

Number of Field.	Number of Plot.	Description of Crop.	Area of Plot.	Cultivation before Sowing.		DATE OF		Quantity of Seedlings.	How often.	IRRIGATION.					DETAILS OF HARVESTING.														
				Per Plot.	Per Acre.	Sowing in Nursery.				Transplanting.		Quantity of Water applied each time.	C. FT.	Total quantity of Water applied.	Equal to Rainfall in Inches.	Actual Rainfall in Inches.	Total quantity of Water-supply in Inches.	Date.	Duration of growth.	Outturn.									
						Grain.	Straw.			Grain.	Straw.									Grain.	Straw.	Grain.	Straw.	Per Acre.					
35	1	North. Gondoo Sumba Paddy.	120	40	1,613	6th October 1882.		19th November 1882.	Eighteen bundles each of 8" girth.	6 times.	90	540	6-0	34-89	40-89	6th January 1883.				165	56	279	2,258	11,253	8,026	9,780	6,413	8,288	6,614
	2	Do.	120	40	1,613			Do.	Do.	Do.	180	1,080	12-0	34-89	46-89	19th March 1883.				165	53	199	2,137	8,026	9,780	6,413	8,288	6,614	
	3	Do.	120	40	1,613			Do.	Do.	Do.	270	1,620	18-0	34-89	52-89					165	43	242	1,754	9,780	6,413	8,288	6,614		
35	1	South. Malagassat Paddy (mixed).	120	40	1,613	5th October 1882.		19th November 1882.	Do.	Do.	90	540	6-0	34-84	40-84	6th January 1883.				159	33	159	1,331	6,413	8,026	9,780	6,413	8,288	6,614
	2	Do.	120	40	1,613			Do.	Do.	Do.	180	1,080	12-0	34-84	46-84					169	46	206	1,875	8,288	9,780	6,413	8,288	6,614	
	3	Do.	120	40	1,613			Do.	Do.	Do.	270	1,620	18-0	34-84	52-84					159	42	164	1,694	6,413	8,026	9,780	6,413	8,288	6,614

The outturn of the Goondoo Sumba plots was good, and it is worthy of note that the lightest watering produced the best outturn; but, as has been noticed, no great importance must be attributed to this, the heavy rainfall having so complicated the experiment. The outturn on the three plots of the so-called Madagascar paddy was fair; it is difficult to understand why plot No. 1 yielded so much less than the others. These experiments throw but little light on the question of the moderate or lavish use of irrigation water; such experiments require to be made under arrangements of a very complete nature, so much depends upon the physical state of the soil, peculiarities of the weather, &c. Arrangements are now being made which, it is hoped, will admit of some irrigation experiments being conducted under conditions which can be thoroughly ascertained and, to a considerable extent, controlled. A very general belief is springing up that irrigation water is generally far too lavishly used in South Indian agriculture; but, up to the present time, no really reliable data have been collected, applicable to ordinary conditions.

34. The Kurnool paddy referred to, is a bearded variety, which has some reputation in the Kurnool District; it is however, as far as can be judged from the experience of the past unfavorable season, not a prolific variety. In the following statement are recorded the outturn of the irrigated crops harvested.

Description of Crop.	Number of Field and Plot.	Area of Plot.	SOWING OR PLANTING.			DETAILS OF HARVESTING.					Duration of growth.	RAINFALL.	
			Date of.	Seed sown.		Outturn.						Inches.	Wet Days.
				Total.	Per Acre.	Date of.	Grain.	Straw.	Grain per Acre.	Straw per Acre.			
		ACRES.		LB.	LB.		LB.	LB.	LB.	LB.	DAYS.		
1. Geondoo Sumba Paddy	28 C.	·99	9th Nov. 1882.	Planted.		10th Mar. 1883.	1,980	3,956	2,000	3,996	122	26·56	15
2. Do.	29 A.	1·18	14th Oct. „	50	42·4	8th „ „	558	1,182	473	1,001	145	33·10	23
3. White Car Paddy	30 A.	·25	25th Nov. „	Planted.		5th „ „	150	830	600	3,320	100	9·49	6
4. Do.	37 B.	·82	18th „ „	Do.		27th „ „	460	1,892	560	2,307	129	19·26	11
5. Do.	37 C.	·47	Do.	Do.		2nd „ „	325	1,371	692	2,917	104	19·26	11
6. Do.	36 B.	·46	19th Sept. 1882.	30	65	28th „ „	295	825	641	1,793	190	36·84	29
7. Do.	36 C.	·90	Do.	34	38	Do.	620	1,396	688	1,551	190	36·84	29
8. Do.	37 D.	·52	18th Nov. 1882.	Planted.		6th Mar. 1883.	420	1,160	807	2,230	108	19·26	11
9. Do.	R. F. 1 & 2	·88	24th Mar. „	Do.		3rd June 1882.	1,546	5,100	1,757	5,795	71	·09	1
10. Red Car Paddy	R. F. P. 4.	·39	„	Do.		18th Apr. 1883.	205	485	526	1,243	..	..	..
11. Do.	R. F. P. A.	·22	8th Feb. 1883.	Do.		17th „ „	280	868	1,268	3,945	68	..	..
12. Madagascar Paddy	28 B.	·40	18th Nov. 1882.	Do.		15th Mar. „	280	1,736	700	4,340	117	19·26	11
13. Do.	35 B.	·61	4th Oct. „	50	82	20th „ „	410	2,110	672	3,459	167	34·89	27
14. Do.	37 A.	·62	18th „ „	Planted.		27th „ „	428	1,708	690	2,755	159	33·45	21
15. Carolina Paddy	35·7	·04	18th Nov. „	Do.		2nd „ „	25	136	625	3,400	104	19·26	11
16. Kurnool Paddy	29 B.	·40	28th Oct. „	30	75	5th Mar. „	168	1,472	420	2,453	128	36·57	18
17. Do.	30 A.	1·55	7th „ „	89	57	22nd Feb. 1883.	800	3,210	516	2,090	138	34·84	26
18. Sixty-days' Sumba Paddy	29 A.	·60	16th Dec. „	150	250	7th Mar. „	248	1,372	413	2,287	81	..	..

