·15	..	·10	..	·01	·80	..	..	..
11 ..	..	..	..	..	..	..	..	..	·13	..	..	..
12 ..	..	..	·05	..	·30	..	..	1·60	·80	..	..	..
13 ..	..	..	..	·09	..	·20	..	6·80	..	..	..	..
14 ..	..	..	..	·05	..	..	..	·35	..	..	..	..
15 ..	..	..	..	..	..	·18	..	·20	..	..	..	..
16 ..	..	..	..	..	..	..	..	..	..	..	..	..
17 ..	..	..	..	..	..	..	..	..	..	..	..	..
18 ..	..	..	..	..	..	3·65	..	..	..	..	..	..
19 ..	..	..	..	..	..	·45	..	..	..	..	..	..
20 ..	..	..	·47	..	..	·35	..	3·40	..	..	..	..
21 ..	..	..	..	..	·15	·05	..	..	..	..	..	..
22 ..	..	..	..	·75	·30	..	..	·25	·95	..	..	..
23 ..	..	..	..	..	..	·90	..	..	..	..	..	..
24 ..	..	..	..	..	..	..	..	..	..	..	..	..
25 ..	..	·14	..	..	·65	..	..	..	..	..	..	..
26 ..	..	..	·02	..	..	..	·05	..	..	..	..	..
27 ..	..	..	..	..	..	..	..	..	..	..	..	..
28 ..	..	..	..	..	..	..	..	..	..	..	..	..
29 ..	..	..	..	..	..	..	..	..	·80	..	..	..
30 ..	..	..	..	..	·38	·01	..	·05	1·85	..	..	..
31 ..	..	..	..	2·15	..	..	..	..	1·10	..	..	..
Total ..	..	·14	1·00	3·19	5·29	7·95	2·85	16·86	6·43	·57	..	..

Further detailed statements of rainfall, will be found in the appendix.

CROPS.

5. The early-sown crops were generally free from "fungoid" diseases, but the later crops were, in several instances, severely attacked by "rust," the result chiefly of the bad climatical conditions, which characterized the latter portion of the cold weather cropping season.

6. Neither "smut" nor "ergot" were observed on the crops. This, probably, was due to the fact that the seeds were, in almost every instance, dressed with sulphate of copper, before being sown. The process followed, is shown in the following directions :—

"For 50 lb. of seed, take 3 ounces of sulphate of copper, which dissolve in one quart of hot water; when the solution is quite cold, pour it over the seed, and mix thoroughly; when quite dry, the seed is fit for sowing."

The object in dressing the seed in this way, is to kill the fungoid spores that may be mingled with the seed; this dressing, however, does not appear to have any marked effect in preventing attacks by "rust." Of course, if straw is used, in bedding the cattle, which has been attacked by fungoid disease, and the manure of which this bedding forms a part, is applied to land, the probability is that the spores of the fungus will be conveyed to the soil at the same time, and in this way the spores may get into the plants, even though the seed, from which they were raised, was chemically prepared. There is, however, one clear advantage in thus dressing the seed, irrespective of any effect that may be produced in checking fungoid disease; this is, in

preventing the coolies from eating the grain when they are sowing it. In other countries the loss, in this way, is too trivial for attention, but in this country, where four or five men are usually employed to do work for which in other countries one man would be employed, and where, the people are grain-feeders, and frequently only half-fed, the consumption of grain during the sowing process is often a most serious evil; not so much on account of the value of the grain as, because the land is frequently only half-seeded—a fact which is disclosed only, when it is *too late* to remedy the evil.

7. The paddy crops of the farm were attacked by a fungoid disease, and afterwards by insects. The cause was the mismanagement of the irrigation water, it having been allowed to stagnate, by too long retention on the land. By draining off the water, and drying the land for a few days, the crops recovered completely from both attacks.

8. The total area under crops was 150·12 acres; of this 22·49 acres were under crop which stood throughout the year; and 8·62 acres of crops were used as green manure.

FODDER CROPS.

9. Fodder crops were raised on an area of 34·01 acres, of which 8·21 acres were sown before the commencement of the year, and 25·80 acres were standing at the close of the year. Besides the crops recorded, 22·05 acres were under old guinea grass, and hariali grass, throughout the whole year, and afforded pasturage for the stock.

10. The next statement shows the fodder crops harvested in the year:—

No.	Description of Crop.	Number of Field and Plot.	Area of Plot.	Sowing. Date of	Sowing. Seed sown. Total.	Sowing. Seed sown. Per Acre.	Details of Harvesting. Date of harvesting.	Details of Harvesting. Outturn. Fodder.	Details of Harvesting. Outturn. Per Acre.	Duration of Growth.	Rainfall. Inches.	Rainfall. Wet Days.
			ACRES.					LB.	LB.	DAYS.		
1	Guinea Grass	I-A.B. ..	2·38	6th October 1881	Planted.		7th February 1882	8,571	3,601	124	23·91	27
2	Do.	3 ..	1·78	8th November 1881	Do.		18th March 1882	8,941	5,023	130	21·51	20
3	Do.	16 ..	4·82	30th November 1880	Do.		19th December 1881	16,530	3,429	384	47·07	68
4	Do.	27-B ..	2·05	9th November 1881	Do.		9th February 1882	1,515	739	85	20·56	19
5	Cumboo	4-A ..	·60	6th August 1881	5	8·3	11th October 1881	3,510	5,850	66	16·04	24
6	Yellow Cholum	4-C ..	·60	6th August 1881	16	26·6	16th December 1881	11,516	19,193	132	34·68	44
7	Planter's Friend	4 ..	·50	2nd August 1881	..	..	13th September 1881 to 22nd October 1881.	1,185	2,370	42	16·04	24
8	Yellow Cholum	20 ..	1·48	28th February 1881	67½	45·6	7th July 1881	3,385	2,287	129	1·14	7
9	Planter's Friend	12-A ..	·82	12th April 1881	20	24·4	9th August 1881	2,732	3,332	89	7·84	16
10	Do.	14 ..	3·47	10th November 1881	147	42·3	5th January 1882	10,961	3,159	81	19·66	18
11	Do.	35-II ..	·62	3rd May 1881	12	19	29th August 1881	1,015	1,637	118	9·24	20
12	Sugar-cane	35-II ..	·62	28th September 1880	Planted.		18th November 1881	1,570	2,532	416	71·40	103
13	Horse-gram	14 ..	3·47	1st August 1881	70	20	26th September 1881	6,808	1,962	57	13·23	20
14	Do. and Cumbu	21-II ..	2·97	23rd July 1881	80	27	31st August 1881	4,032	1,358	39	7·44	10
15	Do. do.	27-II ..	2·05	22nd July 1881	60	29	9th September 1881	3,418	1,667	49	10·25	14
16	Do. and Planter's Friend ..	29-A ..	1·04	22nd March 1881	50	48	17th July 1881	7,248	6,969	117	1·43	10
17	Do. do. ..	30-A.-II ..	·25	11th May 1881	8	32	19th September 1881	483	1,932	131	16·26	29
18	Raghi	30-B ..	1·99	1st December 1881	32	16	20th January 1882	3,040	1,528	51	7·00	10
19	Amber Sugar-cane	E. G. ..	·18	12th August 1881	5¼	29·1	31st October 1881 to 11th November 1881.	2,887	16,039	80	16·79	30
20	Planter's Friend	4 A.D. ..	·60	6th August 1881	13	22	24th December 1881	8,940	14,900	140	35·56	44
21	Amber Sugar-cane	10-B.East.	1·47	9th December 1881	25	17·0	28th March 1882	2,856	1,943	109	7·00	10
22	Sugar-cane	30-A.-2 ..	·25	21st September 1880	Planted.		6th December 1881	1,325	5,300	441	75·10	106

This statement, is given in accordance with the usual practice, but it affords little or no instruction, from the very varying conditions under which the different crops were produced. Many of the crops were not sown for fodder, but were cut for fodder, simply because they did not promise to be worth keeping for producing grain. And usually, at the farm, fodder crops are grown merely as "catch" crops, when opportunity occurs, usually at a season of the year, at which it would be useless to sow a crop for producing corn. Again, the worst of the land is usually employed in fodder-raising.

11. One very good crop of yellow cholum (*Sorghum vulgare*) was grown on a piece of land in fair condition, the yield was nearly 20,000 lb. per acre. This was without irrigation. The plot under sugar-cane was a piece of very inferior land, which received but poor treatment; the plants were very severely attacked by white-ants. Putting the whole outturn together, it will be observed that 34·01 acres of land yielded 112,460 lb. of fodder, or 3,307 lb. per acre.

12. In addition to the produce that was harvested, many of the fields afforded grazing for some time.

UNIRRIGATED CEREALS.

13. Unirrigated cereals were raised on 36·85 acres. No hot-weather crops were sown, on account of the absence of rain at the usual sowing season. The next statement, affords information regarding the crops raised:—

Unirrigated Corn Crops.

No.	Description of Crop.	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.		Grain.	Straw.	Grain per Acre.	Straw per Acre.			
			ACRES.		LB.	LB.		LB.	LB.	LB.	LB.	DAYS.		
1	Amber Sugar-cane	4-A. C. ..	·60	6th August 1881.	10·5	17·5	Between 19th October 1881 and 25th November 1881.	276	11,427	460	19,045	74	16·04	24
2	Reana Luxurians	4-A.E. ..	·60	6th ,, ,,	8	13·3	26th December 1881.	277	7,355	462	12,258	142	35·56	44
3	Amber Sugar-cane	10-A. west.	1·78	11th November ,,	37·5	21·	22nd February 1882.	251	15,911	141	8,939	103	19·65	17
4	Do. do.	B.G. Plot B.	·18	12th August ,,	5·25	29	Between 31st October 1881 and 11th November 1881.	53	2,856	294	15,867	80	12·58	21
5	Planter's Friend..	13 ..	1·35	15th October ,,	63	46·6	20th February 1882.	1,573	16,233	1,165	12,024	141	23·91	27
6	Maize, Hawkesbury River ..	15-A ..	2·08	15th September ,,	50·5	24	4th January ,,	2,168	16,660	1,042	8,009	147	32·12	36
7	Horse-gram	18 ..	4·59	17th December ,,	100	21·8	21st March ,,	724	7,284	158	1,587	94	5·27	7
8	Do.	19 ..	3·79	19th ,, ,,	49	12·9	..	Not harvested.						
9	Planter's Friend	21-B ..	2·97	28th September ,,	80	26·9	15th February ,,	790	26,350	266	8,872	140	26·72	31
10	Raghi	23-B ..	4·2	13th October ,,	71	16·9	25th January ,,	2,099	9,437	499	2,247	104	23·91	27
11	Do.	28-II ..	·40	3rd December ,,	9	22·5	28th March ,,	170	516	425	1,290	115	7·00	10
12	Do.	28-III A.	·99	3rd ,, ,,	18	18	16th ,, ,,	480	1,009	485	1,019	103	7·00	10
13	Horse-gram	28-IV ..	1·06	21st January 1882.	33	31	..	Grazed by sheep.						
14	Planter's Friend	31 ..	1·06	8th September 1881	24	22·6	10th January ,,	116	11,056	109	10,430	124	33·10	40
15	Raghi	32 ..	2·38	3rd ,, ,,	67	28	24th December 1881.	875	11,315	367	4,754	114	28·78	34
16	Sorghum Saccharatum	33 ..	1·77	6th ,, ,,	19	10·7	2nd January 1882.	1,143	21,351	646	12,062	136	32·90	39
17	Raghi	34-I ..	1·38	7th November ,,	20	14·5	11th February ,,	422	6,522	305	4,726	96	21·51	20
18	Planter's Friend..	B. G. ..	·18	15th September ,,	3	16·6	16th January ,,	98½	1,705	547	9,472	123	32·30	37
19	Amber Sugar-cane	Do. ..	·07	12th August ,,	¼	4	18th and 22nd October 1881 and 9th and 17th November 1881.	20	1,466	284	20,942	97	12·53	20
20	Clarence River Maize .. .. / Hawkesbury River Maize ..	Do. ..	·22	8th September ,,	3	13·6	27th December 1881.	240	1,197	1,091	5,441	110	28·78	34
21	Broom Millet	Do. ..	·25	4th October ,,	4	16	14th January 1882.	240	1,064	960	4,256	102	24·96	29
22	Black Cholum	Do. ..	·25	30th September ,,	5	20·	13th ,, ,,	139	1,120	556	4,480	105	26·71	30
23	Sorghum Saccharatum	..	2·0	7th ,, ,,	18	9	4th and 5th January 1882.	1,256	14,672	628	7,336	119	33·10	40
24	Clarence River Maize	11 ..	1·48	13th ,, ,,	30	20·02	2nd January 1882.	1,210	7,985	818	5,361	111	32·10	37
25	Horse-gram	7 ..	1·40	29th December ,,	30	21·4	11th April ,,	326	1,847	232	1,319	103	4·32	6

The outturn of the crops, with a few exceptions, is generally fair. As has already been noticed, there was a considerable area of crop in flower in November, when the heavy rains occurred, which prevented proper fertilization.

14. MAIZE.—Had it not been for the circumstances just noticed, the maize crop would have been a heavy one; as it was, the yield was good, considering the nature of the soil on which the crops were grown. Plot A of Field No. 15 gave an outturn of 5,673 cobs per acre, which yielded 1,042 lb. of maize, while Field No. 11 gave an outturn of 4,027 cobs per acre, which yielded 818 lb. of grain; and the yield of straw in both cases was good. The straw was remarkably sweet, and had it been crushed when the cobs were gathered a considerable quantity of jaggery might have been made from the juice. However, this saccharine matter was not wasted, for it greatly added to the value of the straw, when used for feeding the cattle. The plot of maize produced in the experimental grounds, also yielded well, the outturn was 1,073 lb. of grain and 5,354 lb. of straw, per acre. A portion of the straw, of this experimental plot, was crushed when the cobs were gathered, and from the juice obtained jaggery was made, the outturn was about 3 per cent. of the weight of the straw. The details of the experiment are noted under "Manures."

15. The maize seed, was imported from Sydney, in September last. It was sown in alternate lines with cotton; in No. 11 field on ridges, and in No. 15 field, on the flat surface. The grain was all tarred to prevent it from being carried away by crows, squirrels, or rats, or from being eaten by the coolies when engaged in sowing it. The process followed in preparing the seed, is as follows:—

"Take one and-a-half pints (about half a Madras measure) of hot water and add about one-twelfth of a pint (about one-fourth of an ollock) of tar; stir well together. After allowing the solution to cool, pour it over about twenty measures of maize; mix together until the seed assumes a dark mahogany color, and then dust it with sand, saw-dust, or dry earth, to prevent the seeds adhering together."

From a sowing of 80·5 lb. of seed, an outturn of 3,378 lb. of grain, and 24,595 lb. of straw was obtained. About 2,500 lb. of the acclimatized maize seed, have been placed at the disposal of the Collectors for district experimental cultivation. The maize crop, is one worthy of much attention in this country. Without the aid of irrigation water, on the poor soils of the farm, good tillage and the moderate use of manure, secured the production of an average outturn of 984 lb. of grain and 6,270 lb. of straw per acre; valuing the grain at 30 lb. per one rupee and the straw at Rs. 8 per ton, prices readily obtainable, the crop was worth Rs. 55-3-1 per acre, while the expenses incurred on tillage, manure and harvesting amounted to not more than Rs. 30 per acre. Unfortunately, the greater portion of the farm is too sandy for the production of maize; the soil does not afford the plants anchorage, they fall down when the ground becomes saturated, if there is any wind. It is surprising that maize has not yet received any attention in this country for the production of malt, for use in brewing; barley is so difficult to obtain, and is always so very inferior.

16. BROOM MILLET (a variety of *Sorghum*).—This crop was grown on the farm for the first time. The seed was obtained from Sydney. The outturn, 960 lb. of grain and 4,256 lb. of straw, per acre, was very good. The crop grew luxuriantly to an average height of about 11 feet, though on a very poor sandy soil. The grain is very similar to ordinary cholum, but it has more husk. The straw was quite destitute of saccharine matter. The panicle which carries the seed has numerous stalks, all from a common centre, which, being long and wiry, are, after the removal of the seed, well adapted for use in the manufacture of brooms; and it is for this purpose that much of the broom corn crop is reared, in the United States. The crop under report, is the first, it is believed, that has been grown in this country. A large quantity of the acclimatized seed, will be distributed for district experiments.

17. BLACK CHOLUM.—This is the black variety of cholum (*Sorghum vulgare*) which is grown in some of the Southern Districts. In its general appearance the

plant is very similar to the *Sorghum saccharatum*, but while the latter contains a large quantity of saccharine juice, the black cholum contains none. Mr. Wilkins, the Botanical Lecturer in the Agricultural College, has furnished the following statement, in which he compares the Botanical characters of the black cholum, with those of the *Sorghum saccharatum*, it having been thought that the plants were identical :—

	Indigenous.	Introduced.
	Sorghum vulgare (black cholum).	*Sorghum saccharatum* (*Chinese Sugar-cane*).
Panicle.	Branches not strictly verticellate (sub-verticelled).	Branches drooping, verticelled.
Calyx of hermaphrodite flowers.	Valve black and shining, back smooth. White cilia round the margins.	Less black, not shining. Both valves hairy.
Corolla of hermaphrodite flowers.	One of the valves of the corolla awned.	One valve awned. The specimen sent therefore is the *Holcus saccharatus* of Linnaeus, and not the *Holcus saccharatus* described by Roxburgh, the corolla of which has no awn.
Calyx of neuter flower.	2 valved.	1 valved.
Stem.	Single, smooth, round. Less thick than stem of *Holcus saccharatum*.	Jointed, sometimes ramous thicker than stem of the black cholum.

The grain being an inferior one, and the straw devoid of saccharine juices, the crop seems scarcely worth attention ; for, where it can be grown, the *Sorghum saccharatum* would thrive.

18. MINNESOTA EARLY AMBER SUGAR-CANE.—This is a variety of sorghum which originated, in the State of Indiana in 1860, from a plant which appeared in a crop of Chinese sorghum. The seed of this plant was sown, and the produce again sown, which, having been repeated for several years, a large quantity of the seed has been produced. Through the agency of the United States Agricultural Department, the seed has been widely distributed over the various States, more specially in Minnesota where it has thriven well.

19. This Department is indebted to the courtesy of Messrs. Allen and Co., of New York, for the seed first experimented with, at Saidápet. The supply consisted of half-a-bushel of well-grown seed. Since the arrival of the seed in May 1879, several crops of Amber sugar-cane have been produced on the farm. It will be noticed that 2·63 acres of this crop, raised from 53½ lb. of seed, yielded an outturn of 600 lb. of grain and 31,660 lbs. of straw, equal to 228 lb. of grain and 12,038 lb. of straw per acre. The outturn must be considered as considerably below the average, as the crops were experimentally cut, in different stages of growth, most portions, before the seed appeared, while, the large plot, 1¾ acres, was sown very late in the season, and had to encounter a long drought.

20. Numerous experiments were made in crushing the canes of this sorghum, and converting the juice into jaggery. The following are the results of one set of experiments :—

Number of Experiments.	Date of Experiment.	Number of Canes crushed.	Weight of Canes.	Weight of Heads.	Yield of Juice.			Yield of Jaggery.		
					Volume.	Weight.	Percentage weight of the Cane.	Weight.	Percentage of the Juice.	Percentage of the Canes.
			LB.	LB.	MRS. OLLS	LB.		LB. OZ.		
1 ..	19th Oct. 1881..	1,000	593	79	48 4	197	33·22	23 12	12·00	4·00
2 ..	20th ,, ,, ..		525	47	44 0	164·25	31·28	27 0	16·43	5·14
3 ..	21st ,, ,, ..		476	45	38 0	149	31·30	22 8	15·10	4·72
4 ..	22nd ,, ,, ..		474	46	39 4	154	32·48	21 8	13·96	4·53
5 ..	24th ,, ,, ..		457	38	32 4	141	30·85	17 4	12·23	3·77
6 ..	25th ,, ,, ..		452	41	30 0	137	30·30	20 0	14·59	4·42
7 ..	31st ,, ,, ..	1,300	500	40	35 0	139	27·80	21 8	15·46	4·30

21. A number of other experiments were instituted in February, the results of which, are recorded in the next table :—

Date of Experiment.	Weight of the Canes with Leaves, used for the experiment.	Weight of Ripe Canes stripped, used for crushing.	Weight of Unripe Canes not crushed.	Weight of Leaves stripped.	Weight of Heads of Ripe Canes.	Total weight of Canes with Leaves and Canes.	Quantity of Juice.		100 lb. of Canes yielded Juice.	Quantity of Jaggery made.	100 lb. of Juice yielded Jaggery.	100 lb. of canes yielded Jaggery.
							Volume.	Weight.				
	LB.	LB.	LB.	LB.	LB.	LB.	MADRAS MEAS.	LB.	LB.	LB.	LB.	LB.
3rd Feb. ..	1,464	..	..	..	..	1,464	52·5	194	13	25	12·8	1·7
4th ,, ..	1,335	..	..	..	..	1,335	63	231	17	27	11·6	2·0
6th ,, ..	..	382	756	66	56	1,260	48	182	48	24	13·1	6·3
7th ,, ..	..	1,027	1,064	112	140	2,343	124·5	498	48	60	12·0	5·8
9th ,, ..	..	365	686	..	117	1,168	44·5	177	48	30	16·9	8·2
10th ,, ..	..	479	280	51	67	877	67·5	270	56	30	11·1	6·2
11th ,, ..	..	428	368	46	63·5	905·5	57	228	53	30	13·1	7·0
14th ,, ..	..	383	207	60	42	692	43	172	45	18·5	10·7	4·8
17th ,, ..	..	422	504	53	56	1,035	53	212	50	24	11·3	5·6
22nd ,, ..	..	494	509	56	54	1,113	53	212	43	28·75	13·5	5·8
23rd ,, ..	..	792	756	80	74	1,702	98·5	394	50	38	9·6	4·8

These experiments, it will be observed, were conducted in a somewhat different manner. It was found when they were begun, that not more than 50 per cent. of the plants were sufficiently ripe, but, as the experiments were intended to be continued over two or three weeks, it was not thought advisable to wait for the canes all to become ripe, for those unfitted for crushing could be usefully employed for feeding the milch cattle. From the table, it will be seen that, on the first two days, the out-turn of jaggery was very poor, but on these days the *whole* of the plants were crushed. The yield of jaggery being so low, while its color was so dark, it was thought advisable to crush only the more ripe canes. It will be observed that when this was done the percentage of juice became considerably greater, as well as, the percentage of jaggery. It is evident from these experiments, that it is in every way better to crush only the best canes, and to use those that are less ripe, and the leaves, for feeding stock. By selecting the seed, and by good tillage and good treatment, it will, I think, be possible to secure much greater uniformity in the ripening of the canes. This, is a point to which attention is specially required, for it is both troublesome and expensive to divide the crop into matured and unripe canes; and, but little advantage would be gained by harvesting, first, the matured canes, and afterwards, the others as they ripened.

22. Cream of lime was mixed with the juice before it was boiled until an alkaline reaction was observed. Crystallization began, usually, within twenty-four hours after the syrup cooled; in some cases much earlier. Experiments were made to ascertain the proper time when the syrup should be removed from the fire, and under what conditions the best colored jaggery could be obtained. It was noticed that the syrup was lighter in color when removed from the fire early, but crystallization was slower. When the juice was boiled for a longer time, it became darker, but crystallized rapidly.

23. The syrup of the Amber sugar-cane crystallizes far more rapidly, and to a much more considerable extent, than the syrups of either Sorghum saccharatum or Sorghum Kaffrarium. The refuse canes, after crushing, are far more palatable to stock than refuse of sugar-cane; and, judging from its appearance and general character, the refuse sorghum must be far more digestable.

24. A small packet of the seed of this variety of sorghum was received in July last from the Government of India. The packet contained only about 4 oz. of seed; but it was in a very fresh state, 80 per cent. of it being vital. A small plot measuring 336 square yards was sown with this seed; the cultivation results appear at No. 19 in the statement. Some experiments were made in manuring this crop, particulars of which will be found under head "Manures."

25. This crop appears to have become thoroughly established at Saidápet, and its distribution over the Presidency can thus readily be secured. Under fairly good conditions of soil and climate, such as are generally secured for the ordinary sugar-cane crop, this new variety of sorghum cannot fail in being a very heavy producer. The experiments made at Saidápet seem to show that the best time for cutting the plant for crushing, is when the seed begins to harden; thus, the seed is secured as well as the canes, and, while the juice of the canes may be converted into jaggery or sugar, the cane-refuse is well adapted as fodder for stock; thus, the crop becomes, a grain, sugar, and fodder producer.

26. CHINESE SUGAR-CANE (*Sorghum Saccharatum*).—This crop, it will be observed, grew very satisfactorily. The seed was obtained from Sydney. From 37 lb. of seed sown the produce was 2,399 lb. of grain and 36,023 lb. of straw, equal to 636 lb. of grain and 9,555 lb. of straw per acre, and the period of growth was, on the average, only 128 days. The difficulties experienced last season, in getting the syrup of this *sorghum* to crystallize were so great that no attempts were made to prepare jaggery. The canes were used in feeding the stock, both dairy and working cattle.

27. PLANTER'S FRIEND (*Sorghum Kaffrarium*).—Further experience confirms the opinion expressed in previous reports, regarding the hardiness of this variety of sorghum. From 170 lb. of seed sown the produce was 2,577 lb. of grain and 55,344 lb. of straw, and the average period of growth was 132 days. Several experiments were made in converting the juice of the canes into jaggery. The following are the results:—

Date of Experiment.	Where grown.	Weight of Ripe Canes stripped.	Weight of Heads of Ripe Canes.	Quantity of Juice.		100 lb. of Canes yielded Juice.	Quantity of Jaggery made.	100 lb. of Juice yielded Jaggery.	100 lb. of Canes yielded Jaggery.
				Volume.	Weight.				
		LB.	LB.	MADRAS MEAS.	LB.	LB.	LB.	LB.	LB.
1. Feb. 15th.. ..	Field. 13	817	116	90	360	44	37	10·3	4·5
2 „ 16th.. ..	Do.	787	162	69	276	35	35	12·6	4·4
3. Oct. 26th.. ..	Do. 4	280	45	23	112	40	10·75	9·6	3·8
4. „ 27th.. ..	Do.	500	35	36	124	24·8	17	13·7	3·4
5. „ 28th and 29th.	Do.	593	37	39	161	27	22	13·6	3·7

28. REANA LUXURIANS.—This was grown as an ordinary field crop. The outturn of both fodder and grain was good, but the weather during the experiment was unusually favorable. On good soils, under liberal treatment, when it can obtain plenty of rain or irrigation water, the crop grows most rapidly and luxuriantly; but it cannot withstand a drought. Indeed, the experiments made showed that a drought, which scarcely affected the sorghum crops, was sufficient to check the growth of the Reana to such an extent, as to render it useless to keep the crops standing longer. As a fodder crop, in a damp warm climate, or where irrigation can be secured, it is well worthy of attention. There is perhaps no other crop, sugar-cane excepted, which will produce such an enormous quantity of green plant per acre, but the fodder is very watery, and does not appear to be very palatable to stock when offered for the first time. The watery juices of the stem, appear to be destitute of saccharine matter, during all stages of growth. The grain, is almost useless as food. The following experiments were made, in order to determine the best means of preparing the grain as food for stock. The results, it will be observed, were discouraging:—

"(1.) A quantity of the grain was placed in cold water, and allowed to soak for 56 hours. At the end of this time the grain was almost as hard as when first placed in water, while it had increased only about 10 per cent. in volume.

(2.) Half-a-measure of the grain was boiled for 6½ hours. At the end of this time the shell was perfectly hard, though the inner portion was soft; still it was quite impossible that the grain could be masticated by any animal. After boiling, the grain measured 6½ ollocks, which was an increase of 62 per cent. It appeared to be useless to continue the boiling process longer. The boiled grain, when cold, was offered to several sheep, all of which refused to eat it.

(3.) Half-a-measure of the grain was placed in a stone mortar and was beaten for two hours with a heavy pestle, but none of the grain was crushed.

"(4.) Half a measure of the grain was placed in a powerful corn-crushing mill. The grain in passing through the mill was partly crushed, but only very imperfectly, and it was necessary to pass it seven times through the mill to get the grain powdered; and this was only a rough coarse powder. This powdered grain was offered to a number of sheep, but again it was refused."

29. RAGGY (*Eleusine corocana*).—The total area under this crop was 9·35 acres, which produced 4,046 lb. of grain and 28,799 lb. of straw, equal to 433 lb. of grain and 3,080 lb. of straw per acre.

30. HORSE-GRAM (*Dolichos uniflorus*).—Horse-gram is grown on the farm generally as a "catch" crop after the harvesting of the ordinary crop, chiefly for grazing down, or for ploughing into the ground as "green manure." The yield of the crops that are allowed to mature, is usually very small.

31. IRRIGATED CEREAL CROPS.—These crops were raised on 14·28 acres; of this area 11·17 acres were irrigated from the Mylapore Tank, and this, on account of the deficient monsoon rains, never filled, and became quite dry when most of the paddy was only half matured, thus, necessitating the raising of water from wells. The total produce of the single crop on 14·28 acres, amounted to 13,963 lb. of grain and 58,649 lb. of straw, or 978 lb. of grain and 4,107 lb. of straw per acre. The Madagascar paddy was not successful, which must be attributed mainly to the almost entire failure of the rains in October, and the unusually high temperature. The chief crop of this variety of paddy was sown in September, long before any other paddy, and during October there were 27 days on which rain fell, and no irrigation water was then available; it is, indeed, surprising that after the long drought the crop should have survived and matured. The heavy rainfall of November saved the crop, but it never recovered the vigor which characterized its earlier growth, and coming prematurely into flower when the heavy rains occurred, proper fertilization was prevented. From an unfortunate misunderstanding, nearly the whole of the seed that was in store, 1,763 lb. of the previous year's production, was distributed for district experiments, before it was ascertained that but very little remained for the use of the farm, and this, only refuse seed much mixed with indigenous grain. Next season, experiments will be made with seed raised in the districts, from farm seed, when, it is hoped, comparative data will be collected showing the quantity of water needed, per acre, for rearing the indigenous, and the Madagascar paddy, under similar conditions.

32. The following extracts from correspondence, show the commercial value of the Madagascar rice:—

"In my letter, No. 820, dated the 21st of September 1877, printed with Board's Proceedings, No. 4633, dated the 4th October 1877, I referred to a variety of Madagascar paddy, of which I had received a small sample from the Rev. Mr. Toy, a Missionary residing in Madagascar. In that letter, I pointed out my reasons for believing that Madagascar was the home of the Carolina rice of America. It is possible that the special variety of paddy we have obtained may not be the parent of the American variety. It, however, possesses many similar characteristics, amongst which I may mention preference for a *moderate* supply of irrigation water, strong robust straw, heavy yield, large grain, and, difficult to thrash. The rice is certainly inferior to Carolina rice, but this, may be due, partly to soil, and to the superior processes through which Carolina rice passes, in its preparation.

* * * * *

"I forward a sample of the paddy in the straw—a sample of the grain (*a*) and two samples of the rice—the one (*b*) prepared in the raw state and the other (*c*) after moderate boiling. It would be an advantage if a professional valuation of the grain and rice could be obtained in London.

* * * * *

Board's Resolution thereon—

* * * * *

"The product of the experimental cultivation of this variety of rice appears to the Board to be of superior quality, and if Mr. Robertson's present opinion, that it thrives with a quantity of water less than the indigenous varieties, should be confirmed by further experience, the result should be of great value to localities, where the rainfall is scanty and water not always abundant.

"Government may be disposed to obtain a professional valuation of the rice as suggested in paragraph 5."

The samples were accordingly sent to the Most Honorable the Secretary of State for India in view to their professional valuation. The following are the reports on the samples :—

"Report on three samples of Madagascar rice from Madras, received for valuation from the India Office, dated London, 27th August 1881.

"A. Madagascar paddy : bright and clean, but wanting in plumpness. Value about 6*s.* per cwt. (the freight would be a heavy item in importing rice in this form, as paddy is usually charged at 15 cwt. to the ton for freight).

"B. Very imperfectly cleaned rice : value for starch-making 8*s.* 6*d.* per cwt.; it would have to be recleaned for eating purposes.

"C. Fairly cleaned rice from paddy unhusked in boiling water : value 8*s.* 6*d.* per cwt. (there is an unusual demand for this sort of rice just now).

"(Signed) THOS. GRAY AND WALKER."

"*Note.*—All the samples much weevilled."

"Report on three samples of Madagascar paddy and rice from Madras, received from the India Office, dated 30th August 1881.

"A. Madagascar paddy.—This is difficult to value as the amount of husk is unknown, but we should think it would be about 25 per cent.; in that case the value would be about 6*s.* to 6*s.* 6*d.* until a portion had been cleaned ; it would be impossible to give a nearer quotation.

"B. Madagascar rice, raw.—Badly weevilled ; value 7*s.* to 7*s.* 3*d.* per cwt.

"C. Madagascar rice, boiled.—Considerably weevilled ; value 7*s.* 9*d.* to 8*s.* per cwt.

"The samples B and C being *weevilled* would, in the process of cleaning, break very considerably, and for that reason we are afraid to quote a higher valuation. The present prices of all rice on the spot are low, and distant shipments of soft grain rice (Rangoon, Bassein, &c.,) are about 9*d.* per cwt. dearer than spot values chiefly owing to the unfavorable harvest prospects. We think, therefore, that during the next two or three months we may reasonably expect better prices.

"(Signed) DEVITT AND HETT."

On receipt of these valuations, the Chairman of the Chamber of Commerce, Madras, was asked for information, showing the prices of ordinary Madras paddy and rice in the London Market at the time the foregoing valuations were made. He was good enough to reply as follows :—

"At the end of August, when the samples of Madagascar rice from Madras were reported upon by Messrs. Thos. Gray and Walker and Devitt and Hett in London, a good deal of Madras rice was sold in London as low as 7*s.* per cwt."

It will be observed, on referring to the General Report of this Department, that in some of the districts the Madagascar paddy experiments proved fairly successful. But the majority of the experiments, suffered from adverse conditions, the lot, too frequently, of experimental crops.

33. The next statement shows the outturn of the Cereal Irrigated crops produced during the year :—

Irrigated Cereal Crops.

No.	Description of Crop.	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.		Grain.	Straw.	Grain per Acre.	Straw per Acre.			
			ACRES.		LB.	LB.		LB.	LB.	LB.	LB.	DAYS.		
1	Goondu Sumba Paddy ..	29-B	·74	19th November 1881 ..	Planted.		24th March 1882 ..	805	2,443	1,486·5	4,773	126	10·70	13
2	Car Paddy							295	1,089					
3	Madagascar Paddy	30-A. I ..	1·77	10th September ,, ..	52	29·4	26th January ,, ..	550	3,920	310	2,214	138	32·60	39
4	Goondu Sumba Paddy ..	35-B	·61	8th October ,, ..	80	131	13th March ,, ..	1,237	4,084	2,028	6,695	156	23·91	27
5	Madagascar Paddy ..	35-C	·41	18th November ,, ..	Planted.		28th ,, ,, ..	38	74	300	3,388	130	10·70	13
	Sumba Paddy						25th ,, ,, ..	85	1,315					
6	Goondu Sumba Paddy ..	36-III ..	·90	16th ,, ,, ..	Do.		8th ,, ,, ..	1,770	5,210	1,967	5,789	112	10·70	13
7	Do. ..	36-II ..	·46	15th ,, ,, ..	Do.		8th ,, ,, ..	721	1,003	1,567	2,180	113	10·90	14
8	Car Paddy	36-I	1·58	26th ,, ,, ..	80	50	28th ,, ,, ..	852	1,108	539·2	701	122	7·05	11
9	Goondu Sumba Paddy ..	37-A	·45	23rd ,, ,, ..	60	133	24th ,, ,, ..	586	2,262	1,302	5,027	121	7·05	11
10	Sumba Paddy	37-B	·82	22nd ,, ,, ..	70	85	23rd ,, ,, ..	684	3,116	834	3,800	120	7·30	12
11	Do.	37-C	·46	22nd ,, ,, ..	65	141	22nd ,, ,, ..	340	1,508	739	3,278	120	7·30	12
12	Do.	37-D	·52	22nd ,, ,, ..	65	124	21st ,, ,, ..	596	1,782	1,146	3,427	119	7·30	12
13	Car Paddy	37-E	·67	22nd ,, ,, ..	Planted.		6th ,, ,, ..	409	2,939	610	4,386	104	7·30	12
14	Do.	R. F. I. ..	·27	9th April ,, ..	Do.		14th July 1881 ..	410	2,270	1,518	8,407	96	1·43	10
15	Sixty days' Sumba Paddy ..	R. F. I. ..	·27	28th July ,, ..	70	258	10th November ,, ..	259	793	959	2,937	105	22·45	35
16	White Car Paddy	R. F. II ..	·61	25th April ,, ..	65	106·5	3rd September ,, ..	265	4,821	434	7,903	131	11·18	23
17	Car Paddy	R. F. III ..	·52	6th ,, ,, ..	Planted.		12th July ,, ..	958	4,082	1,842	7,850	97	1·29	8
18	Sixty days' Sumba Paddy ..	R. F. III ..	·52	30th July ,, ..	30	57·6	18th October ,, ..	136	536	261	1,030	80	18·19	25
19	Madagascar Paddy	R. F. IV. ..	·39	18th June ,, ..	25	64	28th ,, ,, ..	217	539	556	1,382	132	19·77	32
20	Car Paddy	R. F. V. ..	·53	6th April ,, ..	Planted.		12th July ,, ..	460	5,562	867	10,494	97	1·29	8
21	Sumba Paddy	29-A. N. ..	·94	23rd November ,, ..	63	67	21st March 1882 ..	1,299	5,208	1,382	5,540	118	7·05	11
22	Do.	29-A. S. ..	·84	23rd ,, ,, ..	57	67·8	21st ,, ,, ..	991	2,985	1,179	3,553	118	7·05	11

34. A small packet of paddy, said to be Carolina paddy, was received from the Government of India for experimental trial. The experiment was made; but as was anticipated the grain proved not to be Carolina paddy, but a very inferior variety of indigenous paddy.