INDUSTRIAL AND OTHER CROPS.

34. The area under these crops was 35.31 acres, of which 30.41 acres were standing at the commencement of the year. Of the crops sown in the year, 4.54 acres were left standing, the yield of which will be recorded in the next annual report.

35. The following statement shows the results of those crops harvested during the year :—

Description of Crop.	Number of Field and Plot.	Area of Plot.	SOWING.			DETAILS OF HARVESTING.		
			Date of.	Seed sown.		Date.	Outturn.	
				Total.	Per Acre.		Per Plot.	Per Acre.
		ACRES.		LB.	LB.		LB.	LB.
1. Cotton	10	1.00	Previous year.	9	9	6th July 1882.	353	353
2. Do.	11 East ..	1.48	13th Sept. 1881.	10	7	1st Sept. "	811.25	548
3. Do.	11 West ..	1.48	13th " "	10	7	1st " "	613.75	415
4. Do.	15 East ..	4.17	15th " "	30	7	3rd Aug. "	1,061	254
5. Do.	15 West ..	1.06	23rd " "	30	28	14th July "	353.75	334
6. Do.	31	2.13	8th " "	15	7	1st Sept. "	178.25	84
7. Do.	32	4.76	3rd " "	50	10	4th Aug. "	476.75	100
8. Do.	33	3.54	6th " "	35	10	17th " "	531.60	150
9. Indigo	10 B. West..	2.15	18th " 1882.	20	9	3rd Feb. 1883.	415.0	193
10. Do.	19	3.00	24th Oct. 1881.	37	12	1st May "	618.0	206
11. Do.	33 East ..	2.39	14th " 1882.	25	10	12th Jan. "	263.5	110
12. Do.	34 B. ..	.77	27th Dec. 1881.	9	12	29th Sept. 1882.	155.5	202
13. Do.	35 D. ..	.35	27th " "	4	11	29th " "	73.5	210
14. Castor Beans ..	16	1.15	23rd Nov. "	8	7	17th April "	165.5	144
15. Do.	20	1.48	26th " "	30	20	27th " "	157	106
16. Arrowroot ..	B. G. ..		8th July 1882.	Transplanted		7th Feb. 1883.	150	1,270.5
	D. 4 .. ..	.61						
17. Plantains	4 B. II ..	.26	6th June 1879.	Planted during the year.			90	346
18. Do.	35 A. 1, 2 & 3.	1.49	6th Sept. 1881.	Do. do.			79	53
19. Do.	12 C. ..	.55	26th Dec. 1878.	Do. do.			54	98
20. Chillies	12 A., B. & D.	1.74	30th Jan. 1882.	Planted.		2nd Sept. 1882.	3,764	2,163

The outturn of cotton-in-seed from 19.62 acres was 4,378 lb. equal to 223 lb. per acre or about 75 lb. of clean lint. The outturn is low; but, it must be remembered, the whole of the land under cotton, produced also either a crop of maize, or one of Sorghum between the lines of cotton plants. In considering these results, the character of the season, and of the farm soils, should be fully remembered. The cotton, which was all of the New Orleans variety, was sold on the farm for Rupees 318-10-1, which is Rs. 120 per candy of 500 lb.

36. The cotton in field No. 10 was sown in September 1881, it was therefore in the second year. The yield of this crop was 353 lb. of cotton-in-the-seed or, about 118 lb. of clean lint per acre, which, was a fair return, under the circumstances; but, generally it pays better to keep the cotton plants standing only one year; as, from the open shade of the plant, the growth of weeds is encouraged and, from the branching habit of growth of the cotton plant, weeding cannot be done by cattle labor, and is therefore expensive.

37. *Irrigated Cotton.*—A portion of field No. 11, sown with cotton, which measured 2.96 acres, was divided into two portions of equal area, and one plot was occasionally irrigated. The next statement affords full information regarding the results :—

Plot.	Area.	How often Watered.	Quantity of Water applied.	Equal to Rainfall.	Actual Rainfall.	Total Amount of Water.
1	2	3	4	5	6	7
	ACRES.		C. FT.	INCHES.	INCHES.	INCHES.
Irrigated	1.48	14 times.	36,120	6.72	37.92	44.64
Unirrigated	1.48	Nil.	Nil.	Nil.	37.92	37.92

Plot.	Outturn Cotton-in-Seed.		OBTAINED BY GINNING.				Percentage of Lint in Cotton-in-Seed.
			Per Plot.		Per Acre.		
	Cotton Lint.	Seed.	Cotton Lint.	Seed.			
	8		9	10	11	12	13
Irrigated	PER PLOT.	PER ACRE.	LB.	LB.	LB.	LB.	
Unirrigated	811.25	548.14	229.05	523.50	154.76	353.71	28.23
	613.75	414.69	193.25	423.25	130.57	286.09	31.48

38. The statements that follow show the percentage outturn of lint, and other information, regarding the cotton crops of the last season :—

Months.	FIELD No. 10.			FIELD No. 11, IRRIGATED.			FIELD No. 11, UNIRRIGATED.			FIELD No. 15, EAST.		
	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.
	2	3	4	5	6	7	8	9	10	11	12	13
1882.	L.B.	L.B.	L.B.	L.B.	L.B.	L.B.	L.B.	L.B.	L.B.	L.B.	L.B.	L.B.
March	107	29.25	27.3	98.50	28.14	28.50	62.75	18	28.7	350	104.5	29.8
April	121	32	26.4	160.75	51.35	31.94	169.25	55	32.5	157.25	48.5	30.8
May	78	6.20	34.4	86.00	23.25	27.03	128.50	38.25	29.8	250.75	76.5	30.3
June	83	27.50	33.1	167.50	49.00	29.50	131.25	42.5	31.9	117	40	34.2
July	24	7.50	31.25	180.50	52.80	29.50	58.00	17.50	30.2	130	41.5	31.5
August .. ..	..	..	..	118.00	33.00	27.96	64.00	19.25	30.0	56	16.5	28.6
September .. ..	..	..	..	..	..	..	..	..	..	..	..	..
October .. ..	..	..	..	..	..	..	..	..	..	..	..	..
Total ..	353	102.45	..	811.25	237.54	..	613.75	190.50	..	1,061.50	327.5	..
Average per Acre ..	353	102.45	29.0	548.1	160.5	29.2	414.6	128.7	31.0	254.4	78.5	30.8

Months.	FIELD No. 15, WEST.			FIELD No. 31.			FIELD No. 32.			FIELD No. 33.		
	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.
	14	15	16	17	18	19	20	21	22	23	24	25
1882.	L.B.	L.B.	L.B.	L.B.	L.B.	L.B.	L.B.	L.B.	L.B.	L.B.	L.B.	L.B.
March	84.75	24.75	29.2	62.50	18.85	30.1	230.25	73.25	31.8	222.5	68.40	30.7
April	161.56	40.00	30.3	4.25	1.25	29.4	91.50	29.50	32.2	122.0	37.00	30.3
May	27.50	7.25	26.3	32.50	9.25	28.4	34.00	9.50	27.9	51.0	13.60	26.4
June	39.00	14.00	35.9	31	8.5	25.9	60.00	18.25	30.4	54.0	19.25	35.6
July	41.00	11.50	28.0	8	2	25.0	40.00	11.25	28.1	32.0	10.25	32.0
August .. ..	..	..	..	40	12.5	30.1	20.00	6.50	32.5	50.0	15.60	31.0
September .. ..	..	..	..	..	..	..	..	..	..	..	..	..
October .. ..	..	..	..	..	..	..	..	..	..	..	..	..
Total ..	353.75	106.50	..	178.25	52.35	..	475.75	148.25	..	531.5	163.9	..
Average per Acre ..	353.7	100.4	30.1	83.6	24.5	29.3	99.9	31.1	31.1	150.1	46.3	30.8

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.
1	2	3	4	5	6	7
Maize and Cotton	11 ..	ACRES. 2-96	RS. A. P. 26 0 3	RS. A. P. 13 10 0	RS. A. P. 49 1 11	RS. A. P. 18 4 0
Do.	15 A ..	4-17	25 3 0	11 4 1	29 5 5	20 12 6
Do.	15 B ..	1-06	19 8 0	12 6 2	36 6 5	9 13 3
Planter's Friend and Cotton ..	31 ..	2-13	13 14 0	4 9 0	7 11 6	11 2 6
Ragi and Cotton	32 ..	4-76	6 10 0	11 8 0	20 12 0	8 4 9
Sorghum and Cotton	33 ..	3-64	16 6 6	6 5 0	14 11 0	18 2 6

Description of Crop.	Value of Manure applied.	Total Expenditure on Crop.	Value of unexhausted Manure carried forward.	Net Cost of Crop.	Value of Produce.	Remarks.
	8	9	10	11	12	13
Maize and Cotton	RS. A. P. 45 2 0	RS. A. P. 159 0 2	RS. A. P. 13 6 0	RS. A. P. 145 10 2	RS. A. P. 234 6 8	
Do.	72 9 0	159 2 0	20 15 0	138 3 0	268 1 3	
Do.	65 13 0	* 143 14 10	15 12 0	128 3 4	43 9 2	Failed from land having become flooded.
Planter's Friend and Cotton ..	33 5 0	70 10 0	6 10 0	60 0 0	57 15 7	
Ragi and Cotton	43 1 0	90 3 9	14 5 0	75 14 9	102 10 7	
Sorghum and Cotton	33 15 0	89 8 0	8 12 0	80 12 0	158 1 10	

39. *Yca Valley Cotton*.—Nearly an acre of land is under this crop, the plants are growing luxuriantly, and, so far, have not been attacked by the borer from which this variety of cotton suffered so severely, in former experiments. The lint is, apparently, quite as long and good, as that produced when the seed was first obtained from South America. The seed is being collected, and preserved with care for sowing. The lint is superior to Sea Island or, any other variety of cotton that has been tried at Saidápet.