INDUSTRIAL CROPS.

35. 38·69 acres were under these crops; of which 12·60 acres were standing at the beginning of the year. Of the crops sown in the year, 27·09 acres were standing at the close of the year, the produce of which cannot be reported until next year. These are cotton 19·36 acres, oil-seeds 6·71 acres, and indigo 1·02 acres.

36. CASUARINA TREES (*Casuarina Muricata*)—The plantations continue to thrive. An account has been opened for each plantation, and it is hoped that data will be collected, which, will be of use in showing the cost per ton, of the fuel produced under different systems of planting. At an auction sale held in Febreary, 100 trees were sold for Rs. 194-4-0, or nearly 2 rupees per tree; the buyers cut down the trees and removed them, at their own expense. None of these trees were over ten years of age. Some were under eight years. Another lot of ten trees were sold by weight; they weighed 3,796 lb., and the price obtained for them at Rs. 9 per ton, with one rupee obtained for the roots was Rs. 16-4-0, or Rs. 1-10-0 per tree. Of course, the trees cut down were the best in the plantations. The object in planting the land with Casuarina trees, was chiefly to improve the soil, and to utilize land, which for arable tillage was almost worthless. The intention is, to plant the land with fruit-bearing trees, such as guavas, mangoes, &c., as the Casuarinas are removed. During the year 8·93 acres of poor sandy outlying land were planted with Casuarinas.

37. The following statement, shows the industrial crops harvested during the year:—

Industrial Crops.

Description of Crop.	Number of Field and Plot.	Area of Plot.	Sowing.			Details of Harvesting.					
			Date of	Seed Sown.		Date.	Outturn.				
				Total.	Per Acre.		Gross.		Per Acre.		
							Seed.	Leaves.	Seed.	Leaves.
		ACRES.		LB.	LB.		LB.		LB.	
Castor-oil seed	1 *a*, *b*.	2·38	2nd October 1880 ..	33	13·8	14th June 1881 ..	91	..	38	..
Indigo	15 *a*.	4·17	10th December 1880 ..	45·5	10·9	31st August 1881 ..	221	Bundles. 147	53	Bundles. 35
Do.	15 *b*.	2·00	9th December 1880 ..	30	15	5th September 1881 ..	623	..	311	..
Do.	Do.	1·91	9th December 1880 ..	28	14·6	5th September 1881 ..	..	219	..	115
Cotton	10 *a*.	1·78	1st October 1880 ..	16	9	27th September 1881 ..	Cotton-in-seed. 486	..	Cotton-in-seed. 273	..
Do.	10 *b*.	2·47	2nd October 1880 ..	20	8·1	3rd October 1881 ..	578·25	..	234·1	..
Do.	18	4·59	16th September 1880 ..	74	16·1	29th October 1881 ..	852·75	..	185·8	..
Do.	34 *a*.	1·38	15th September 1880 ..	22	15·9	15th October 1881 ..	186·50	..	135·1	..

It must be remembered that these crops were sown in 1880-81, and were merely harvested, in the year under review. The outturn generally is very low, attributable to the absence of seasonable summer rains, and the low drought-resisting power of the soils of the farm.

38. The next statement, shows the percentage outturn of lint, obtained from the cotton crops of last season :—

Month.	10-B. East.			10-B. West.			10-A. North.			10-A. South.			18. North.			18. South.			18. Headlands.			34.		
	Cotton in Seed.	Lint.	Percentage of Lint.	Cotton in Seed.	Lint.	Percentage of Lint.	Cotton in Seed.	Lint.	Percentage of Lint.	Cotton in Seed.	Lint.	Percentage of Lint.	Cotton in Seed.	Lint.	Percentage of Lint.	Cotton in Seed.	Lint.	Percentage of Lint.	Cotton in Seed.	Lint.	Percentage of Lint.	Cotton in Seed.	Lint.	Percentage of Lint.
	LB.	LB.		LB.	LB.		LB.	LB.		LB.	LB.		LB.	LB.		LB.	LB.		LB.	LB.		LB.	LB.	
March 1881.	24·75	6·75	27·3	23	6·25	27·2	16	5	31·3	13·50	4·25	31·5	32·75	8·75	26·7	33·75	8·50	25·2	17	5·50	32·4	4·50	1·25	27·8
April ,,	7·25	2	27·6	6·25	1·75	28	6·50	1·75	26·9	8·25	2·50	30·3	20·50	6·25	26·6	15	4	26·6	9·50	3	31·6	11	2·75	25·0
May ,, ..	31	10	32·3	23·25	6·75	29·0	49·75	16	32·2	29·50	7·25	24·6	14·75	3·50	25·7	17	4·50	26·5	6·25	1·75	28·0	4·50	1·50	33·3
June ,, ..	93·75	28·50	30·4	108	31	28·7	97·50	24	24·6	74·25	18·75	25·3	32·25	8	24·8	28·75	9	31·3	14·25	3·75	26·3	2·75	·50	18·2
July ,, ..	71·50	22·25	31·1	47·75	15·75	32·9	38	12	31·6	31·75	10·25	32·3	11	3·25	29·5	13	4·25	32·7	..	..	..	37·75	11·75	31·1
Aug. ,, ..	44	13	29·5	58·75	17·50	29·8	64	16	29·6	24·25	7·75	31·9	8·50	2·50	29·4	5·25	1·75	33·3	8	2·25	28·1	34·75	10·25	29·5
Sept. ,, ..	16	4·50	28·1	16·75	4·75	28·4	18·75	5·50	29·3	24	8·25	34·4	..	..	..	8	2·25	28·1	..	..	..	28	8·25	29·5
Oct. ,, ..	..	..	..	6·25	1·75	28·0	..	..	..	..	..	..	284·25	87	30·6	231	71	30·7	39	9	23·1	63·25	19	30·0
Total ..	288·25	87	..	290	85·50	..	280·50	80·25	..	205·50	69	..	407	119·25	..	351·75	105·25	..	94	25	..	186·50	55·25	..
Per Acre ..	233·4	70·4	30·2	234·8	69·2	29·5	315·2	90·2	28·6	230·9	66·3	28·7	251·2	73·6	29·3	185·2	55·4	29·9	87·8	23·4	26·7	135·2	40·0	29·5

It will be observed that the percentage of lint varied from as low as 18 per cent to, as high as 34. It should be remembered, with reference to these results, that they have been obtained under ordinary agricultural conditions, and that, it is quite possible that in some cases the cotton-in-seed may have been damp when weighed, and might have become dry when ginned, which would, of course, make the outturn of lint apparently low. In the table below, the cost of growing, and the value of the produce obtained from the double crop—cotton and maize—harvested in the year, but sown in the preceding year, appear ;—

Description of Crop.	Number of Field and Plot.	Area.	Cost of preparation of Land.	Cost of Seed and Sowing.	Cost of after cultivation.	Cost of Harvesting and securing produce.	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.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
New Orleans Cotton and Maize* ..	10-A.	1·78	13 10 0	5 8 6	18 15 7	3 5 6	39 0 0	80 7 7	11 0 0	69 7 7	46 15 8
New Orleans Maize* and Yellow* Cholum	10-B.	2·47	10 2 0	4 11 0	20 14 6	2 4 0	42 0 0	79 15 6	12 0 0	67 15 6	55 14 2
New Orleans and Planter's Friend.	18	4·82	10 10 0	7 12 0	17 7 7	18 0 2	51 14 8	105 12 5	11 7 8	94 4 9	211 1 8
New Orleans and Yellow Cholum..	34-A.	1·87	2 4 0	3 10 0	12 3 0	5 9 0	25 8 0	49 2 0	5 1 7	44 0 5	49 12 6
Total ..	..	..	..	..	..	..	..	..	..	275 12 3	363 12 0

* Failed.

39. The following, are the results of the experiment, referred to at paragraph 41 of last year's report:—

Plot A.	Plot B.
Rows of cotton, 4 feet apart ..	Rows of cotton, alternately 2 and 6 feet apart.
Outturn of cotton, lb. 377·7 ..	Outturn of cotton, lb. 387·5 ..

The plots were of the same area, and were similarly manured and tilled. It will be observed that the outturn of the two plots differs but slightly. The wide interval between each pair of rows, gives facilities for cleaning the ground during the growth of the crop, which, the narrower uniform intervals, did not afford. The space between the pair of rows, is more difficult to weed, but this, is of minor importance compared with the advantages gained in being able to till, throughout the season, nearly two-thirds of the land.

40. INDIGO (*Indigofera tinctoria*).—The season was also an adverse one for this crop, and the outturn of plant was low. Two acres in Field No. 15 produced a fair crop of seed, the yield being 623 lb. which was sold for about 40 rupees. On the farm it generally pays best, to grow indigo only on the best soils for seed, in the cold season. In seasons when the rainfall has been more evenly distributed, than is usually experienced, indigo has yielded very considerable crops of green plant.

41. CASTOR-OIL CROP (*Ricinus communis*).—This was sown more as a "catch crop" than, as an ordinary crop of the farm. Like the indigo, and cotton crop, it suffered from drought. Several small packets of castor-oil seed of different varieties were obtained from Italy, through the courtesy of Professor Gaglioli, of the Royal Agricultural College, Naples. The following notes refer to the plants raised from these seeds :—

"The seeds were sown in pots on the 5th March 1881; they germinated very well; the seedlings were transplanted on the 11th April 1881 in beds prepared to receive them.

"(1.) *Ricinus communis* var. *Armatus*.—At the close of the year only three plants of this variety were living. This is an annual; grows to a height of six feet; it has too many side branches. The spikes are short and the capsules are of medium size; only four ounces of the seed were collected.

"*Soltingeri*.—Two plants only are living; they grew to a height of five feet. This variety seems to be an annual. The spikes are short but the capsules are large. The plants have not borne well; only two oz. of seed were collected.

"*Arcuatus*.—The plants were healthy and robust in the cold season, but died when the hot weather set in; the growth is bushy. The spikes are long and the capsules are of a medium size.

"*Rugosus chunveanus*.—Three plants of this variety are in the bed; they thrive well even during dry weather; they have grown to a height of 20 feet with a stem girth of 10 inches in 12 months. They bear well. The spikes are long and capsules closely attached to the stalk and of a good size. Some seed of this variety was collected and sown in another bed, where it has thriven even better.

"*Subrisides*.—The plants grew to a height of 10 feet with a stem girth of 8 inches. The spikes are long but the capsules are very small."

42. Brazillian Cotton.—A few plants of Brazillian cotton are at present growing in the Botanical Grounds; they are large, about 7 feet in height, and are healthy, and they grow well, as long as there is plenty of moisture in the soil, but do not thrive in dry weather; and the bolls are much attacked by insects. The lint is short, but is of good quality.

43. Yca Valley Cotton.—The few plants of this variety growing in the experimental grounds continue to thrive; several are of great size, with stems 5 or 6 inches in circumference. The lint maintains its very high character. A sufficiency of seed has been collected this season to plant an acre of ground. Special attention will be given to the propagation of this valuable species of cotton. It will be remembered that the cotton was referred to in very high terms in previous reports, but, the plants were attacked by a borer and nearly the whole were lost. When more seed is available, some of it will be sent into some of the districts where the plants can meet with better conditions, than at Saidápet.

44. Miscellaneous Crops.—Of these the common plantain, as usual, occupied the largest area. Several of the plots cropped with miscellaneous crops were of such a small area, full details regarding them were not registered. Some of these crops were grown on the farm for the first time. The next statement, affords information regarding the produce of the Miscellaneous crops, harvested in the year:—

Miscellaneous Crops.

Description of Crop.	Number of Field and Plot.	Area of Plot.	Sowing.			Details of Harvesting.				
			Date of	Seed sown.		Date.	Outturn.			
				Total.	Per Acre.		Crop.		Per Acre.	
Manilla Hemp *(Musa Textilis)* ..	..	..	..	..		..	..	..	..	..
Plantain *(Musa Paradisiaca)* ..	4-B.-I ..	·93	15th March 1878 ..	Planted		During the year ..	Bunches. 654	..	Bunches. 253	..
Do. (do.).. ..	4-B.-II ..	1·25	6th June 1879							
Do. (do.).. ..	4-B.-III ..	·40	18th August 1880 ..							
Do. (do.).. ..	12-C. ..	·85	26th December 1878 ..	do.		do. ..	40 Tubers.	..	47 Tubers.	..
Tapioca	4-B.-III..	·40	30th November 1880 ..	do.		16th October 1881 ..	lb. 1,097½	.. Starch. lb.	2,744	.. Starch. lb.
Arrowroot	B.G. ..	·04	7th to 9th February 1881.	do.		During April	401 Fruit. lb.	28·5	10,025 Fruit. lb.	712
Brinjals	28-III-B ..	·23	11th March 1881 ..	do.		18th July 1881 ..	151	..	657	..
Tomatoes	B.G. ..	·06	2nd February 1882 ..	do.		End of April	683 Bulbs. lb.	..	11,383 Bulbs. lb.	..
Onions	Do. ..	·08	31st January 1882 ..	do.		March and April ..	126	..	1,575	..

45. MANILLA HEMP PLANT (*Musa Textilis*).—The plot of Manilla hemp plants has been considerably enlarged during the year, by planting out the shoots of the matured plants. At the present time, the plot contains the following plants:—

Full grown, about two years' old	69
Half grown	30
Young plants, a few months' old	147
Total ..	246

Besides these, there are thirty shoots fit for planting out. The plants have grown well, under the same conditions as the ordinary plantain. They will not thrive, unless planted on a deep well-manured soil, under regular irrigation. Hence, the cost of growing plants, until they reach the stage fit for cutting is great; at Saidápet, this cost will amount to not less than 2 annas each. It costs about the same sum to bring into bearing a plant of the ordinary variety of plantain, but then, the bunch of fruit may be worth 4 or 5 annas at the least, whereas, the fruit of the *Musa textilis* is of no value.

46. There seems little or no probability of the *Musa textilis* becoming an established crop, on this side of India. On the Western Coast, in some localities where irrigation and manuring are less urgently needed, the cost of producing the plants will be much less; and there, some experiments should be tried.

47. A number of plants were cut down for fibre, the following statement, gives some of the results:—

No.	Date of Experiment.	Weight of Stem.	Length of Stem.	Circumference near the Ground.	Yield of Fibre.	
					Yield of one Plant.	Percentage of the Stem.
		LB.	FEET.	FEET.	LB. OZ.	
1	12th November 1881	138	11	2¼	1 2	·81
2	12th ,, ,, ...	56	6	1¾	0 6	·67
3	12th ,, ,, ...	72	9	2	0 10	·86

48. The next table shows the results of a second series of experiments:—

No.	Date of Experiment.	Weight of Stem.	Weight of Inner Portion.	Weight of Middle Portion.	Weight of Outer Portion.	Weight of the Pith.	Length of the Stem.	Circumference at the Bottom of the Stem.	Circumference at half the Height of the Stem.	Circumference at the Top of the Stem.	Yield of fibre from			Percentage of Fibre in the Stem.
											Inner Portion.	Middle Portion.	Outer Portion	
		LB.	LB.	LB.	LB.	LB.	FT.	FT. IN.	FT. IN.		OZ.	OZ.	OZ.	
1	23rd March 1882.	58	23	..	25	10	8	2 3	1 10	1 6	4	..	1	·53
2	24th ,, ,,	78	42	..	31	5	8¼	2 6	1 11	1 6	5	..	1	·48
3	27th ,, ,,	77	22	23	27	5	8	2 6	1 11	1 6	4	1¼	1	·50

49. Some of the plants were in flower, and some bearing fruit, when they were cut. It was, of course, undesirable, as regards the production of fibre, that the plants should be allowed to stand so long as to produce fruit, but the intention had been to try to rear plants from the seeds, which was frustrated by a cyclone prostrating the plants; they were therefore utilized as already shown. The men when engaged in separating the fibre were allowed to work in their own way, in the manner adopted in extracting the fibre of the common plantain. The process is extremely clumsy, very slow, and very costly. With practice the men might have done better, but they never would be able, by their process, to produce prepared fibre at a cost sufficiently low to admit of it being sold at a profit.

50. Some rough experiments were made in crushing longitudinal sections of the stems of the common plantain through an ordinary oat-crusher. In one experiment 20 lb. of plantain stalk yielded 7½ oz. of rough fibre, but even in this case the cost was

about 2 annas per pound, much beyond the value of the fibre and the cleaning was very imperfectly done. For some purposes, it may be desirable to obtain roughly-prepared strong fibre, at a moderate cost, rather than a highly-prepared fibre, at a high cost. There is no probability of really clean fibre being turned out by the ordinary process, at a cost less than 6 annas per pound—a cost far in excess of the value of the fibre. The experiment with the corn-crusher therefore, suggests a direction in which economy may be secured in the extracting process. It was found that the iron rollers discolored the fibre. A stem-crusher formed of a pair of wooden rollers, has been constructed, but it needs further improvement. The experiments made with this machine will be noticed in the next report. Samples of this fibre, and of that prepared by the hand, in the usual way, have been sent to England for valuation.

51. It would appear, that in this part of India, it would be better to give attention to the common plantain, in view to the production of fibre, or, a paper material, rather than to spend money in endeavouring to introduce *Musa textilis*. The fibre of the common plantain is utilized only to a very small extent; the plant is grown everywhere, where water can be commanded and a suitable soil is available. The culture of the crop is well understood, and in the price got for the fruit all expenses are returned; thus, the stems are obtained almost free of cost. The following data, referring to an ordinary plantain, the stem of which was crushed for fibre, may be of interest:—

Date of experiment	... 17th Nov. 1880.
Weight of stem	... 52 lb.
Length of stem	... 7¾ ft.
Circumference of the stem near the ground ...	... 2 ft.
Yield of fibre	... 8 oz.
Percentage of the stem	... 1·04

It is evident, however, that the possession of a suitable mill for crushing the plant is an absolute necessity, to admit of the fibre being produced at a sufficiently moderate price to compete in the market. Several mills for extracting fibres, are now advertised by different manufacturers in the United States, and in that country inquiries will be instituted.

52. TAPIOCA (*Jatropha manihot*).—A small plot was grown in the Botanical grounds, the plants were in rows about half a yard apart; the ground was occasionally watered. The outturn of tubers was 6,487 lb. per acre. No attempt was made to extract the starch.

53. TOBACCO (*Nicotiana tabacum*).—A small supply of Virginia, Havanah, and Maryland tobacco seed, was received from Sydney. Small plots of each of these were grown in view to raising seed.

54. WHEAT (*Triticum sativa*).—A small plot sown with this crop failed to give satisfactory results. Wheat has not as yet been successfully cultivated at Saidápet, except the husked variety (*Triticum spelta*). The climate is apparently too hot, for the better kinds of wheat.

55. CHICORY (*Chichorium intybus*).—A supply of seed was obtained from Sydney; it was sown on the 26th December 1881; the crop grew luxuriantly; the plants were in flower at the close of the year. The roots are fibrous and poor.

56. TOMATOES (*Solanum Lycopersicum*).—This crop did very well indeed; it was sown on the 2nd February 1882; and during the next three months it yielded 683 fruits, varying in size from that of a gooseberry to that of a fair-sized guava. It is surprising that this crop, which grows so readily and produces so well, at a season of the year when vegetables and fruits are scarce, should be so little cultivated around Madras. In the warmer parts of America, the Tomato is very largely grown, and is used not only as a vegetable, but for making jams, pickles, &c.

57. ONIONS (*Allium Cepa*).—A small experiment was made in growing onions with seed obtained from Cuddapah. The crop matured in about two months from the time of sowing, and gave an outturn of 1,575 lb. per acre—a fair return, considering the season at which the crop was grown, the poverty of the soil, and, the short period of growth.

58. PERSIAN DATES.—Thirteen of the imported plants are living, but they have made very little progress. Some date seeds received from Egypt germinated well, and have produced a number of plants. Edible dates should thrive in South India.

59. COFFEE (*Coffea Arabica*).—The coffee shrubs continue to thrive. There are 26, all about 4 years of age; they are of an average height of 5 feet, and at the close of the year were heavily covered with blossom. The Liberian plant has made but little progress; it is $3\frac{1}{2}$ years of age, and only about $5\frac{1}{2}$ feet in height. It also was in bloom at the end of the year.

60. POTATOES (*Solanum tuberosum*).—Some Maltese potatoes were obtained, and were planted on a small plot of land; they germinated well, and several threw up strong stems; but the hot weather killed all.

61. INTRODUCED GRASSES (*Andropogon Halipense*).—The seed of this grass was obtained from the United States of America; it germinated well, and produced strong, healthy plants which have seeded. The grass is a very coarse reedy one, and is not likely to be of much value in places where Guinea grass (Panicum jumentorum) can be grown. During the hot weather of January, February and March, when this variety of grass was withered up, Guinea grass growing side by side, under similar conditions, was quite green.

62. ANDROPOGON ALBUM.—The seed of this grass was also introduced from America. The grass is apparently a good one; it produces a large number of bottom blades, even, in comparatively dry weather. It also has seeded well.

63. BUFFALO GRASS.—The roots of this grass were obtained some years ago from Australia, but the plants have made no progress, and have not seeded. The grass, does not appear to have much to recommend it.

64. PANICUM BROWNII.—The seed of this species, also, was obtained from the United States. It is an excellent grass; it has thriven at Saidápet remarkably well. When fully naturalized, it will make an excellent pasture grass. It has seeded very freely. This grass is decidedly the best that has yet been introduced into this part of India.

65. FIBRE PLANTS.—The following varieties of fibre plants were grown in the experimental grounds:—

66. HEMP (*Cannabis sativa*).—This is the common hemp plant. It grew very well indeed. Its average height was about $6\frac{1}{2}$ feet.

67. JUTE (*Corchorus olitorius*).—The growth was poor and irregular.

68. SUNN HEMP (*Crotalaria juncea*).—It grew very well indeed. The plants were both tall and free from side branches.

69. ROSELLE (*Hibiscus subdariffa*).—This crop also grew very satisfactorily; it produced tall, upright plants, and from these some good fibre was produced.

70. BENDACOY (*Hibiscus esculentus*).—This grew very well, but was short and very bushy.

71. RHEEA (*Boehmeria nivea*).—This crop grew very well during the cold season. but the plants were short, the average height being about 4 feet. The stems were straight and almost branchless, and contained a large quantity of very strong fibre. Some experiments were made in extracting the fibre by the hot-water process, but, the results were not satisfactory. The fibre was of a dark color and very gummy.

72. LINSEED (*Linum usitatissimum*).—The plants grew fairly well; but they were very short and bushy, even though the seed had been sown very thickly. It is the usual practice in this country to sow linseed for the seed, rather than for fibre; hence, it is customary to sow thinly. This secures a better crop of seed, though it spoils all chance of any good fibre being produced, probably, if the indigenous seed was sown successively for several seasons, specially in view to producing tall branchless plants, this result might be obtained. At any rate the experiment will be tried at the farm. The small plot gave an outturn of seed at the rate of 302 lb. per acre

73. (*Malachra Rotundifolia*).—Though the plants were healthy, they were very small and so branched as to be of no use for fibre.

74. INTRODUCED AND OTHER TREES.—The following data, regarding the condition and progress of different trees, at the experimental grounds, may be of interest:—

Botanical Name.	Common Name.	Number of Specimen.	Place from which the Seed or Specimen was received.	Height of the Tallest Specimen.	Diamter of spread of Branches.	Age of the Specimen.		Remarks.
				FT.	FT.	YS.	MS.	
Morus Indica	Mulberry plants.	7	Bangalore.	16	18	3	7	Began to bear last year.
Psidium pomiferum ..	Graft guava ..	10	Do.	10	12	3	7	Do.
Punica Granatum ..	Pomegranate ..	3	Do.	8	7	3	7	Do.
Achras Sapota ..	Sapota ..	2	Do.	4	2½	3	7	Not bearing; very slow growth.
Aegle Marmelos ..	Bael tree ..	2	Do.	8	3	3	7	Not bearing; grows well.
Anona Squamosa ..	Custard apple ..	2	Do.	6½	4	3	7	Not bearing.
Do. Muricata ..	Sour sop ..	3	Do.	9	7	3	7	Began to bear last year; bore heavily.
Do. Reticulata ..	Sweet sop or Bullock's heart.	1	Do.	10	7	3	7	Began to bear last year.
Citrus Vulgaris ..	....	5	Do.	5	9	3	7	Do. do.; bore heavily.
Bassia Longifolia ..	Bassia tree ..	1	Do.	15	1½	3	7	Not bearing.
Citrus Decumana ..	Shaddock or Pumplemose.	2	Do.	8½	4	3	7	Do.
Do. Medica	Citron ..	2	Do.	2	2	2	5	Do.
Do. Aurantium ..	Sweet orange ..	4	Do.	7	4	3	7	Do.; grows well.
Do. Bergamia ..	Acid lime ..	3	Do.	9	8	3	7	Bearing this year.
Ficus Carica	Fig	1	Do.	8	4	3	7	Bears well; fruits small.

Botanical Name.	Common Name.	Number of Specimens in the Botanical Garden.	Place from which the Specimens or Seed were received.	Height of the tallest Specimen.	Girth of the tallest Specimen.	Age of the Specimens. Y.	Age of the Specimens. M.	Remarks.
Eucalyptus Hemipoya	....	2	Bangalore ..	24′ 1″	15″	3	7	Produces gum.
Do. Paniculata	....	2	Do. ..	26′ 8″	17″	3	7	Partially spoiled by late cyclone.
Do. Teriticormis	Red gum tree ..	11	Australia	27′ 8″	11″	2	1½	The tallest grown Eucalyptus tree.
Do. Citriodosa	Lemon-scented gum .	2	Do.	17′ 7″	8″	2	1½	Produces black gum.
Do. Sidrophlio	....	3	Do.	18′ 7″	7″	2	1½	Bushy in general; red gum.
Do. Hemipoya	....	2	Do.	12′	5″	2	1½	Produces gum.
Do. Rostiata	....	2	Do.	17′ 4″	10″	2	1½	Do.
Do. Rosinifera	....	3	Do.	15′ 9″	11″	2	1½	Do.
Do. Bicolor	....	3	Do.	10′ 4″	6″	2	1½	No gum; bushy growth.
Do. Yellow Mahagony ..	....	3	Do.	5′ 9″	2½″	2	1½	Leaves dark green.
Do. Gonicalyt	....	3	Do.	13′ 4″	7″	2	1½	Produces gum.
Casuarina Muricata	Casuarina ..	80	Bangalore ..	43′ 4″	22″	3	6	
Conocarpus Latifolia ..	....	6	....	20′ 9″	17½″	3	2	
Hæmatoxylon Campechianum ..	Log wood ..	1	Agri-Horticultural Gardens, Madras.	10′	5″	3	0	
Pongamia Glabra	Pungam tree ..	30	....	21′	23″	5	0	
Terminalia Catappa	Country almond ..	3	Agri-Horticultural Gardens, Madras.	16′	9″	3	0	
Acacia Raspling	....	2	Nilgiri Hills ..	11′ 7″	3½″	2	1½	
Do. Implexa	....	2	Do. ..	4′ 6″	2½″	2	1½	
Do. Jaligna	....	4	Do. ..	11′ 3″	8″	2	1½	Very much branched.
Do. Longifolia	....	1	Do. ..	6′ 7½″	3″	2	1½	
De. Proslanthera	....	12	Do. ..	8′ 2″	4″	2	1½	
Cæsalpinia Coriaria	American Sumach ..	17	Bangalore ..	15′ 9½″	8″	2	1½	Yielded 13 lb. of seed in the year.
Pterocarpus Marsupium	Kino tree	3	Madras Horticultural Gardens.	14′ 2″	9″	3	0	
Sterculia Alata	Winged Sterculia ..	2	....	4′ 4″	5″	3	0	
Swietenia Mahagony	Mahagony tree ..	3	Australia	14′ 4″	9″	4	0	
Dalbergia Frondosa	....	4	....	14′ 10″	12″	3	0	
Tectona Grandis	Teakwood tree ..	4	Bangalore ..	19′ 4″	11″	3	0	Damaged by cyclone.
Eriodendron Anfractuosum ..	White cotton tree ..	6	Do. ..	20′ 4″	21″	3	0	
Pithecolobium Saman	Rain tree	13	Madras Horticultural Gardens.	23′ 8″	30″	3	4	Flowered for the first time this year; closes its leaves at 4-30 to 5 P.M., and opens at 6-30 to 7 A.M., in April.
Ficus Elastica	India rubber tree ..	1	....	3′ 3″	2″	1	2	

75. THE SOY BEAN—*Glycine Soja* (*Soja Hispida*).—This is the ordinary China bean, a plant largely cultivated in China and Japan. The bean affords a valuable oil, and the residue, after crushing a valuable cattle food, while the green pod is made into the well-known sauce. The Society of Arts Journal, of August last, having drawn attention to some experiments made on the Continent of Europe in feeding stock with this valuable bean, it was thought advisable to obtain from the hotter part of China a supply of the seed, in view to making a small experiment in its culture at Saidápet. Messrs. Jardine, Matheson & Co., the eminent merchants of Hongkong, were good enough to procure, and forward to Saidápet, a small supply of the seed. It arrived safely, and on the 4th January 1882, a plot of 72 square yards was planted with the seed. It germinated well and produced healthy plants but only about 1½ ft. in height; some of which were well covered with pods, but the majority, did not thrive, apparently owing to the excessive heat of the weather at the time. Of course, it was far from a favorable time of the year, at which to sow the crop, but it was thought better to sow the seed, with the chances of adverse weather, rather than, to keep it over until the following cold season, as, experience had shown, that the larger leguminous seeds so readily lose their vitality, when exposed to a high temperature. The crop was gathered in April 1882, the yield per acre was 280 lb. only.

76. The plant, and the seed, much resembled Mochacottay (*Lablab Vulgaris*), but the Soy bean grows more uprightly, and the leaf is slightly different, while it has no tendrils. Mr. Wilkins has furnished the following statement, showing the differences between Lablab vulgaris and, the Soy bean :—

Lablab Vulgare.—Larger plant, less hairy than Dolichos Soja, twining.

Pods horizontal. Broadly scimitar-shaped, gibbous below apex, and ending abruptly in a straight or recurved cuspidate point. Three to 5-seeded seed, with raphe very marked, seed larger, longitudinally oval, compressed.

Dolichos Soja.—Plant small, not twining, leaves *very hairy*, small. Pods pendulous, narrower, 2-seeded, often 3-seeded, seeds smaller, inclined to be round, raphe indistinct.

77. The following analysis, published by the Society of Arts, shows that the bean is, a very nutritious one :—

Constituents.	P.C.
Water	15·20
Fat	16·21
Protein compounds	28·63
Non-nitrogenous extractive matter	30·84
Fibre	4·38
Mineral matter	4·74
Total ...	1 0·00

78. It would be a very great advantage, in this part of India, if a good variety of bean, could be introduced into general cultivation, for human food. The people of South India, depend largely on a vegetable diet, generally of a very inferior kind, and the addition of a good pulse to their daily food, would go a long way towards supplying the albuminoids which they so greatly require, and which, they at present get in such small quantities.

79. PANICUM CAPPILLARE (*Giant Grass*).—This grass having attracted some attention in Java, it was thought that its introduction into this country might be advisable. Before taking steps to introduce it, enquiries were instituted regarding its history and character. The result of these enquiries was not satisfactory, as will be seen from the following extracts from reports submitted :—

"It is not an Asiatic species, but is indigenous in the region of country lying to the west of the Missouri River, United States, where it is found widely spread. Referring to this grass, in his report for the year 1870, the United States Commissioner of Agriculture wrote : "The yearly pioneer, however, has already learned how soon the good native grasses are destroyed by the

clipping and treading of domestic animals, and he sees with regret their places immediately occupied by * * * *Panicum Cappillare, Panicum Sanguinale*, &c., &c., worthless weeds and grasses that occupy the soil to the exclusion of every profitable production."

From this quotation, it would appear that the grass has not a good reputation in the country where it is indigenous. Of course, it is possible, the grass may have since been improved, by undergoing special cultivation and treatment. The following are extracts from letters from Java, and the United States, referring to this grass;—

"As to the '*Panicum Cappillare*' you want my information about, I can only tell you that it has been introduced in Java by a private planter, but I do not know in how far the results of its cultivation answer to the great expectations this gentleman had of its qualities as a fodder plant.

"This is one of the many varieties of panic grasses found wild in this country, none of which seem to be thought worthy of cultivation; however, this special variety is not cultivated, and this seed cannot be procured."

MANURES.

80. The manures used during the year were, oil-cake, paddy husks, ashes, farm-manure, slaughter-house refuse, indigo-vat refuse, &c.

81. A compost of oil-cake, paddy husks and ashes, was applied with good results as, a top dressing to the paddy land. The manure most largely used was farm-manure, made, as usual, in the loose boxes; it remained undisturbed until required in the fields. The loose-box system, continues to afford most satisfactory results, both as regards the health of the stock, and the quality of the manure obtained. There can be no doubt, but that this system of collecting and preparing manure, is well adapted to the requirements of South Indian farming.

82. Sheep manure was collected in the sheds where the sheep are confined at night; a layer of sand collected the urine, and this, with the solid manure, form an excellent top-dressing for grass and other crops.

83. Some fields were manured directly by sheep, by penning them on the land. To ascertain the effects of sheep-folding in comparison with the fertilizing effect of indigo-vat refuse, the following experiment was made:—Field No. 29 was divided into two plots; one plot measured ·84 acre, and the other ·94 acre. The former was manured, by folding seventy-six sheep on it for twenty-two nights, which was equal to about 2,000 sheep, one night, per acre; the sheep had a daily allowance of $\frac{1}{2}$ lb. of oil cake, per head, and were grazed during the day. The other plot was manured with indigo refuse at the rate of 3 tons per acre. The land was sown with paddy, and the following are the results:—

Manure applied.	Area of Plot.	Outturn.			
		Per of Plot.		Per Acre.	
	ACS.	LB. GRAIN.	LB. STRAW.	LB. GRAIN.	LB. STRAW.
Plot manured by sheep folding	·84	991	2,985	1,180	3,554
Do. with indigo refuse	·94	1,299	5,208	1,382	5,540

The indigo refuse produced the best crop; probably much of this result is to be attributed to the physical action of the organic matter; still, indigo refuse is undoubtedly a valuable manuring agent when, it has been protected from the weather.

84. To test the efficacy of lime, as a manure for indigo on the farm land, the following experiment was made. The western portion of Field No. 15, about 3 acres in extent, was divided into three plots, one plot was unmanured, one plot received 17 parahs of lime, and the other plot was manured with 34 parahs of lime; a parah contains 4,000 cubic inches. The lime was slacked before being applied. The following statement shows the results:—

Manures.	First Cutting.		Second Cutting.		Third Cutting.		Total Outturn.	
	Bundles.	Weight.	Bundles.	Weight.	Bundles.	Weight.	Bundles.	Weight.
		LB.		LB.		LB.		LB.
No manure	40	2,240	17	874	31·5	1,718	88·5	4,832
8½ Parahs of lime ..	43	2,408	22	1,186	44	2,528	109	6,122
17 Do. do. ..	61	3,416	20	1,032	44·5	2,625	125·5	7,073

85. To ascertain the manurial value of the slaughter-house refuse, compared with that of farm manure for cotton, the following experiment was made. Field No. 10, west, was divided into two equal plots, one of these plots was manured with 8 tons of farm manure, and the other with 8 tons of slaughter-house refuse, and the whole of the land was sown with cotton. The next table shows the results :—

Months.	10 A. North.	10 A. South.
	8 Tons Farm Manure.	8 Tons Slaughter-house Refuse.
	Cotton-in-seed lbs.	Cotton-in-seed lbs.
March 1881	16	13 50
April ,, ...	6·50	8·25
May ,, ...	49·75	29·50
June ,, ...	97·50	74·25
July ,, ...	35·	41·75
August ,, ...	54·	14·25
September ,, ...	18·75	11
October ,, ...	..	6·25
	277·50	198·75

86. The slaughter-house refuse consisted chiefly of rejected offal, blood, &c., largely mixed with wood ashes ; the refuse is collected daily, and, is thrown into a pit and covered with wood ashes ; after being in the pit for about 3 months, the manure is thoroughly deodorized, and is then in a fine dry powdery condition.

87. Gypsum (sulphate of lime) was tried as a manure, in a small experiment with Minnesota Amber sugar-cane. This manure, under the name of "plaster," is largely used in the United States, for Sorghum crops. It is difficult to procure gypsum near Madras, and it costs from 10 to 15 rupees per ton. There are no natural deposits of gypsum, it is believed, nearer Madras than Trichinopoly. The special point, under investigation in this experiment, was the effect that gypsum would produce in the amount of crystallizable sugar in the juice of the plants. The cultivation results of the plots have already been noticed under "Crops." The following extracts refer to the experiments made in preparing jaggery from plants raised with gypsum, and, without it :—

"Not having been able to obtain suitable apparatus for making sugar, I confined the experiment to the manufacture of jaggery. The results of the various determinations are tabulated below :—

Number of Experiment.	Date of Experiment.	Number of Canes crushed.	Weight of Canes.	Weight of Heads.	Yield of Juice.			Yield of Jaggery.			Remarks.
					Volume.	Weight.	Percentage of Weight of the Cane.	Weight.	Percentage of the Juice.	Percentage of the Canes.	
	1881.		LB.	LB.	*MRS. OLLS.	LB.		LB. OZ.			
1	18th October.	50	47	4	4 3	17¾	37·76	1 6	7·74	2·92	Soil dressed with gypsum.
2	18th ,,	50	49	4	5 0	20¼	41·32	1 12	8·64	3·57	
3	22nd ,,	50	49	5	4 1½	17¼	35·20	2 3	12·68	4·46	Soil dressed with gypsum.
4	22nd ,,	50	45	4¾	4 0	16	35· 5	2 5	14·45	5·13	
5	28th ,,	66	50	..	6 1	24½	49· 0	3 0	12·24	6· 0	
6	28th ,,	82	50	..	6 5	26	52· 0	3 1	11·77	6·12	

* A Madras measure contains 100 cubic inches.