40. *Nankin Cotton*.—Attention has been directed to this cotton since the adoption in the Army of brown-colored cotton uniforms in lieu of white. The natural dun-colored lint produces a fabric of a much more permanent and uniform a color, than hitherto has been obtained by dyeing ordinary cotton cloth. The Nankin cotton plant has long been known in this Presidency; but it is a small producer of lint, and is not in favor with cultivators. There is an impression that it crosses very readily with other kinds of cotton, and that as these mostly produce white lint, there will be a want of uniformity in the color of the lint. This is, of course, possible; but, on the farm so far, there is no evidence to show that the color of the Nankin cotton produced has, in any way, suffered from this cause. It is indeed remarkable how seldom there is any evidence of interbreeding between the different varieties of cotton grown on the farm. New Orleans, Yca Valley and Brazil cotton have been grown for some years in the Botanical Gardens in close proximity, and there is not a particle of evidence to show that these varieties have interbred.

41. *Indigo*.—The indigo crops were grown chiefly for the production of seed, the variety being a gigantic one, growing to a height of 5 or 6 feet, obtained from Agra.

42. *Castor-oil*.—No regular crops were grown, the seed was sown simply to raise shade plants amongst young casuarinas.

43. *Arrowroot*.—A small plot measuring 80 square yards was cropped with arrowroot. It yielded 150 lb. of tubers; of these, 100 lb. were used in making flour, of which the outturn was 14 lb. Had flour been made from the whole of the tubers,

* The land was twice or thrice sown.

the yield per acre would represent 1,270 lb. The old flour on hand when the last Report was prepared was sold by auction at $1\frac{1}{2}$ annas per pound.

44. *Colocasia Antiquorum*.—The so-called country potato known in Tamil as Shamakilanghoo yielded on a plot of 80 square yards 52 lb. of tubers, which was at the rate of 3,146 lb. per acre. Both tubers and leaves are used as human food.

45. *Typhonium Orixense*.—The Tellinga potato yielded on a plot of 80 square yards 53 lb. of tubers, equal to 3,206 lb. per acre. The tubers are used as vegetables and also, for medicinal purposes.

46. *Manilla Hemp (Musa Textilis)*.—This crop is now quite acclimatised on the farm, and does not require any attention beyond that given to the common plantain; indeed, from the appearance of the plants it would seem that they require less water than the common plantain. The stems of some of the plants are of remarkable thickness, and of great height compared with those of the common plantain. Numerous experiments have been made to extract the fibre, but the cost of production generally compared unfavorably with the value of the clean fibre.

47. The following are some of the results obtained.

Date of Experiment.	Number of Stems.	Portion of Stem used.	Length of Stem.	Circumference of Stem.	Weight of Stem.	Weight of Pith.	Weight of portion of Stem used for experiment.	Weight of Fibre obtained.	DETAILS OF OPERATIONS.				Cost of Operation.	Cost of preparing the Fibre per Pound.	Remarks.
									Time Occupied.						
									For Crushing.	For Steeping.	For Washing.	For Beating.			
			FT. IN.	FT. IN.	LB.	LB.	LB.	OZ.	MIN.	HOURS.	MIN.	MIN.	RS. A. P.	RS. A. P.	
7th June 1882	.. 1	Manilla Hemp. Outer layer	6 9	0 19	34	9	25	4½	13	..	10	45	0 1 0	0 3 10	Crushed, washed and beaten at once.
17th " "	.. ..	Inner layer .. ..	..	..	..	..	..	3½	9	..	10	40	0 0 6	0 2 3½	Do. do.
17th " "	.. 2	Outer layer	6 10	0 20	35	8½	26½	3	12	3	..	55	0 1 6	0 8 0	Steeped for three hours and then crushed.
17th " "	.. ..	Inner layer .. ..	..	..	..	..	..	3½	11	3	..	52	0 1 0	0 4 3½	Do. do.
20th " "	.. 1	Outer layer	6 2	2 1	55	6½	48½	7	18	..	10	40	0 0 6	0 1 1½	With flower stalk, crushed and beaten.
20th " "	.. ..	Inner layer .. ..	..	..	..	..	..	13½	12	..	8	30	0 0 4	0 0 4½	Do. do.
20th " "	.. 2	Outer layer	8 0	2 10	128	17½	110½	16½	35	3	15	60	0 0 11	0 0 10½	Without flower, crushed, steeped three hours and beaten.
20th " "	.. ..	Inner layer .. ..	..	..	..	..	..	16½	25	3	12	48	0 0 8½	0 0 8½	Do. do.
20th " "	.. 3	Outer layer	9 0	2 5	105	16	89	12½	28	..	15	55	0 0 10½	0 1 1½	Without flower, crushed and beaten.
20th " "	.. ..	Inner layer .. ..	..	..	..	..	..	16½	18	..	11	48	0 0 8	0 0 7½	Do. do.