"Mr. Hamilton, F.C.S., Chemical Lecturer in the Agricultural College, was good enough to make analyses of the jaggery produced. The following is his report :—

'REPORT of Analysis of three Samples of Sorghum Jaggery, the produce of the Government Saidápet Farm.

——	Amber Cane Jaggery from Plants grown without Gypsum.	Amber Cane Jaggery from Plants grown without Gypsum.	Amber Cane Jaggery from plants grown with Gypsum.
	1	2	3
	PER CENT.	PER CENT.	PER CENT.
Crystallizable sugar	68·98	65·91	65·91
Non-crystallizable sugar	15·75	14·24	14·24
Water and extractives	15 27	19·85	19·85
	100·00	100·00	100·00

'REMARKS.—The samples are of varying appearance. No. 1 is more consistent and lighter in color than the other two ; the crystallizable sugar in this sample is in a finely granular condition. Nos. 2 and 3 are of a darker color ; the crystals are more abundant, and are deposited in the bottom of the vessel beneath the dark supernatant syrup. No. 3 is somewhat darker from the presence of caramel due to slight burning.

'The examination of the jaggery was made with an average sample prepared by intimately mixing the syrup and sugar in each vessel.

'Taking into consideration that the process employed on the Farm is of the simplest description, the results are very favorable. The quantity of non-crystallizable sugar is high in all the samples, but this may be due to some defect in the preparation of the syrup by which the crystallizable sugar had suffered change by 'inversion.' The proportion of glucose in the freshly expressed juice is small, as I have ascertained. If, therefore, precautions were taken to avoid fermentation, there is no doubt that a larger outturn of crystallizable sugar would result. The juice decomposes quickly when exposed to the action of the air.

'The quantity of the jaggery was determined by Fehling's gravimetric copper process : this method was selected owing to its general adoption by Chemists in the United States, and will be useful for comparison with the published analyses of sugars from American-grown cane.

'If the necessary means for controlling the fire were available in boiling the clarified juice, the syrups could doubtless have been submitted to further concentration ; the presence of the water showing a relative decrease in the three samples in the proportion of crystallizable sugar.

No. 1 shows an apparent increase in the total quantity of sugars, which can be accounted for by the greater concentration of the syrup in this case. The uniformity in the results obtained from Nos. 2 and 3 is striking. The manure used does not appear to have influenced the production of sugar.'"

The juice on leaving the mill contains glucose, besides cane sugar, and, an acid. When the canes are not sufficiently ripe, there appears to be more glucose present. Lime was used to neutralize the acid, but even in neutral solutions of juice, fermentation converts cane sugar into glucose—a result also produced by concentrating the juice in open pans. Another small experiment was made in dressing land with gypsum, in view to increasing the percentage of sugar in Maize plants. These cropping results also, have been referred to. The following account, refers to the jaggery-manufacturing portion, of the experiment:—

Number of Experiment.	Crop.	Date of Experiment.	Canes			Yield of Juice.			Yield of Jaggery.		
			Number of Canes crushed.	Weight of Straw.	Weight of Canes after stripping and topping.	Volume.	Weight.	Percentage Weight of the Canes.	Jaggery.	Percentage of the Juice.	Percentage of Straw.
				LB.	LB.	MS. OL.	LB.		LB.		
1	Hawkesbury River Maize..	27th Dec. 1881 ..	100	80	54	5 0	21	26·25	2·25	10·7	2·81
2	Do. do. ..	27th ,, ,, ..	200	175	112	10 4	43½	24·85	5·50	12·6	3·14*
3	Clarence River Maize ..	27th ,, ,, ..	100	94	63	5 2	21½	22·87	2·50	11·6	2·66
4	Do. do. ..	28th ,, ,, ..	100	95	64	5 6	25	26·31	3·25	13·0	3·42*

* Manured with gypsum.

" It will be observed that the yield of jaggery on the average is about 3 per cent. of the weight of the straw. Mr. Hamilton, F. C. S., was good enough to make an analysis of the jaggery produced. The following is his report:—

" Report of Analysis of four Samples of Maize Syrup, the produce of the Government Saidápet Farm.

—	Clarence River Maize.		Hawkesbury River Maize.	
	Manured with Oil Cake.	Manured with Oil Cake and Gypsum.	Manured with Oil Cake.	Manured with Oil Cake and Gypsum.
	1	2	3	4
	PER CENT.	PER CENT.	PER CENT.	PER CENT.
Crystallizable Sugar	34·99	29·61	28·93	31·40
Non-crystallizable Sugar	11·46	25·22	17·19	18·34

' The large amount of water in Nos. 1 and 3 will account for the smaller quantity of total saccharine matter. None of the samples have the consistence of jaggery; they are syrups of varying density, Nos. 2 and 4 being more concentrated. The higher percentage of non-crystallizable sugar in No. 2 points to some defect in preparation—either that the juice was not immediately boiled, or that the prolonged boiling of maize juice in open pans favors the conversion of the crystallizable sugar into glucose.'

It will be seen that the jaggery from the " Clarence River Maize " is richer in crystallizable sugar than that of the other variety. It is difficult to explain why the gypsum-manured portion of the plot yielded a smaller percentage of crystallizable sugar, for it is generally supposed that gypsum facilitates the formation of this kind of sugar. However, on both plots, unlike in the Amber sugar cane experiment, the gypsum increased considerably the total yield of sugar. In the case of the " Clarence Maize," the increase was nearly 10 per cent. As far as the data afforded by these experiments, enable an opinion to be formed, it does not appear that it will pay to make jaggery from the juice of the maize plant unless, it be grown on much superior soils than at the farm. The subject, however, is one well worth further investigation both here

and elsewhere, as in the United States it has been found highly profitable to extract the sugar of the maize plant. The presence of so much sugar, in the straw of maize, indicates the high value of this straw for feeding stock.

88. The following experiment, was made to ascertain the effects of lime on the arrowroot plant, as regards its yield of starch :—

Plot C was dressed with 30 lb. of slacked lime, equal to an application of 2,017 lb. per acre ; the other two plots, received no lime. The following, are the results :—

Plot A.	Area.	Actual Outturn.		Per Acre.	
		Tubers.	Starch.	Tubers.	Starch.
	SQ. YD.	LB.	LB.	LB.	LB.
2 (A)	72	82	4	5,512	269
3 (B)	72	161	6	10,823	403
4 (C)	72	158	18·50	10,621	1,244

The tubers in Plots A and B, were very small, and much diseased, whereas those in Plot C, were of a fair size and generally, sound. As the soils were identical, and, the treatment similar in every respect, the great superiority of the crop of Plot C can, therefore, be attributed only to the effects of the lime.

89. The manuring experiments in Field No. 8 were continued on eight of the plots ; those on the other plots, had to be abandoned, from the great want of uniformity in the soils, chiefly, as regards their physical condition—drawbacks, not disclosed fully, until the long drought of the past season. Each plot, measures one-tenth of an acre, and each, is separated from the other, by a foot-path.

90. Since the year 1880, the manures used, have been those only that can readily be procured in the neighbourhood of the farm, and the cost, per acre, has been limited to Rs. 5, excepting in the case of farm manure, which, was employed as a standard, for comparison. It would, perhaps, have been better, from the first, to have confined the experiments to one variety of sorghum ; and, in future, the yellow variety only, which is the hardiest of the family, will be sown. The crop of the last season was sown on the 7th September, the seed was very good, 90 per cent. being vital. It germinated freely, and produced a uniform covering of plants. On the 4th of January, the crop was harvested, and from the eight plots 616 lb. of grain and 5,992 lb. straw were obtained, equal to 770 lb. of grain, and 7,490 lb. of straw, per acre.

91. The next statement, shows the results of the cropping of the two years, over which, the experiment has extended :—

FIRST YEAR (1880-81). Crop—Sorghum Vulgare.						SECOND YEAR (1881-82). Crop—Sorghum Saccharatum.						Total Outturn of each Plot per Acre in the 2 Years over which the Experiments have extended.		Value of Produce per Acre.		
Plot.	Manure used on each Plot.	Outturn. Per Plot. Grain.	Per Plot. Straw.	Per Acre. Grain.	Per Acre. Straw.	Manure used on each Plot.	Outturn. Per Plot. Grain.	Per Plot. Straw.	Per Acre. Grain.	Per Acre. Straw.		Grain.	Straw.	Grain.	Straw.	Total.
		LB.	LB.	LB.	LB.		LB.	LB.	LB.	LB.		LB.	LB.	RS.	RS.	RS.
3	1 ton Farm manure	95	531	950	5,310	No manure	60	840	600	8,400		1,550	13,710	31·0	45·7	76·7
4	No manure	54	291	545	2,915	10 cwts. Farm manure	99	672	990	6,720		1,535	9,635	30·7	32·1	62·8
5	2,860 lb. Ashes	51	238	515	2,385	No manure	84	840	840	8,400		1,355	10,785	27·1	35·2	62·3
6	No manure	57	281	570	2,810	66½ lb. Oil cake	75	840	750	8,400		1,320	11,210	26·4	37·3	63·7
7	211 lb. Slacked lime	48	210	485	2,100	No manure	61	728	610	7,280		1,095	9,380	21·9	31·2	53·1
8	No manure	47	218	475	2,185	1 ton Farm manure	99	896	990	8,960		1,565	11,145	31·3	37·1	68·4
9	50 lb. Oil cake	84	361	845	3,615	No manure	80	616	800	6,160		1,645	9,775	32·9	32·5	65·4
10	No manure	34	191	345	1,915	Do.	58	560	580	5,600		925	7,515	18·5	25·0	43·5
	Average Yield ..	59	290	591	2,904	Average Yield ..	77	749	770	7,490		..	..	..	..	..

It will be noticed that the highest money value of produce, is that of plot 3 manured with Farm manure at the rate of 10 tons per acre. The highest outturn of grain, however, was obtained on plot 9, manured with oil-cake, and yet, this manure contained only about half as much nitrogen as, the Farm manure was supposed to contain. It will be observed also that, contrary to usual experience, the ashes gave a larger return in the second year, than in the first. They were a mixture of the ashes of paddy husks, cow-dung, and of wood. The low outturn from lime, may be due to the great deficiency of organic matter in the soil, and, to the fact that the soil is a very sandy one ; lime, usually, has more effect on clay soils, than on sands, especially clay soils which, contain a fair amount of organic matter.

92. Assuming that in the two years, the manures applied in 1881, to plots 3, 5, 7 and 9 were all used up, it would appear that the manural value of the Farm manure, compared, with that of ashes, lime, and oil-cake, at the prices at which they are procurable at the Farm, is only Annas 10 per ton, a price much lower than that, at which it has hitherto been valued. The Farm manure may, however, be more lasting in its manural effects, than the other substances experimented with, and on this point, the next year's crop will throw light, as the plots will be cropped without manure.

93. To ascertain, whether the growth of weeds, of any special variety, was encouraged, by any of the manures used in the experiments, the ground was examined by Mr. Wilkins after the removal of the last crop, and he, has been good enough to furnish the following statement :—

	10	9	8	7	6	5	4	3
Weeds Number.	Very few.	Few.	Overgrown with weeds.	Very few.	Few.	Few.	Very few.	Very few.
Weeds Varieties	*Poa plumosa. †Ipomæa Pestigridis. ‡Cyperus rotundus. §Commelina. Bengalensis.	*Cynodon Dactylon. ‡Cyperus rotundus. §Commelina. Bengalensis.	*Cynodon Dactylon. ‡Cyperus rotundus. §Commelina. Bengalensis.	*Poa plumosa.. †Ipomæa Pestigridis. ‡Cyperus rotundus. §Commelina. Bengalensis.	*Cynodon Dactylon. ‡Cyperus rotundus. ‖Eclipta erecta. ¶Lenca Indica.	*Poa plumosa. †Ipomæa Pestigridis. ‡Cyperus rotundus. §Commelina. Bengalensis.	†Poa plumosa. †Ipomæa Pestigridis. ‡Cyperus rotundus. §Commelina. Bengalensis.	‡Cyperus rotundus. §Commelina. Bengalensis.

Natural Order.

*Graminacæ. †Convolvulaceæ. ‡Cyperaceæ. §Commelinaceæ. ‖Compositæ. ¶Labiateæ.

It will be observed that the oil-cake encouraged the growth of Hariali grass (Cynodon Dactylon); a hint for grass growers.

94. The experiments, referred to at paragraph 57, of the last report, were continued during the past year. It was found necessary to ascertain the manural value of paddy straw, in connection with theses experiments, and two of the plots were accordingly manured with 185 lb. of paddy straw; while, as paddy husks are used in preparing the bratties, from which the cow-dung ashes were made, an equivalent amount of husk ashes has been added to the plots manured with box manure, solid dung, and paddy straw. The crop grown was *Sorghum Kaffrarium*, the drought in October nearly ruined it, resulting in a serious attack of "rust" which, occurring when the plants were in flower, proved most disastrous.

95. The great uncertainty of the weather in this part of India, is a very serious difficulty in the way of field experiments, conducted without the aid of irrigation water, over a series of years; which, a single bad season may bring to an untimely end. On the other hand, manural experiments conducted on irrigated land, are liable to serious errors, by accident, or carelessness, in the application of the water. The experiments will, be persevered in, for though, their results are now, apparently, very conflicting, they may become intelligible when more data are available on which to form a conclusion; and, probably, the character of the season has much to do with these results. The manures used, were made by 3 pairs of cattle, worked, and fed, alike. The next statement, shows the amount of manure of each kind, obtained in each year:—

1880-81.

Description of Manure.	Number of Hours during which the Cattle were tied up.	Weight of each pair of Bullocks.	Box Manure.		Solid Excrements.		Ash of Cattle-dung.		Food of the Animals.		
			Straw used for Bedding.	Weight of Box Manure obtained.	Weight of the fresh solid Excrements.	Solid Excrements finally available.	Indigo Husk used for Bratties.	Weight of Ashes obtained.	Cake.	Green food.	Straw.
	HOURS.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.	LB.
A. Box manure	1,051	1,126	545	1,716	..	..	..	..	182	2,275	2,275
B. Solid excrements ..	1,049	1,135	..	..	2,171	784	..	..	182	2,275	2,275
C. Ashes	1,051	1,115	..	..	2,288	..	90	240	182	2,275	2,275

1881-82.

A. Box manure	1,209	1,219	185	1,848	..	..	..	..	320	2,731	1,335
B. Solid excrements ..	1,195	1,281	..	..	1,653	676	..	..	320	2,931	1,335
C. Ashes	1,200	1,252	..	..	1,636	..	56	171	320	2,831	1,335

Average outturn of manure .. .. From one pair of cattle during fifty. two days.

	LB.
In Farm manure	1,848
Solid dung	1,653
Ashes	171

The pairs of cattle, were recognised as, A, B, and C. The excrements of A, solid and liquid, were collected with the litter, in the form of box manure. As regards B, only solid excrements were collected, as is the practice amongst the ryots; this was thrown into an open midden quite unprotected from the weather. While the solid excrements of C, were daily collected, and made into bratties, and these, were afterwards burnt into ashes.

96. The results of the two years' experiments, are tabulated on the other side:—

1880-81.

Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5.
Manure—856 lb. box manure.. ..	Manure—None	Manure—392 lb. solid excrements ..	Manure—None	Manure—120 lb. dung ashes.
Produce .. { Grain .. 25 lb. Straw .. 189 ,,	Produce .. { Grain .. 14½ lb. Straw .. 125 ,,	Produce .. { Grain .. 28¼ lb. Straw .. 193 ,,	Produce .. { Grain .. 15¾ lb. Straw .. 168 ,,	Produce .. { Grain .. 18¾ lb. Straw .. 201 ,,

Plot 12.	Plot 11.	Plot 10.	Plot 9.	Plot 8.	Plot 7.
Manure—856 lb. box manure ..	Manure—None	Manure—392 lb. solid excrements.	Manure—None	Manure—120 lb. dung ashes ..	Manure—None.
Produce.. { Grain .. 24¾ lb. Straw .. 172 ,,	Produce.. { Grain .. 19 lb. Straw .. 149 ,,	Produce.. { Grain .. 28½ lb. Straw .. 196 ,,	Produce.. { Grain .. 14¼ lb. Straw .. 170 ,,	Produce.. { Grain .. 23½ lb. Straw .. 198 ,,	Produce.. { Grain .. 12½lb. Straw .. 177 ,,

1881-82.

Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5.	Plot 6.
Manure—924 lb. box manure and 9 lb. husk ashes.	Manure—None.	Manure—338 lb. solid excrements and 9 lb. husk ashes.	Manure—92½ lb. paddy straw and 9 lb. husk ashes.	Manure—82½ bratty ashes ..	Manure—None.
Produce.. { Grain .. 12 lb. Straw .. 201 ,,	Produce.. { Grain .. 3 lb. Straw .. 75 ,,	Produce.. { Grain .. 6½ lb. Straw .. 125 ,,	Produce.. { Grain .. 10½ lb. Straw .. 136 ,,	Produce .. { Grain .. 9 lb. Straw .. 136 ,,	Produce.. { Grain .. 5½ lb. Straw .. 110 ,,

Plot 12.	Plot 11.	Plot 10.	Plot 9.	Plot 8.	Plot 7.
Manure—924 lb. box manure and 9 lb. husk ashes.	Manure—None	Manure—338 lb. solid excrements and 9 lb. husk ashes.	Manure—None	Manure—85½ lb. bratty ashes ..	Manure—92½ lb. paddy straw and 9 lb. husk ashes.
Produce.. { Grain .. 6 lb. Straw .. 139 ,,	Produce.. { Grain .. 5½ lb. Straw .. 119 ,,	Produce.. { Grain .. 6½ lb. Straw .. 143 ,,	Produce.. { Grain .. 9 lb. Straw .. 16¼ ,,	Produce.. { Grain .. 9½ lb. Straw .. 189 ,,	Produce.. { Grain .. 9½ lb. Straw .. 168 ,,

The results of plot 6, were in the first year rejected, the previous cultivation having changed greatly the state of the soil of this plot.

97. *Green Manuring.*—Further experience shows, that in dealing with the very sandy soils of the Farm, " Green Manuring " is, perhaps, the most successful means of improvement. The practice, now adopted, is, in the hot season, when the weather is showery, to sow with horse-gram a large area of the land without crop, the produce, either to be grazed by sheep folded on the land, or ploughed into the ground as green manure. There is, in most years, enough rain in June and July, to admit of this practice being carried out, though not enough for a regular crop to be matured, and secured, before the north-east rains set in. During the long preceding dry season, nitrification occurs in these soils to a very considerable extent, for though they are deficient in lime, they contain an abundance of soda, and this base, is utilized in forming nitrates, and these being so very soluble would, if left in the land be washed out, by the heavy rain of the monsoon; but when horse-gram is sown on the land, it greedily feeds on these nitrates, which, becoming worked up in organic combinations, are stored safely against removal by heavy rain. There must, be an enormous waste of nitrates in this country when, after a very long dry season, heavy rains occur, as at the beginning of a monsoon. This, shows the necessity for getting in the seed, as early as possible at seed time, before the setting in of the heavy monsoon rains, in order that the young plants may take up the nitrates and hold them safe. It has, in Europe, been repeatedly shown that during a year, as much as 40 lb. of nitrates, per acre, may be formed and stored in a good properly worked soil. Nitrates are so extremely valuable, the careful farmer should use every endeavour to utilize them thoroughly ; and, the plan before suggested is, perhaps, the best that can be adopted.

98. *Germination of Cocoanuts.*—Attention having been recently directed, in several scientific journals, to the possibility of hastening the germination of hard husked seeds, by steeping them in solutions of different salts and acids, especially, in solutions of sulphuric acid, an experiment was made to test whether the germination of cocoanuts could thus be hastened. For the experiment ten fresh cocoanuts were taken, and they were treated as follows :—

Experiment.

No. 1.—Two nuts, steeped in water.
" 2.— " " with 5 P.C. of sulphuric acid.
" 3.— " " with 10 P.C. of "
" 4.— " " with 15 P.C. of "
" 5.— " not steeped.

The nuts were kept in the water, and solutions, for five days. On the 1st of December last, the whole of the nuts were planted in a piece of suitable soil. The soil was watered when necessary. On the 12th of March one of the nuts sent up a vigorous shoot, but the others having failed to send up shoots, they were all dug up on the 31st of March, when they were found in the condition stated below :—

Experiment.

No. 1.—Both nuts had germinated well, and produced vigorous shoots.
" 2.—One nut had germinated, the other was rotten.
" 3.—Neither of the nuts had germinated, but both were in good order.
" 4.—One of the nuts was just commencing to germinate, both were in good order.
" 5.—One of the nuts was just commencing to germinate, both were in good order.

99. As far as can be judged from this single experiment, steeping in acid solutions, seems to retard, rather than to facilitate the germination of cocoanuts, while steeping in pure water hastens germination. The subject will, however, receive further attention, and other experiments, will be instituted.

100. *Great variation in the produce of land.*—Few persons not practically conversant with agriculture, have any idea how the produce of the different parts of a field may differ in amount. Some agricultural experimentalists, instead of weighing and measuring the whole of the produce of a plot or field, select what they suppose to be an average portion and weigh or measure that only, the result being accepted as, the basis for calculating the outturn of the whole plot, or field. This course is, frequently, an erroneous one, for few men, even trained agriculturists, can select a few square yards of crop, which is, really, an average representative portion of the whole of a field, unless it is of very moderate dimensions.

101. In preparing a piece of land for future experimental crops, it was necessary to determine the natural productiveness of the soil. The field was divided into 14 plots, each of $\frac{1}{10}$th of an acre. These plots were ploughed, and on the 29th December 1881, the whole were sown with horse-gram (*Dolichos uniflorus*). The land had for four or five years previously been under grass. No manure was applied. The eastern portion of the field, comprising plots 5, 6, 7 and 10, 9, 8 is somewhat lower and, not so well drained, as the remainder of the field, and on this portion, the natural grasses had not grown so well as elsewhere. The pulse germinated well, and over the whole field the growth appeared to be very uniform, and this, continued until about the middle of March when the crop on the eastern side of the field became decidedly inferior, to that on the western side. The crop, was cut on 11th April 1882. Before cutting, each plot was sub-divided into six plots, each having an area of $\frac{1}{60}$th of an acre, and the produce of each of these minor plots, was separately determined, first, when the green plant was cut, next, after thrashing out the pulse. On looking over the following table, it will be observed how widely the outturn varied, in different parts of the field. From an ordinary inspection, before commencing harvesting operations, it appeared that the produce on plots 1, 2 and 14, 13, 12 was very uniform over the whole, but the outturn figures show that, there was a very considerable difference in the outturn of different parts of these plots, the green plant having varied from 2,880 lb., to 8,520 lb. per acre; while, the pulse, varied from 150 lb. to 480 lb. per acre.

102. It is probable that had smaller areas been taken, even greater variations in the outturn, would have been discovered. It is scarcely likely, that any one would have made the mistake of taking any part of the eastern portion of the field as, representing the average of the whole field, at any rate not when the crop was ready for cutting; but, it was almost impossible to discern any difference in the crop, on the five plots above noticed. These results, deserve the serious attention of those whose duty it is, to determine the yield of land, for purposes of assessment; it is a duty, which requires great personal knowledge, and, should not be entrusted to any one without a considerable agricultural experience.

EXPERIMENTAL FIELD No. 7.

NORTH.

Area of each plot 1 acre.

PLOT No. 1.		PLOT No. 2.		PLOT No. 3.		PLOT No. 4.		PLOT No. 5.		PLOT No. 6.		PLOT No. 7.	
1.	2.	1.	2.	1.	2.	1.	2.	1.	2.	1.	2.	1.	2.
Green plants ... 48 lb.	Green plants ... 95 lb.	Green plants... 142 lb.	Green plants ... 132 lb.	Green plants ... 98 lb.	Green plants ... 80 lb.	Green plants ... 112 lb.	Green plants ... 116 lb.	Green plants ... 76 lb.	Green plants ... 75 lb.	Green plants ... 68 lb.	Green plants ... 60 lb.	Green plants ... 100 lb.	Green plants ... 100 lb.
Dry straw. 37	Dry straw. 36	Dry straw 45·5	Dry straw. 32	Dry straw. 28½	Dry straw. 22	Dry straw. 25½	Dry straw. 30	Dry straw. 17	Dry straw. 16	Dry straw. 18	Dry straw. 15	Dry straw. 32	Dry straw. 24
Pulse ... 7	Pulse ... 7	Pulse ... 5·5	Pulse ... 5	Pulse ... 5	Pulse ... 5	Pulse ... 4	Pulse ... 5	Pulse ... 3½	Pulse ... 3	Pulse ... 3½	Pulse ... 3½	Pulse ... 6	Pulse ... 7
3.	4.	3.	4.	3.	4.	3.	4.	3.	4.	3.	4.	3.	4.
Green plants ... 151 lb.	Green plants... 106 lb.	Green plants ... 118 lb.	Green plants ... 132 lb.	Green plants ... 104 lb.	Green plants ... 98 lb.	Green plants ... 100 lb.	Green plants ... 128 lb.	Green plants ... 75 lb.	Green plants ... 56 lb.	Green plants ... 70 lb.	Green plants ... 66 lb.	Green plants ... 66 lb.	Green plants ... 86 lb.
Dry straw. 29½	Dry straw. 25½	Dry straw. 39	Dry straw. 29	Dry straw. 28	Dry straw. 23	Dry straw. 27	Dry straw. 33	Dry straw. 18	Dry straw. 13	Dry straw. 16½	Dry straw. 14½	Dry straw. 14	Dry straw. 17
Pulse ... 5½	Pulse ... 5½	Pulse ... 3	Pulse ... 6	Pulse ... 5	Pulse ... 4½	Pulse ... 3½	Pulse ... 5	Pulse ... 2½	Pulse ... 2½	Pulse ... 2½	Pulse ... 3½	Pulse ... 2½	Pulse ... 4½
5.	6.	5.	6.	5.	6.	5.	6.	5.	6.	5.	6.	5.	6.
Green plants ... 114 lb.	Green plants ... 74 lb.	Green plants ... 116 lb.	Green plants ... 118 lb.	Green plants ... 80 lb.	Green plants ... 78 lb.	Green plants ... 104 lb.	Green plants ... 124 lb.	Green plants... 151 lb.	Green plants ... 38 lb.	Green plants ... 44 lb.	Green plants ... 18 lb.	Green plants ... 14 lb.	Green plants ... 32 lb.
Dry straw. 31	Dry straw. 21½	Dry staw. 30·2	Dry straw. 34·5	Dry straw. 20	Dry straw. 21	Dry straw. 29½	Dry straw. 32	Dry straw. 42	Dry straw. 8½	Dry straw. 10	Dry straw. 3½	Dry straw. 3	Dry straw. 9
Pulse ... 8	Pulse ... 4	Pulse ... 6·7	Pulse ... 5·2	Pulse ... 3	Pulse ... 2½	Pulse ... 1½	Pulse ... 4	Pulse ... 2½	Pulse ... 1	Pulse ... 1½	Pulse ... 1	Pulse ... 1	Pulse ... 1
Produce of No. 1.		*Produce of No.* 2.		*Produce of No.* 3.		*Produce of No.* 4.		*Produce of No.* 5.		*Produce of No.* 6.		*Produce of No.* 7.	
Green plants ... 588 lb.		Green plants ... 758 lb.		Green plants ... 538 lb.		Green plants ... 684 lb.		Green plants ... 471 lb.		Green plants ... 326 lb.		Green plants ... 398 lb.	
Dry straw ... 180½ ,,		Dry straw ... 201·2 ,,		Dry straw ... 142½ ,,		Dry straw ... 176½ ,,		Dry straw ... 114½ ,,		Dry straw ... 77½ ,,		Dry straw ... 99 ,,	
Pulse ... 37½ ,,		Pulse ... 31·4 ,,		Pulse ... 25½ ,,		Pulse ... 23 ,,		Pulse ... 15¼ ,,		Pulse ... 15 ,,		Pulse ... 22¼ ,,	

PLOT No. 14.		PLOT No. 13.		PLOT No. 12.		PLOT No. 11.		PLOT No. 10.		PLOT No. 9.		PLOT No. 8.	
1.	2.	1.	2.	1.	2.	1.	2.	1.	2.	1.	2.	1.	2.
Green plants ... 78 lb.	Green plants... 108 lb.	Green plants ... 109 lb.	Green plants ... 108 lb.	Green plants ... 94 lb.	Green plants ... 100 lb.	Green plants ... 94 lb.	Green plants ... 106 lb.	Green plants ... 93 lb.	Green plants ... 66 lb.	Green plants ... 61 lb.	Green plants ... 30 lb.	Green plants ... 61 lb.	Green plants ... 59 lb.
Dry straw. 27½	Dry straw. 30	Dry straw. 36½	Dry straw. 28½	Dry straw. 22	Dry straw. 24	Dry straw. 21	Dry straw. 27	Dry straw. 22	Dry straw. 20½	Dry straw. 14	Dry straw. 4½	Dry straw. 13	Dry straw. 12½
Pulse ... 5½	Pulse ... 6½	Pulse ... 6½	Pulse ... 4½	Pulse ... 4½	Pulse ... 4	Pulse ... 2½	Pulse ... 2½	Pulse ... 3	Pulse ... 3	Pulse ... 3	Pulse ... 1	Pulse ... $2\frac{1}{16}$	Pulse ... $2\frac{1}{16}$
3.	4.	3.	4.	3.	4.	3.	4.	3.	4.	3.	4.	3.	4.
Green plants ... 74 lb.	Green plants ... 64 lb.	Green plants ... 115 lb.	Green plants ... 96 lb.	Green plants ... 118 lb.	Green plants ... 106 lb.	Green plants ... 68 lb.	Green plants ... 64 lb.	Green plants ... 67 lb.	Green plants ... 46 lb.	Green plants ... 60 lb.	Green plants ... 50 lb.	Green plants ... 88 lb.	Green plants ... 84 lb.
Dry straw. 16½	Dry straw. 16½	Dry straw. 37	Dry straw. 31½	Dry straw. 30	Dry straw. 22	Dry straw. 22	Dry straw. 18	Dry straw. 19	Dry straw. 11	Dry straw. 15	Dry straw. 13	Dry straw. 20	Dry straw. 19
Pulse ... 4	Pulse ... 5½	Pulse ... 7	Pulse ... 5½	Pulse ... 5	Pulse ... 2½	Pulse ... 2½	Pulse ... 2½	Pulse ... 4	Pulse ... 3½	Pulse ... 1½	Pulse ... 3½	Pulse ... 5½	Pulse ... 6½
5.	6.	5.	6.	5.	6.	5.	6.	5.	6.	5.	6.	5.	6.
Green plants ... 76 lb.	Green plants... 107 lb.	Green plants ... 89 lb.	Green plants ... 88 lb.	Green plants... 105 lb.	Green plants ... 88 lb.	Green plants ... 88 lb.	Green plants ... 66 lb.	Green plants ... 84 lb.	Green plants ... 70 lb.	Green plants ... 54 lb.	Green plants ... 54 lb.	Green plants ... 48 lb.	Green plants ... 64 lb.
Dry straw. 28	Dry straw. 21½	Dry straw. 25	Dry straw. 26½	Dry straw. 28½	Dry straw. 19½	Dry straw. 15	Dry straw. 10	Dry straw. 19	Dry straw. 18½	Dry straw. 13	Dry straw. 12	Dry straw. 11	Dry straw. 15
Pulse ... 5	Pulse ... 5½	Pulse ... 3½	Pulse ... 4½	Pulse ... 4	Pulse ... 2	Pulse ... 1	Pulse ... 1½	Pulse ... 4½	Pulse ... 3	Pulse ... 2½	Pulse ... 5½	Pulse ... 1	Pulse ... 4
Produce of No. 14.		*Produce of No.* 13.		*Produce of No.* 12.		*Produce of No.* 11.		*Produce of No.* 10.		*Produce of No.* 9.		*Produce of No.* 8.	
Green plants ... 507 lb.		Green plants ... 605 lb.		Green plants ... 611 lb.		Green plants ... 486 lb.		Green plants ... 426 lb.		Green plants ... 318 lb.		Green plants ... 404 lb.	
Dry straw ... ... 139¾ ,,		Dry straw ... ... 185½ ,,		Dry straw ... ... 146½ ,,		Dry straw ... ... 122 ,,		Dry straw ... ... 109¾ ,,		Dry straw ... ... 71¾ ,,		Dry straw ... ... 80¾ ,,	
Pulse ... ... 31¼ ,,		Pulse ... ... 31½ ,,		Pulse ... ... 22 ,,		Pulse ... ... 12 ,,		Pulse ... ... 20½ ,,		Pulse ... ... 19 ,,		Pulse ... ... 20½ ,,	

103. As has already been noticed, the object of cropping the land, was simply to determine the natural state of the soil, as regards its capacity to produce a pulse crop. The land, will next be cropped (again without manure) with a cereal crop, and the results, will be determined in the same way as those of the pulse crop. After having raised a pulse, and a cereal crop, on the land, by its own unaided resources, it will be possible to determine something definitely regarding the physical and chemical state of the soil, after which, the experiments to be conducted thereon, will give information of a more intelligible nature, than otherwise, they would. The expenditure of labor, in carrying out an experiment such as this, is great; but is unavoidable, if the results of the experiments are to possess any real value.

LIVE-STOCK.

104. *Cattle.*—There were no deaths from disease, during the year. A number of the cattle were attacked by foot-and-mouth disease, which put them out of condition, but otherwise, no bad consequences resulted. The treatment adopted was the ordinary one, viz., isolation from the healthy stock, the frequent application of astringents to the mouth and, feet, and, frequent washing with carbolic acid. The animals during the attack, had a liberal supply of green food, and were attended by men who, were not permitted to go near the healthy stock.

105. The working cattle were, as usual, kept in loose boxes, and were fed chiefly on green fodder and ground-nut oil cake—a system of feeding which has proved well adapted to their work, which is heavy and continuous.

106. The cost of maintaining a pair of these cattle, in full working condition, may be taken, as below :—

	RS.	A.	P.
Fodder throughout the year, at the rate of 100 lb. a-pair daily, valued at Rs. 2½ a ton	40	11	9
Cake throughout the year, at the rate of 8 lb. a-pair daily, valued at Rs. 6½ per 500 lb.	36	8	0
Interest on value of the pair of cattle, say, Rs. 100, at 5 per cent.	5	0	0
Deterioration, say, at 10 per cent. per annum, on Rs. 100, the value of the cattle	10	0	0
Shoeing throughout the year, twelve times, at 12 annas ...	9	0	0
Contingencies	3	12	3
Total	105	0	0

Estimating that each pair works 16 acres of arable land, the cost, per acre, for bullock labor, amounts to Rs. 6-9-0, per annum. It would be lower, were it not that the seed-sowing season, is such a very short one, a larger force of cattle must be kept, than would be necessary, were it possible to divide the work over a longer period in the year.

107. *Aden Cattle.*—The experiment in breeding Aden stock, is progressing very satisfactorily; the herd now consists of the following animals :—

7 Bulls.
6 Cows.
1 Heifer.
6 Bull-calves.

Total ... 20

Of these, two bulls, three cows and four bull-calves were imported from Aden in October last. They had a rough passage, and arrived in Madras much out of condition. Two cows were shipped at Aden, but one died on the voyage. The two bulls, are inferior to the bull which was previously imported; one of them, is about 2 years, and the other, 5 years, of age. The cows, are similar to the specimen first imported, and are apparently fairly good milkers, one is, however, very old, while another is very young, too young indeed to have had a calf, for some time after her arrival at Saidápet, she was in a very precarious state of health, but has since quite recovered. The four calves are

a fine lot; they have thriven admirably; and, will prove a valuable addition to the herd. There is now a sufficiency of bulls of this valuable breed, to commence breeding operations, and it is proposed, next cold season, to station a few of these bulls in different parts of the country, for use in improving the local dairy breeds.