48. For comparison, the following statement is added, giving results of experiments made in extracting the fibre of the common plantain:—

Date of Experiment.	Number of Stems.	Portion of Stem used.	Length of Stem.	Circumference of Stem.	Weight of Stem.	Weight of Pith.	Weight of portion of Stem used for experiment.	Weight of Fibre obtained.	DETAILS OF OPERATIONS.				Cost of Operation.	Cost of preparing the Fibre per Pound.	Remarks.
									Time Occupied.						
									For Crushing.	For Steeping.	For Washing.	For Beating.			
			FT. IN.	IN.	LB.	LB.	LB.	OZ.	MINS.	HOURS.	MINS.	RS. A. P.	RS. A. P.		
16th June 1882	1	Common Plantain. Outer layer ..	5 0	21	32	7½	24½	3	10	3	15	50	0 1 0	0 5 4	Steeped and then beaten.
Do.	1	Inner layer ..	5 0	..	..	..	..	3½	..	3	12	40	0 0 8	0 2 11	Do.
Do.	2	Outer layer ..	5 2	19	30	4½	25½	7½	12	3	10	..	0 0 9	0 1 7	Steeped for three hours and then crushed.
Do.	2	Inner layer ..	5 2	..	..	..	..	8½	..	3	8	..	0 0 6	0 0 11	Do.
Do.	3	Outer layer ..	5 0	15	20	3	17	3½	11	1	..	..	0 1 6	0 7 4	Boiled for one hour after crushing.
Do.	3	Inner layer ..	5 0	..	..	..	..	3½	..	½	..	..	0 1 0	0 4 9	Boiled for half an hour after crushing.

49. A roughly made stem-crusher was used in the experiments; it consists of a pair of wooden rollers about one foot long and four inches in diameter, fixed in uprights, and worked by a handle. Two men were needed to work the machine, and two to feed and remove the fibre, &c. A mill on the principle of the Beheea Sugar Mill, with wooden instead of iron rollers would, it is believed, do good work. The machine used in these experiments was without cogs for driving, or the means of adjustment. With the aid of proper apparatus a roughly prepared fibre for rope-making might be turned out at a sufficiently low cost. The ordinary selling-price of Manilla Hemp rope in Madras is 5 annas per pound.

50. The least costly way of separating the fibre was found to be, to steep the sheaths in water after crushing, and to remove the remainder of the pulp after slight fermentation by washing; but the fibre was of a bad color, and fitted only for rope-making. Up to the present time the fruit of the plant has not been utilized in any way; it contains a great number of large seeds and the pulp is insipid and rather unpleasant to the taste. Possibly by separating the pulp from the seed, and converting the former into starch, something could be done towards utilizing the fruit.

51. Several applications for shoots we received, and they have been met as far as possible. The following statement shows the number of shoots distributed:—

Place.	No. of Shoots.
Madras	18
Central Provinces	50
South Arcot	20
South Canara	4
Nilgiris	3
Total	95

At the close of the year the plot consisted of the undermentioned plants:—

Full-grown	23
Half-grown	323
Shoots fit for planting	182
Total	528

The plot will be extended as shoots become available for the purpose.

52. *Chillies*.—This crop was cultivated on a somewhat larger scale than usual. The crop in field (12) was a very fine one, the fruits were much larger than are usually seen, although only ordinary seed was used. About two months after planting flowers appeared, and the production of fruit continued until the crop was taken up. Numerous plants had as many as forty fruits at one time, besides being profusely covered with flower. The produce was at the rate of 2,163 lbs. of chillies per acre. As the field had to be sown with cotton and maize in September, the chillie crop was taken up when still bearing heavily. There is not much difficulty in producing chillies, if the crop is well watered during its early growth and is kept free of weeds. The fruit can be readily sold either fresh or dry. The condition of the soil, and the kind of manure used, influences greatly the value of the crop. A somewhat stiff soil and strong manure, such as blood-compost specially suit the crop.

53. *Casuarina trees* (*Casuarina Muricata*).—The various experimental plantations of these trees continue to thrive. The year was not a favorable one for tree-planting operations, where irrigation water was not available. On one plot, in field 17 which was planted in February last, the trees have grown in a very remarkable way; when they were planted they were only about one foot in height, and they have since grown on the average about six inches per month, the soil is a very coarse sand, and is in a low manural condition, but it was kept open by the frequent use of the plough while the watering was regular and sufficient. The trees were planted four feet apart in the rows and six feet apart between the rows. This distance appears to be that best suited for *Casuarina* trees on the sandy soils of the farm. During the year, the area planted was 8 acres; all the land was sandy and poor.

There are now on the estate about 39 acres under Casuarinas, in different stages of growth. Not only will the land thus occupied yield a handsome return in a few years, but the land itself is gradually being improved, from the large addition of organic matter from the fallen leaves of the trees. The fall of leaves during a year is very considerable; in a Casuarina plantation aged four years, the weight of decaying leaves covering the ground was found to be as follows:—

Plot		Area.	Weight, shed leaves.
		SQUARE YARDS.	LBS.
Plot 1	.. .. .	54	34.5
" 2	.. .. .	54	38.5
" 3	.. .. .	54	39.0
" 4	.. .. .	54	44.5

The average of these results shows that the land has a covering of leaves distributed, at the rate of about $1\frac{1}{2}$ tons per acre. Below the covering of fallen leaves lies a thin strata of black vegetable mould, the remains of previous sheddings of leaves. There cannot be a doubt but that the sandy soils of the farm will benefit very greatly by being planted with Casuarinas, the one great defect in these soils being their poverty in organic matter.

54. *Cocoanut Trees*.—A number of cocoanut trees which were planted about eight years ago, came into bearing this year; some of them yielded heavily. A number of cocoanut trees were planted in some salt land where ordinary crops did not thrive; and as far as can be judged now, these cocoanuts are doing as well as could be desired. Large pits were made and filled with coarse sand before the plants were put in. In another field cocoanuts were planted along with plantains the intention being that the latter should afford shade, and in a measure utilize the ground during the first two years, while the cocoanut trees are small. Planting the portions of the Farm estate, unfitted for agricultural use with fruit and fuel trees will greatly add to the value of the property; though, there will be, on this account, an outlay on labor for which for some time there will be no corresponding return.

55. (*Atriplex nummularia*) *Salt-bush*.—Attention has been directed to this shrub as one adapted for cultivation on land containing too large a percentage of salt for the favorable growth of ordinary crops. The salt-bush is highly appreciated in certain parts of Australia where cattle and sheep are fond of browsing on its leaves and twigs. A small supply of seed was obtained from the Botanical Gardens, Saharanpur, and arrangements have been made for procuring a further supply direct from Australia.

56. *Divi Divi*.—There were on the farm at the beginning of the year sixteen bushes planted in 1879. They yielded 13 lb. of pods at the end of March 1882 and again in March last bore another crop of 60 lb. of pods which yielded $4\frac{1}{2}$ lb. of seeds. From the first crop a number of seedlings have been raised and planted out in different places over the estate, and there are at present six hundred young seedlings ready for planting out on the first favorable opportunity. It is proposed to plant these by themselves to form an experimental plantation.

57. *Eucalyptus*.—The Eucalyptus trees planted out about three years ago, continue to thrive, and there are at present 296 seedlings from recently imported seed, ready for planting out, of the following kinds:—

Eucalyptus	Hemipoya.
Do.	Paniculata.
Do.	Teriticormis.
Do.	Citrodosa.
Do.	Lidrophlio.
Do.	Hemipoya.
Do.	Rostiata.
Do.	Rosinifera.
Do.	Bicolor.

There seems to be now every prospect of eight varieties at least of Eucalypti being naturalized at Saidápet, for the trees are not likely trees to encounter a much worse

season than the past has been. The measurements of the various specimen trees were given under paragraph 74 of the last report.

MANURES.

58. Oil-cake was largely used on the farm last year, of the following varieties :—

White Castor Cake.	Gingelly Cake.
Bassia Cake.	Ground-nut Cake.

The total weight amounted to upwards of 80 candies of 500 lb. average. The prices paid were, delivered at the farm, as follows :—

		RS.	A.	P.
White Castor Cake, per Candy	.. .. .	6	8	0
Bassia Cake do.	.. .. .	3	8	0
Gingelly Cake do.	.. .. .	5	4	0
Ground-nut Cake do.	.. .. .	5	0	0

59. The undermentioned analyses show the usual average composition of these cakes :—

	White Castor Cake.	Bassia Cake.	Gingelly Cake.	Ground-nut Cake.
	PER CENT.	PER CENT.	PER CENT.	PER CENT.
Moisture	10.19	13.54	9.78	8.10
Oil	11.57	80.79	7.50	8.76
(a) Albuminoids	48.62		30.37	30.50
Digestible fibre	11.56		27.12	27.78
Cellulose (woody fibre)	8.16		12.21	19.12
(b) Mineral matters (ash)	9.90	5.67	13.02	5.74
Total	100.00	100.00	100.00	100.00
(a) Containing nitrogen	7.78	2.73	4.86	4.88
(b) Containing sand	2.07	..	4.41	..
Soluble portions of ash	7.83	..	..	..

The white castor cake had been made from decorticated seed, and was in the form of a powder very convenient for distribution. Seeing that it contained nearly 8 per cent. of nitrogen, it is a very valuable manural agent. Bassia cake contains only about one-third the quantity of nitrogen that white castor cake contains; it is however procurable in some places at a low cost, and may there be used with advantage. Gingelly and ground-nut cake are valuable feeding cakes and, as a rule, it pays the farmer much better to use these cakes in feeding his stock, and to fertilize his land with the manure of the stock so fed, rather than to manure the land directly with these cakes; but, cake of these varieties is occasionally met with, in a condition unfitted for use as cattle food, and such, when the price is sufficiently low may, with advantage, be used as manure. The bassia, gingelly and ground-nut oil cakes are usually in blocks each from $\frac{1}{2}$ lb. to 5 or 6 lb. in weight, these pieces must be broken and pulverized before the cake can be used as manure, and this increases its cost. In addition to oil-cake, farm manure, wood ashes, and the other ordinary manures, were made use of.