108. The old Aden cow referred to at paragraph 62 of last report, and in other reports, continued to give milk up to the 22nd of May last; the total produce obtained during this milking period, was 965¼ measures, as shown below:—

	Measures.	
July 1880, from the 23rd	30·9	
August	130·0	
September	133·1	
October	151·2	
November	140·2	
December	140·2	
January 1881	Sick.	Milk thrown away.
February, from the 16th.....	28·9	
March	90·8	
April	90·6	
May, up to 22nd	29·3	
Total ...	965·2	

This is the highest yield, yet obtained from this cow, in a milking period, and the longest period over which she has milked; and during January and a portion of February, when she was attacked by foot-and-mouth disease, the whole of the milk was thrown away and not brought to account. The outturn of milk is higher than is usually obtained from the cows of some of the most highly-esteemed dairy breeds. Taking the yield, during the last milking period, to weigh 3,350 lb., this is, nearly seven times the cow's weight (490 lb). An English milch cow, of one of the larger breeds, will weigh about 1,500 lb., and will not yield more than 6,500 lb. of milk, in the milking period, or only a little over four times the cow's weight. These results, are very surprising, for the cow has, since she came to the Farm, produced six calves, and she had a calf at foot when she was imported. She cannot, therefore, be less than 14 years old—an age at which, in this country, few milk cows yield well. The expenditure incurred for maintaining this cow during her milking period, and until the birth of the last calf, in August, was as follows:—

	Rs.	A.	P.
To 12,060 lb. Green food	40	3	2
„ 902 lb. Ground-nut cake	11	11	7
„ 15 lb. Salt	0	11	0
„ 653 lb. Bran	8	10	10
„ 618 lb. Dholl husk	12	5	9
„ 24 lb. Maize	1	3	2
„ 37½ lb. Cotton-seed	0	15	0
„ 176 lb. Yellow cholum	4	6	5
„ Attendance and Sundries	18	13	5
Total ...	99	0	4

In this table, no charge has been made for the straw used in bedding the cow, because the manure obtained is considered to have a value considerably in excess of that of the straw used. It should also be pointed out that the fodder is charged at its selling price, Rs. 7 per ton, whereas it can be produced for Rs. 2-8-0 per ton at the farm. Besides yielding the milk recorded, the cow reared a fine calf, worth, at the least, Rs. 20. The cost of the 965¼ measures of milk, deducting the value of the calf, was thus Rs. 79-0-4, or 1 anna and 4 pies, per measure. All the milk, produced on the Farm, is sold there, at 2 annas and 8 pies, per measure, to the students. If it was sent to Madras, it would sell for a much higher price, the ordinary price there, being from 3 to 4 annas per measure; and this price, is frequently paid for milk of a very inferior quality. A measure, is equal to about 3 pints. During the four milking periods, beginning with May 1877, for which only we possess full statistics, the yield of milk was as is shown in the next table:—

—	No. of Days between Birth of each Calf or Milking Period.	—	—
		Mrs. Olls.	Gallons.
Milking period beginning May 1877	396	832 3	299·41
Do. do. June 1878	335	694 1	249·68
Do. do. August 1879..	426	831 1	298·96
Do. do. July 1880	427	965 2	347·21
Total ..	..	3,322 7	1195·26

109. The cow had another calf at the end of August 1881, and was yielding milk at the close of the year. The following are the registrations:—

	Mrs.	Olls.	Gallons.
August 30th and 31st	4	0	1·43
September	93	4	33·63
October	113	4	40·82
November	103	7	37·36
December	95	6	34·44
January 1882	95	0	34·17
February	79	5	28·64
March	86	5	31·16
Total ...	671	7	241·65

110. A daughter of the cow just referred to, which was born in June 1878, calved in November; and produced a fine bull-calf. The quantity of milk this cow has yielded up to the end of the year is shown in the following table:—

	Mrs.	Olls.	Gallons.
November 1881	44	1	15·87
December	76	4	27·51
January 1882	85	6	30·84
February	75	6	27·25
March	81	6	29·00
Total ...	363	7	130·47

She was fed in the same way as the cow first noticed.

111. A sister of the cow last referred to, born on the 27th August 1879, produced a calf on the 29th of January, when she was under $2\frac{1}{2}$ years of age. Her yield of milk, up to the end of the year is shown below:—

	Mrs.	Olls.	Gallons.
February	37	6	13·58
March	59	2·0	21·31
Total ...	97	0	34·89

112. *Kerry Cow.*—To afford the students, information regarding the characteristics of other breeds of cattle, a Kerry cow, which was offered for sale in the neighbourhood, was purchased. Nothing, with any degree of certainty, could be ascertained regarding her history; but, it is quite certain that she is not pure bred, though she possesses several of the characteristic points of the Kerry breed. She was, apparently, in full milk at the time of purchase, and continued to yield milk until the early part of October, when she became dry. The next table shows the yield of milk:—

	Mrs.	Olls.	Gallons.
June, from 5th to 30th, 1881	92	5	33·32
July	92	4	33·27
August	83	5	30·08
September	71	0	25·54
October	9	5	3·46
Total ...	349	3	125·67

113. The cost of maintaining this cow, until she calved on the 11th of October, was, as shown in the next table :—

	Rs.	A.	P.
To 3,960 lb. Green food	13	3	0
„ 310 lb. Ground-nut cake	3	9	10
„ 371½ lb. Bran...	7	6	10
„ 3 lb. Salt	0	2	0
„ 104 lb. Dholl husk	2	1	3
„ Attendance and Sundries	5	6	8
Total ...	31	13	7

The milk cost therefore, 1 anna 6 pies per measure. This cow continued to give milk from the time of calving, until the close of the year. The next table shows the milk obtained :—

	Mrs.	Olls.	Gallons.
October, 11th to 31st	66	5	23·96
November	97	1	34·93
December	98	5	35·47
January 1882	96	1	34·58
February	70	1	25·22
March	74	5	26·84
Total ...	503	2	181·00

The cost of maintaining the cow, during this period, is shown in next table :—

	Rs.	A.	P.
To 8,010 lb. Green food	26	11	3
„ 360 lb. Ground-nut cake	4	3	2
„ 539½ lb. Bran	10	12	8
„ 4 lb. Salt	0	3	0
„ 65 lb. Planters' friend	1	10	0
„ 9 lb. Horse gram	0	2	3
„ Attendance and Sundries	6	9	8
Total ...	50	4	0

In this case, the milk cost 1 anna 7 pies, per measure.

114. *Nellore Breed.*—Two cows of this breed were purchased on the 19th of January last. Each was about four years of age, and each had a calf (first) aged about three months. They are good specimens of the breed. They cost Rs. 100 each. The next statement shows the milk, yielded by these cows, up to the close of the year :—

Months.	Grey Cow.		White Cow.	
	Mers.	Olls.	Mers.	Olls.
January	42	6	36	1
February	84	1	80	1
March	82	1	86	2
Total ..	209	0	202	4

These cows were fed in the same way as, the Kerry, and Aden cows.

115. The milk produced on the Farm—about 200 gallons a-month—is all sold, as fresh milk, to the students, hence it has not been necessary to make butter. Several small experiments have, however, been made in butter-making, the results of which, are shown in the next table :—

Dairying Experiment.

Date of Churning.	Cow from which the Milk was obtained.	Milk used. Morning Milking.	Milk used. Evening Milking.	Churning took place after Milking Hour.	Butter obtained. First Churning.	Butter obtained. Second Churning.	Butter obtained. Total.	Butter = Percentage of Milk.	Duration of Churning. First Churning.	Duration of Churning. Second Churning.	Amount of Ghee obtained.	Ghee = Percentage of Butter.	Feeding and General Management of the Cows.	Treatment of Milk from leaving the Cow until the Butter was produced.
		oz.	oz.	hrs.	oz.	oz.	oz.		mts.	mts.	oz.			
28th April.. ..	Mixture from all cows.	$91\frac{7}{8}$	..	25	$2\frac{1}{8}$	..	$2\frac{1}{8}$	2·72	7	..	..	..	All the cows were fed daily with $2\frac{1}{2}$ lb. ground-nut cake, 4 lb. bran and 30lb.¶ of green food, but to Aden and Kerry cow $2\frac{1}{2}$lb. Planters' Friend seed extra and to Sultana I—III and Bonu $2\frac{1}{2}$ lb. horse-gram.	Immediately after milking the milk was poured into a tin can, and 4 or 5 drops of buttermilk were added for each measure of milk.
28th ,, ...	Do.	..	$61\frac{1}{4}$	18	$1\frac{1}{4}$	..	$1\frac{1}{4}$	2·04	$7\frac{1}{2}$	..	..	..		
28th ,, ...	Do.	$61\frac{1}{4}$	..	1	$1\frac{1}{4}$	..	$1\frac{1}{4}$	2·04	11	..	..	..		
1st May	Do.	$156\frac{3}{8}$	..	25	$2\frac{1}{2}$	$1\frac{3}{4}$	*$4\frac{1}{4}$	2·71	9	2	..	..	All the cows get half the daily allowance of food at 5-45 A.M., the remainder at 5-15 P.M., and milked at 6 A.M. and 5-30 P.M.	
1st ,, .. .	Do.	$160\frac{5}{8}$	..	1	$1\frac{5}{8}$	$1\frac{3}{8}$	†3	1·86	17	3	..	..		
1st ,, ...	Do.	..	$160\frac{3}{4}$	15	$4\frac{1}{2}$	$3\frac{3}{8}$	$8\frac{1}{4}$	5·13	9	2	..	..		
3rd ,, ...	Baggium (Kerry).	$55\frac{11}{16}$	..	26	1	..	‡1	1·79	21	..	..	..		
5th ,, ...	Do.	$61\frac{7}{8}$	..	25	$2\frac{1}{4}$	$\frac{3}{4}$	3	4·84	8	2	$1\frac{7}{8}$	62·50	The cows are watered at 7 A.M. and 3-30 P.M. daily and grazed between the hours 8 and 10 A.M. and 3-30 and 5 P.M., and are kept in the sheds during the remainder of the day.	
5th ,, ...	Do.	..	$37\frac{1}{2}$	15	$\frac{3}{4}$	$\frac{3}{4}$	$1\frac{1}{2}$	2·02	26	7	$\frac{3}{4}$	50·00		
6th ,, ...	Bonu	$72\frac{3}{4}$	..	25	3	$\frac{1}{4}$	$3\frac{1}{4}$	4·46	10	3	2	61·53		
9th ,, ...	Lutchme, grey ..	$76\frac{1}{2}$	..	25	$3\frac{3}{4}$	$\frac{1}{2}$	$4\frac{1}{4}$	5·55	8	3	$2\frac{1}{2}$	58·82		
11th ,, ...	Sultana I ..	$47\frac{1}{2}$	..	25	$3\frac{1}{2}$	..	$3\frac{1}{2}$	7·36	9	..	$2\frac{1}{4}$	64·28		
11th ,, ...	(Aden) ,, ..	..	$32\frac{3}{8}$	15	$1\frac{1}{2}$	$\frac{1}{2}$	2	6·13	10	3	$1\frac{1}{4}$	62·50		
13th ,, ...	Do. II ..	$57\frac{1}{16}$	..	48	4	..	4	7·00	7	3	$2\frac{1}{4}$	56·25	¶ From 1st to 3rd May fed with Planters' Friend and horse-gram fodder; from 5 to 6 with Planters' Friend fodder, and from 9 to 16 with green paddy fodder.	
13th ,, ...	(Aden) ,, ..	..	$54\frac{6}{16}$	38	4	..	4	7·36	8	..	2	50·00		
16th ,, ...	Do. III ..	$67\frac{1}{2}$	..	51	$4\frac{1}{2}$	..	$4\frac{1}{2}$	6·29	7	..	$2\frac{1}{2}$	52·94		
16th ,, ...	(Aden) ,, ..	..	54	39	$3\frac{1}{2}$	..	$3\frac{1}{2}$	6·01	11	..	$1\frac{3}{4}$	46·15		
16th ,, ...	Do. ,, ..	$59\frac{6}{16}$	..	26	$2\frac{1}{2}$	..	$2\frac{1}{2}$	4·21	5	..	$1\frac{1}{4}$	50·00		
16th ,, ...	Do. ,, ..	..	54	15	3	..	3	5·55	12	..	$1\frac{1}{2}$	50·00		

* Milk was heated after being drawn.
† Fresh milk.
‡ Butter did not form properly.
‖ None All the butter had been obtained.

116. *Sheep.*—The sheep were free from disease during the year. Their daily allowance of food per head, was 10 oz. of ground-nut oil-cake, half of which they get in the morning, and the remainder in the evening. They were grazed usually, in the morning from 8 to 10-30 and in the afternoon from 2-30 to 5-30. At other times, they were kept in the pens, either in the field, or at the farm buildings.

117. The two Southdown Mysore rams, referred to in paragraph No. 65 of last year's report, continued in perfect health; the breeding ewes were all served by them; the new blood, produced considerable improvement in the shape, and in the wool, of the lambs.

118. During the year, 11 rams were sent to the district, for breeding experiments, as shown below:—

Date.	To whom sent.	Number of Rams.
1881.		
17th September ..	The Tahsildar of Tiruvallúr	2
21st October ..	Do. do.	2
22nd do. ..	The Sub-Collector, Chingleput ..	3
28th December ..	The Tahsildar of Tiruvallúr	2
29th do. ..	Do. do.	2
		11

119. In the next table, the strength of the flock, and the number of deaths, are shown. Similar data are also given for the last eight years. The death-rate is low, and this would have been even less, if it had not been necessary to keep in the flock for breeding, many sheep that had passed their prime, the flock being now so small:—

——	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	1881-82.
Average number of flock	207	221	237	275	295	274	251	160	92
Number of deaths	16	24	21	11	31	34	55	136	4
Percentage of deaths	7·73	10·9	8·9	4	10·5	13·14	*21·9	*85	4
Rainfall in inches	48·07	68·98	38·14	20·88	65·55	33·16	56·95	57·16	44·28

* Outbreak of small-pox, from Commissariat Slaughter-house sheep.

120. The usual statements of stock maintained, percentage of deaths, and the purchased food consumed by the stock, are given in the following table:—

——	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	1881-82.
Live stock maintained calculated as country cattle	132	135	123	125	102	76
Stock as country cattle per 100 acres of cultivable land	82·5	84·375	84·24	88	83·65	50·60
Percentage of deaths	7·6	12·9	8·9	8·8	16·2	4
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	A. P. 8 9

IMPLEMENTS AND MACHINES.

121. *Implements and Machines.*—More applications for improved implements were received during the past year, than in any previous year, since the farm was established. The statement on the next page shows the implements supplied, during the year, and where they were sent:—

Presidency, Province or District.	Swedish Ploughs.	Large American Ploughs.	Improved Country Ploughs.	Grubbers, Bullock, Hoe, &c.
Godávari	1	..	..	..
Madras	..	14	3	..
Chingleput	1	1	..	..
Madura	..	..	..	2
Tanjore	..	..	61	..
Tinnevelly	..	2	2	..
Mysore	1	1	2	..
Salem	..	..	..	1
Bellary	10	2	..	..
Kurnool	..	..	..	1
Cuddapah	..	..	..	2
Bombay	1	2	..	4
Total ..	14	22	68	10

122. At the close of the year, the registered applications, still to be met, were for 35 ploughs of different sorts. In several instances, the ploughs supplied were obtained merely as patterns, from which to make up others; the number issued therefore, represents but a portion of those introduced through the agency of the farm. As is noticed, in the general report of the year, 300 iron ploughs were ordered direct from Sweden by a firm in Bellary, who, were induced to do so, by the successful working of several Swedish ploughs supplied from the farm.

123. The Board of Revenue on my recommendation, sanctioned the delivery free of charge, of all improved implements required by *bona fide* cultivators. The cost in the year was but trifling, only Rs. 13-2-0, but it amounted to 17 per cent. on the price of the implements. The concession, however, was not, it is believed, very widely known. The next statement, shows the number of implements, on which the farm paid the delivery charges :—

Implement.	Where delivered.	Price paid.	Expenses incurred of delivery.
		RS. A. P.	RS. A. P.
59 Improved country ploughs	Tanjore	5 0 0	6 8 0
2 Combined ploughs	Tinnevelly	15 0 0	
2 Improved country ploughs with iron stilt			1 12 0
	Do.	6 12 0	
1 Swedish plough	Alúr (Bellary District) ..	20 0 0	1 0 0
1 Model of double mhote	Kondápuram (Cuddapah District)	3 8 0	0 12 0
1 Do. do.	Cuddapah	3 8 0	0 12 0
1 Do. do.	Kurnool	3 8 0	0 14 0
1 Swedish plough	Godávari	20 0 0	1 8 0
	Total ..	77 4 0	13 2 0

124. The ploughs in greatest request, for use as patterns, were the single-stilted Swedish plough and the American combined plough. The first mentioned, were supplied at Rs. 20, and the latter at Rs. 13, and, 9 each, according to size. Under an arrangement made with an extensive manufacturer in Sweden, the Department will be able to supply single-stilted Swedish ploughs, made entirely of steel, at Rs. 16 each. Steel possesses many advantages over both cast-iron and wrought-iron, as a material for making ploughs, chiefly, in its greater strength and lightness, while steel can be welded with almost as great ease as wrought-iron.

125. These Swedish steel ploughs are, it is believed, the best ploughs for the requirements of Indian agriculture, that have yet been introduced.

126. A number of improved country ploughs were made up at the request of a land-owner resident in Tanjore, who for the past three or four years has had a Graduate of the School of Agriculture as his Manager. He forwarded a pattern plough which he called the "Nawab" that he said, he had obtained from Cawnpore, and of which, he had been making up copies in Tanjore; but, finding the expense too great, he had given up

further efforts in that direction. On receipt of the pattern at Saidápet, it was examined and tried, and was found defective in several respects. Another improved form of a country plough was, therefore, made up and sent to the land-owner, for experimental trial, along with his pattern plough. He wrote: "I have received the ploughs sent to me by Mr. Schiffmayer, and experimented with them in the wet lands, and find that the cattle here works with your light improved pattern with greater amount of ease and facility than the "Nawab" plough, and at the same time, this improved pattern inverts the furrow sods at the proper degree or position, whereas the other plough fails to do so. * * * * I therefore request that you would be pleased to order for the construction of 80 ploughs of your improved pattern, in the Farm Workshops." In explanation of a Madras Land-owner sending all the way to Cawnpore for ploughs it should be stated that, he first applied to the farm for ploughs, but that, the workshops then being closed, through some misapprehension on the part of Government, no ploughs could be supplied from the farm, and he had, therefore, no choice but to send to Cawnpore. This improved country plough, weighs about 30 lb.; though a low-priced plough, it is not one that can be recommended for general use; it cannot, in full work, last longer than a ploughing season, without repair, and it is always liable to break, when the work it is required to do, is at all rough in character. It is adapted only for use on wet land, or, very light dry land, but is not suited for deep ploughing. Another improved country plough, made entirely of iron, except the pole, has proved fairly successful for irrigated land, and for working between the rows of cotton and similar work. The stilt of this plough is fitted with a cross bar, to admit of both of the ploughman's hands being used. These ploughs cost from Rs. 6 to 7, each. They are much stronger, and, therefore, more useful, than those with wooden stilts.

127. Great difficulty has been met, in experimenting on the farm with single-handle ploughs, made like the country plough. The farm ploughmen have, for years used only the double-handle ploughs of the European pattern, which require far less exertion on the part of the ploughman, than country ploughs. The men most decidedly prefer the double-handle ploughs. A great deal of nonsense has been written regarding the supposed advantage of a single-handle plough, in its admitting, when at work, of the ploughman using one of his hands in twisting the tails of his cattle. The farm ploughmen, plough a much larger area of land in a day than is usually ploughed elsewhere, yet, as has already been noticed, they work only double-handle ploughs, and never touch the tails of their cattle; indeed, any such reprehensible performance in tail-twisting, though apparently, in some quarters, deemed inseparable from ploughing with cattle, would lead to the immediate dismissal of the ploughman. Each ploughman, uses a pair of reins, and carries on his plough a light whip, which he occasionally uses. Each man manages entirely his own plough and cattle; some of the men, can make as straight a furrow as, is made in other countries.

128. A new implement was constructed which, promises to be useful. It is a copy of one used largely in Germany. It consists of a strong iron beam which, has holes for the reception of coulters fitted with shares; these are broad and narrow for broad sharing, grubbing, or sub-soiling; and one of the coulters is fitted with a mould-bard, so that, the implement may be used as a cultivator, a grubber, a sub-soiler, and as a plough. Attention is being given to this implement, in view to its further improvement, and adaptation to the wants of this country.

129. Models of the double mhote, are still in request. They are supplied and delivered, free of charge, to applicants.

MISCELLANEOUS.