60. *Salt*.—Common salt was employed with considerable advantage in arresting the attacks of white-ants on cocoanut trees, and as manure for these trees. The quantity applied varied from 1 to 5 lb. according to the age of the tree. The usual price of salt, however, is too high to admit of its general use in agriculture. As will be noticed elsewhere (cattle), there is no good reason why specially-prepared common salt should not be available duty free to the agriculturists of this country.

61. *Green Manure*.—The arable land was as far as possible sown with horsegram after the removal of the ordinary crops, and the gram crop was grazed, cut for fodder, or ploughed-in, as circumstances necessitated. There cannot be a doubt but

that the nitrogen that accumulates in the soil during the long dry season is, in this way, conserved, and protected from waste, when the heavy monsoon-rains set in.

62. The experiment in Field No. 8 which was commenced in 1880 (*vide* paragraph 90 of the last report) was continued. The crop, yellow cholom (*Sorghum vulgare*), was sown on the 14th of September. The seed was dressed in the usual way, it germinated well, and produced a fair covering of plants; but the crop, like others growing at the time, suffered severely from unseasonable weather. The outturn from the eight experimental plots was 440.25 lb. of grain and 3,203 lb. of straw, which is equal to 550 lb. of grain and 4,004 lb. of straw per acre. In the previous year the outturn was 770 lb. of grain and 7,490 lb. of straw per acre. It will be observed that no manure was used in the past season. The limed plot again gave a small yield. The ash-manured plot has, contrary to all experience, yielded almost as good results in the third year as farm-yard manure; however, the value of its total outturn in the three years is still considerably below that of the plot manured with farm-manure. It is proposed to continue the experiments longer without manure, and further experience may throw light upon the apparent contradictions which now present themselves; but instead of cholom, which is so readily attacked by "rust" on the sandy soils of the farm, it is proposed to substitute ragi, which is better suited to such soils. The next statement gives the results for the three years over which the experiment has extended.

FIRST YEAR (1880-81).						SECOND YEAR (1881-82).						THIRD YEAR (1882-83).						TOTAL OUTTURN OF EACH PLOT PER ACRE IN THE 3 YEARS OVER WHICH THE EX- PERIMENTS HAVE EXTENDED.		VALUE OF PRODUCE PER ACRE.		
CROP—SORGHUM VULGARE.						CROP—SORGHUM SACCHARATUM.						CROP—SORGHUM VULGARE.										
Plot.	Manure used on each Plot.	Outturn.				Manure used on each Plot.	Outturn.				Manure used on each Plot.	Outturn.										
		Per Plot.		Per Acre.			Per Plot.		Per Acre.			Per Plot.		Per Acre.								
		Grain.	Straw.	Grain.	Straw.		Grain.	Straw.	Grain.	Straw.		Grain.	Straw.	Grain.	Straw.	Grain.	Straw.	Total.				
		LB.	LB.	LB.	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	No manure was used.	66	466	660	4,660	2,210	18,370	44.2	61.2	105.4		
4	No manure	54	291	545	2,915	10 cwt. farm manure ..	99	672	990	6,720		55	454	550	4,540	2,085	14,175	41.7	47.2	88.9		
5	2,860 lb. ashes	51	238	515	2,385	No manure	84	840	840	8,400		65	458	650	4,580	2,005	15,365	40.1	51.2	91.3		
6	No manure	57	281	570	2,810	66½ lb. oil cake	75	840	750	8,400		66	421	660	4,210	1,980	15,420	39.6	51.4	91.0		
7	211 lb. slacked lime	48	210	485	2,100	No manure	61	728	610	7,280		48	328	480	3,280	1,575	12,660	31.5	42.2	73.7		
8	No manure	47	218	475	2,185	1 ton farm manure	99	896	990	8,960		53	370	530	3,700	1,995	14,845	39.9	49.4	89.3		
9	50 lb. oil cake	84	361	845	3,615	No manure	80	616	800	6,160		50.2	342	502.5	3,420	2,147.5	13,195	42.9	44.0	86.9		
10	No manure	34	191	345	1,915	Do.	58	560	580	5,600		37	364	370	3,640	1,295	11,155	25.9	37.1	63.0		
Average yield ..		59	290	591	2,904	Average yield ..		77	749	770	7,490	Average yield ..		55	400	550	4,004					

63. The "ash and cattle-dung experiments" referred to at paragraph 94 of the last year's report were also continued. The bad season nearly put an end to this experiment. The soil contains upwards of 92 per cent. of sand, and the drought of October ruined the crop. The results are recorded merely to continue the history of the experiment, otherwise they do not, as far as can now be judged, possess any value. The widely-varying results obtained in each year show the necessity for experiments such as these being continued over several years, before definite conclusions are drawn; at the same time it must be remembered that from the sandy nature of the soils of the farm, its crops are exceptionally liable to damage in an adverse season. It is proposed in this experiment also to substitute ragi (*Eleusine corocana*) for sorghum as being better suited to the soil:—

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.
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

1882-83.