130. *Estate.*—The expenditure incurred on behalf of the estate, was chiefly for maintaining the buildings, roads, bridges, water channels, &c., in good repair. A small office was built for the use of the Overseer and Storekeeper.

131. *Farm Accounts.*—The usual abstract statements, appear in the appendix.

132. *Commissariat Slaughter-houses.*—The slaughtering of cattle at Commissariat premises on the Farm will, it is hoped, shortly cease, and thus, a nuisance, which

has been experienced for years, will be removed. On the transfer of the buildings to the charge of this Department, it is intended to extend considerably operations in dairying, as this branch of farming, has received so little attention, and it is one of considerable importance, seeing that such a large a percentage of the population, are milk consumers.

133. *Criminal Reformatory.*—The proposal, made some years ago, to start a Criminal Reformatory on a portion of the Farm estate, having again been revived, it has been necessary to state most decidedly that, to attempt to carry out the proposal would be highly prejudical, both to the work of the Farm, and that of the Agricultural College. The aim of both these institutions is, to raise the status of agriculture; and to enlist the interests of the well-to-do classes in the cause of agricultural reform; but, to associate either institution, even in the remotest degree, with the criminal classes, would be fatal to success. Indeed, the proposal, is so preposterous, it is scarcely possible to consider it as having been seriously made.

134. *Irrigation experiments.*—Sanction has been obtained for the construction of a new sluice in the tank, which supplies irrigation water to a portion of the farm; when this is completed, it is hoped that, it will be possible to carry out the long-deferred irrigation experiments.

135. *Non-Experimental Area.*—The piece of land set apart under the instructions of the Board of Revenue, as a non-experimental area, was cropped, during the year, with ordinary crops. The results of the year's work, are shown below:—

Dr. *Cr.*

	Rs.	A.	P.		Rs.	A.	P.
Value of standing crop, June 1st, 1880	59	0	0	Value of produce received during the year	767	3	9
Value of unexhausted manures, June 1st, 1880	72	0	0	Value of crop standing, May 31st, 1881	75	0	0
Cattle labor supplied	472	1	2	Value of unexhausted manure, May 31st, 1881	96	0	0
Cooly do. do.							
Manure do.	120	0	0	Cultivation carried forward, May 31st, 1881	15	0	0
Seed, &c., do.	104	5	6				
	827	6	8		953	3	9

These figures are, however, but compilations from the general accounts of the Farm, it having been found impossible, without incurring unnecessary expense, to stock the land, and provide it with its own implements, and working agency. The land is, however, most disadvantageously situated, and proposals have been made to set aside another portion of the Farm for the purpose, where the drawbacks are less serious. It is, however, more than doubtful, whether it is wise to employ time and means, in carrying out such work, while there remains so much legitimate experimental work very urgently demanding attention, and for which, in the whole of the Presidency of Madras, with a revenue of four million pounds sterling, depending on agriculture, there is no other agency for doing. In every civilized country, those whose duty it is to direct State efforts towards the improvement of agriculture hold that, it is pre-eminently the duty of State Agricultural Institutions, to engage in work of research and inquiry, leaving to those actually engaged in farming, the application of the facts ascertained,

136. *Pisciculture.*—Nothing has yet been done at the Farm, in the artificial breeding of fish but, for 13 years or more the portion of the River Adyar, which forms the southern and eastern boundaries of the Farm estate, has been strictly preserved, only rod fishing having been allowed. Usually, once or twice a year, a portion of the river has been dragged, in view to the capture and destruction of the predacious fish. The results, of preserving, having been very encouraging, as regards the increase in the number of fish. It is now proposed, to introduce into the river some better kinds of fish. The predacious fish, which are numerous, will always be a hinderance in the way of getting up a stock of useful fish; but, it is quite impossibe to capture and kill the whole, for considerable portions of the river cannot be netted from its depth, and the inequalities in the rocky bed; and whenever the river is in flood, fresh stocks of predacious fish come down from tanks, and the higher portions of the river. But after

all, it does not seem so necessary to strive to kill the last of the predacious fish, were there any possibility of any such result being achieved, for the nonpredacious ones are, already, able to take care of themselves, and, are more numerous than their predacious neighbours.

137. *Snakes, &c.*—The persistent efforts to kill down snakes, on the Farm estate, have been attended with gratifying results. Snakes are now seldom met with on the Farm, whereas 10 or 12 years ago, they were very numerous indeed. This, must be attributed partly to the clearing of a considerable area of land, but, is chiefly the result of the small rewards given for the destruction of snakes. These rewards were for a cobra two annas, and for any other snake one anna; the cost, has not amounted to more than about one anna, per acre, per annum. It is true, that many non-poisonous snakes have been killed, but it is better that this should happen than, to risk the chance of any poisonous snake escaping. It was said that, when the war against snakes was begun on the Farm, that rats, of which snakes are the foes, would multiply to such an extent as to prove a more serious evil than the snakes, but, such has not been the experience on the Farm. Indeed, rats appear to be far less numerous, than they were, when snakes were abundant. The killing down of the snakes, has resulted in a very large increase of birds, some varieties of which, especially those of the owl family, may have contributed towards keeping down the rats. Birds were never so numerous on the Farm estate for a long time, as they have been in the past few years, a result, which must be attributed entirely to the diminished numbers of their natural enemies—the snakes. Some alarm, appears to have been created, in certain quarters, regarding the supposed diminution in the number of birds beneficial to agriculture; but, this alarm appears to be quite groundless. The simplest way, to keep up a good supply of insectiverous birds is to encourage the destruction of snakes.

138. *Personnel.*—Mr. Schiffmayer was absent on sick leave, from the beginning of the year, until the 2nd of November. The Farm, was in Mr. Benson's charge up until the 4th of August, when he also, was obliged to take sick leave, and he continued absent up to the close of the year. On the 2nd of November, Mr. Schiffmayer returned to duty, and took charge of the Farm, which charge, he retained until the close of the year. The members of the subordinate establishment, have afforded satisfaction, in the performance of their respective duties.

SAIDAPET, 19th June 1882.

(Signed) W. R. ROBERTSON, M.R.A.C.,
Superintendent, Government Farms,
Madras Presidency.

APPENDICES.

APPENDIX I.

STATEMENT showing the Monthly Rainfall, compared with the Average of the previous Twelve Years.

Month.	1881-82.		Average of 12 Years.	
	Rainfall.	Wet Days.	Rainfall.	Wet Days.
April	..	..	·35	·5
May	·14	1	3·78	1·9
June	1·00	6	2·52	5·9
July	3·19	5	3·72	8·9
August	5·29	9	4·83	9·6
September	7·95	12	6·08	8·4
October	2·85	4	11·17	11·7
November	16·86	16	13·28	12·8
December	6·43	7	4·03	5·8
January	·57	3	·81	1·2
February	..	..	·95	·6
March	.	..	·29	·5
Total ..	44·28	63	51·81	67·8

STATEMENT showing the Weekly Rainfall during 1881-82, with the Average of the previous Twelve Years.

Weeks.	1881-82.		Average of the previous 11 Years.		Weeks.	1881-82.		Average of the previous 12 Years.	
	Rainfall.	Wet Days.	Rainfall.	Wet Days.		Rainfall.	Wet Days.	Rainfall.	Wet Days.
1st Week	..	..	·18	·16	27th Week	2·81	4	2·07	2·66
2nd ,, ...	..	..	·00	·08	28th ,, ...	..	..	1·41	1·83
3rd ,, ...	..	..	·04	·17	29th ,, ...	..	..	3·05	2·99
4th ,, ...	..	..	·00	·08	30th ,, ...	·05	1	3·45	3·24
5th ,, ...	..	..	1·28	·49	31st ,, ...	·65	3	1·94	2·33
6th ,, ...	..	..	·09	·25	32nd ,, ...	3·56	6	2·63	2·41
7th ,, ...	..	..	·14	·50	33rd ,, ...	8·95	5	3·85	4·16
8th ,, ...	·14	1	1·08	·50	34th ,, ...	3·65	2	2·88	3·25
9th ,, ...	·10	1	·11	·25	35th ,, ...	·05	1	3·45	2·58
10th ,, ...	·36	2	·55	·39	36th ,, ...	..	..	1·97	1·83
11th ,, ...	·05	1	1·00	1·41	37th ,, ...	1·73	3	·39	1·49
12th ,, ...	·47	1	·33	1·25	38th ,, ...	·95	1	·55	1·25
13th ,, ...	·02	1	·42	1·83	39th ,, ...	·80	1	·44	·91
14th ,, ...	..	..	·70	1·41	40th ,, ...	3·52	5	·02	·24
15th ,, ...	·29	3	·81	1·74	41st ,, ...	..	..	06	·08
16th ,, ...	..	..	·90	2·24	42nd ,, ...	..	..	·43	·68
17th ,, ...	·75	1	·69	2·16	43rd ,, ...	..	..	·14	·41
18th ,, ...	2·15	1	1·26	2·33	44th ,, ...	..	..	..	..
19th ,, ...	3·51	4	1·14	2·41	45th ,, ...	..	..	·56	·41
20th ,, ...	·30	1	1·34	2·25	46th ,, ...	..	..	..	..
21st ,, ...	1·10	3	·72	1·83	47th ,, ...	..	..	·30	·16
22nd ,, ...	·58	2	1·16	2·08	48th ,, ...	..	..	·04	·08
23rd ,, ...	1·36	1	1·94	2·57	49th ,, ...	..	..	·13	·33
24th ,, ...	·98	4	1·55	2·16	50th ,, ...	..	..	..	..
25th ,, ...	4·50	4	1·32	1·41	51st ,, ...	..	..	·25	·16
26th ,, ...	·90	1	·95	1·03	52nd ,, ...	..	..	·05	·08

APPENDIX II.

STATEMENT showing the number of Stock maintained during each month of the Year 1881-82.

—	1881.									1882.			Average.
	April.	May.	June.	July.	August.	September.	October.	November.	December.	January.	February.	March.	
Cattle	28	27	30	30	29	29	38	39	39	44	44	44	35
Sheep	103	96	92	91	91	86	82	78	74	111	111	107	94
Equivalent as country cattle of 300 lb. live weight.	70·8	67·6	69·8	69·6	67·5	66·7	77·7	77·6	76·8	86·0	88·9	88·1	75·6

COST of purchased, and Farm-grown, Food, supplied to the Live Stock, during the Year 1881-82

—	Working Cattle.		Cows and Calves.		Sheep.		Amount supplied.	Value.
	Amount.	Value.	Amount.	Value.	Amount.	Value.		
	LB.	RS. A. P.	LB.	RS. A. P.	LB.	RS. A. P.	LB.	RS. A. P.
Ground-nut Oil-cake ..	34,668	404 7 4	8,954	104 7 5	13,581	158 7 1	57,203	667 5 10
Bran	..	..	6,207	124 2 3	299	5 15 9	6,506	130 2 0
Salt	464	15 3 4	81	2 10 6	146	4 12 6	691	22 10 4
Grains	142	2 13 5	2,524	57 13 6	259	5 7 5	2,925	66 2 4
Dholl husk	..	..	584	11 10 11	..	..	584	11 10 11
Total ..	..	422 8 1	..	300 12 7	..	174 10 9	..	897 15 5
Deduct ⅓ Charged to Manure	..	140 13 4	..	75 3 2	..	58 3 7	..	274 4 1
Net Charge ..	..	281 10 9	..	225 9 5	..	116 7 2	..	623 11 4
Cost per head per mensem.	..	1 1 2	..	2 5 5	..	0 1 10	..	1 6 0

APPENDIX III.

Statement of the Accounts of the Saidápet Farm, for the Year 1881-82.

BALANCE SHEET, 31ST MARCH 1882.

Liabilities.	RS.	A.	P.	*Assets.*	RS.	A.	P.
Capital	24,949	14	5	Valuation on 31st March 1882.	25,077	0	0
Due to sundry persons ..	420	2	0	Due by sundry persons ..	293	0	5
Total ..	25,370	0	5	Total ..	25,370	0	5

CASH ACCOUNT FOR 1881-82.

Receipts.	RS.	A.	P.	*Expenditure.*	RS.	A.	P.
Capital advanced by Government	6,002	5	8	Live Stock	2,186	7	11
Live Stock	574	9	11	Seeds	477	12	10
Implements and Machines ..	1,187	12	0	Implements and Machines ..	1,758	12	11
Sundries	541	0	11	Sundries	333	1	8
Crops	1,887	4	11	Labor	3,001	0	0
				Establishment	1,581	0	0
				Despatching Seeds	448	11	5
				Manures	406	2	8
Total ..	10,193	1	5	Total ..	10,193	1	5

PROFIT AND LOSS ACCOUNT.

	RS.	A.	P.		RS.	A.	P.
Establishment	1,581	0	0	Sundries	228	11	3
Bad Debt	10	6	0	Capital for balance	5,388	9	8
Despatching Seeds ..	448	11	5				
Implements and Machines ..	1,191	1	11				
Live Stock	1,007	8	7				
Labor	513	7	0				
Crops	865	2	0				
Total ..	5,617	4	11	Total ..	5,617	4	11

Valuation of the Saidápet Farm and Estate made on the 31st March 1882, compared with that made on the 31st March 1881.

——	Valuation of Stock on the 31st March 1881.	Increase in the Year.	Decrease in the Year.	Valuation of Stock on the 31st March 1882.
FARM.	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Live Stock (*a*)	2,112 0 0	768 8 0	....	2,880 8 0
Crops (*b*)	16,173 0 0	899 0 0	....	17,072 0 0
Manures	244 0 0	....	133 15 0	110 1 0
Implements (*c*)	5,669 0 0	....	654 9 0	5,014 7 0
Total ..	24,198 0 0	879 0 0	....	25,077 0 0
ESTATE.				
Land	35,000 0 0	....	....	35,000 0 0
Buildings (*d*)	24,600 0 0	....	1,800 0 0	22,800 0 0
Wells and Channels	7,000 0 0	....	....	7,000 0 0
Total ..	66,600 0 0	....	1,800 0 0	64,800 0 0

(*a*) Includes live stock and cattle food increase due to cattle purchased.
(*b*) Do. trees, standing crops and grains.
(*c*) Decrease due to sales and worn out implements.
(*d*) Do. due to deterioration of buildings.

RESOLUTION—dated 8th August 1882, No. 1962.

The Board submit to Government their General Report on the Saidápet Experimental Farm for the year 1881-82.

2. The season was not favorable to farm operations. Want of rain prevented the sowing of any hot-weather crops, while heavy rains at the blossoming season seriously injured much of the then young cold-weather crops. The cyclone of November moreover did great damage to topes and standing crops.

3. Neither "smut" nor "ergot" was observed on the crops owing to the seed being dressed with a solution of sulphate of copper before sowing, while fungus and insects which attacked the crops were successfully opposed by improved manipulation of irrigation water.

4. 34·01 acres were sown with *fodder crops*, the outturn of which was, on an average, 3·307 lb. per acre; but one crop of yellow cholum (*Sorghum vulgare*) yielded 19·193 lb. per acre, without irrigation. 36·85 acres were sown with *Unirrigated cereals*, the outturn of which was generally fair. The *maize* crop, on poor soil without the aid of irrigation water, but with good tillage and the moderate use of manure, yielded a nett return, valued, over and above the cultivation expenses, at Rs. 25-3-1 per acre. *Broom millet*, a variety of *Sorghum*, was tried with success yielding an outturn of 960 lb. of grain and 4,256 lb. of straw per acre. This is the first experiment in this country with this grain. But the stalk is void of saccharine matter, and it is not known if the seed panicles are as suitable for broom making in this country as in America. This should be ascertained before distributing seeds. The cultivation of the *Minnesota early amber sugar-cane*, another variety of *Sorghum*, promises to yield good results in the future. Chinese sugar-cane also yielded a large outturn. There seems little use in continuing the cultivation of *Reana luxurians;* the grain is useless, and the fodder is watery and destitute of saccharine matter. 14·28 acres were cultivated with *Irrigated cereals*, resulting in an average outturn of 978 lb. of grain and 4·107 lb. of straw per acre. *Madagáscar paddy* was a failure owing to the badness of the season, and an unfortunate mistake about the seed-grain. Some samples of the grain were sent to London for professional valuation, and the results will be found at length in paragraph 32 of the Report. The experiments should be continued, as the circumstances of the year were unusually disadvantageous. 38·69 acres were under *Industrial crops*. *Casuarina trees*, which are gradually being removed, sold at something less than Rs. 2 per tree. The other crops were *castor-oil*, *indigo*, and *cotton*. The former was sown more as a "catch-crop" than a regular farm-crop. The yield of indigo was but small, chiefly owing to the bad season. The cotton outturn was similarly inferior. *Yca valley cotton* promises to become a valuable source of income hereafter, and seed will be sent into the districts when available. Of miscellaneous crops, *Manilla hemp* seems to be of little value owing to the difficulty of extracting the fibre. Possibly the system of agricultural exhibitions may result in the invention of some cheap machine for the purpose which may raise the value of the plant. Mr. Robertson recommends the common plantain as more likely to yield good fibre and is inquiring in America for mills for the purpose. The other small crops of this (miscellaneous) class call for no special remark, with the exception of the pasture grass called *Panicum brownii* on which the Superintendent reports very favorably, styling it "decidedly the best that has yet been introduced into this part of India." The seed was obtained from the United States.

5. The Superintendent has gone at length into the question of *Manures* (paragraphs 80 to 103), but it is obvious that careful experiments for a series of years must be conducted before it will become desirable to draw general conclusions from ascertained results.

6. *Live-stock*.—The Aden breed of cattle continues to prosper, and the Superintendent should carry out the proposals embodied in paragraph 107 of the Report, viz., to station some of the bulls in different parts of the country for breeding purposes.

The Board desire that this be done without delay. The milk produced during the year by the old Aden cow, which cannot now be less than fourteen years old, is very remarkable, being, for the ten months, 965·2 measures, estimated at 3·350 lb., a better proportional return than that of most of the best dairy-breeds.

7. *Machinery, &c.*—The value of improved ploughs is, the Board are glad to notice, becoming more generally recognized throughout the country. The Swedish plough appears to be the best, and is relatively the cheapest.

8. The Board must again call attention to the fact that no attempt has yet been made, in spite of repeated references, to commence operations on a selected area set apart for a Commercial or Model Farm. This has been insisted on more than once as the crucial test by which the value of all the agricultural operations hitherto carried out must be measured, and the Board look to the Superintendent to conform to their wishes without further delay. Mr. Robertson seems disinclined to make this trial until he can be certain of turning out good results, but the Board remark that by so doing he entirely misses the whole point of the experiment, which is to prove practically to the farmers of the country the benefits to be derived from improved farm-operations, not only in good, but in bad seasons, and not only on the finest classes of land, but on inferior or poor soil. All experimental cultivation is practically worthless unless the results can be actually proved to tend to financial success.

9. It is observed that the Report does not deal with the financial results of the various operations of the Farm in sufficient detail.

(True Copies and Extract.)

(Signed) R. SEWELL,
Acting Sub-Secretary.

(True Copy.)

(Signed) S. SRINIVASA RAGHAVAIYANGAR,
First Assistant.

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

Exd. A. Grubert.