A. Box manure ..	1,467·5	1,271	125	2,314	..	..	..	..	433	32	1,983
B. Solid excrements.	1,334	1,232	..	..	1,405·7	491	..	..	433	30	1,835
C. Ashes	1,348·2	1,207	..	..	1,429·2	..	Husk. 27·5	Ashes. 119	433	32	1,890

Average Outturn of Manure from one Pair of Cattle during ninety-three Days.

In Box manure ..	..	..	..	..	..	2,314
Solid excrements ..	..	..	..	..	..	1405·7
Ashes .. ..	..	..	..	..	..	119

The next statement gives the crop return for the past three years.

1880-81.

Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5.
Manure—856 lb. box manure. Produce.. { Grain .. 25 lb. { Straw .. 189 „	Manure—None. Produce.. { Grain .. 14½ lb. { Straw .. 125 „	Manure—392 lb. solid excrements. Produce.. { Grain .. 28½ lb. { Straw .. 193 „	Manure—None. Produce.. { Grain .. 15½ lb. { Straw .. 168 „	Manure—120 lb. dung ashes. Produce.. { Grain .. 18½ lb. { Straw .. 201 „

Plot 12.	Plot 11.	Plot 10.	Plot 9.	Plot 8.	Plot 7.
Manure—856 lb. box manure. Produce.. { Grain .. 24½ lb. { Straw .. 172 „	Manure—None. Produce.. { Grain .. 19 lb. { Straw .. 149 „	Manure—392 lb. solid excrements. Produce.. { Grain .. 28½ lb. { Straw .. 196 „	Manure—None. Produce.. { Grain .. 14½ lb. { Straw .. 170 „	Manure 120 lb. dung ashes. Produce.. { Grain .. 23½ lb. { Straw .. 198 „	Manure—None. Produce.. { Grain .. 12½ lb. { 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. Produce.. { Grain .. 12 lb. { Straw .. 201 „	Manure—None. Produce.. { Grain .. 3 lb. { Straw .. 75 „	Manure—338 lb. solid excrements and 9 lb. husk ashes. Produce.. { Grain .. 6½ lb. { Straw .. 125 „	Manure—92½ lb. paddy straw and 9 lb. husk ashes. Produce.. { Grain .. 10½ lb. { Straw .. 136 „	Manure—82½ lb. bratty ashes. Produce.. { Grain .. 9 lb. { Straw .. 156 „	Manure—None. 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. Produce.. { Grain .. 6 lb. { Straw .. 139 „	Manure—None. Produce.. { Grain .. 5½ lb. { Straw .. 119 „	Manure—338 lb. solid excrements, and 9 lb. husk ashes. Produce.. { Grain .. 6½ lb. { Straw .. 143 „	Manure—None. Produce.. { Grain .. 9 lb. { Straw .. 164 „	Manure—85½ lb. bratty ashes. Produce.. { Grain .. 9½ lb. { Straw .. 189 „	Manure—92½ lb. paddy straw and 9 lb. husk ashes. Produce.. { Grain .. 9½ lb. { Straw .. 168 „

1882-83.

Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5.	Plot 6.
Manure—1,157 lb. box manure, 1½ lb. husk ashes. Produce.. { Grain .. 6 lb. { Straw .. 254 „	Manure—None. Produce.. { Grain .. 3 lb. { Straw .. 72 „	Manure—245½ lb. solid excre- ment and 1½ lb. husk. Produce.. { Grain .. 8 lb. { Straw .. 164 „	Manure—62½ lb. paddy straw and 1½ lb. husk ashes stored. Produce.. { Grain .. 8 lb. { Straw .. 194 „	Manure—59½ lb. bratty ashes. Produce.. { Grain .. 4 lb. { Straw .. 80 „	Manure—None. Produce.. { Grain .. 5½ lb. { Straw .. 120 „
Plot 12.	Plot 11.	Plot 10.	Plot 9.	Plot 8.	Plot 7.
Manure—1,157 lb. box manure, and 1½ lb. husk ashes. Produce.. { Grain .. 5 lb. { Straw .. 204 „	Manure—None. Produce.. { Grain .. 6 lb. { Straw .. 100 „	Manure—245½ lb. solid dung and 1½ lb. husk ashes. Produce.. { Grain .. 6 lb. { Straw .. 160 „	Manure—None. Produce.. { Grain .. 7½ lb. { Straw .. 124 „	Manure—59½ lb. bratty ashes Produce.. { Grain .. 8½ lb. { Straw .. 152 „	Manure—62½ lb. paddy straw, 1½ lb. husk ashes. Produce.. { Grain .. 6 lb. { Straw .. 156 „

19TH NOVEMBER 1883, Nos. 1430, 1430A, REVENUE.

64. The following statement regarding the manufacture of farm-manure affords some useful information :—

Cattle of the Boxes.	Cattle.	Number of Animals.	Area of Boxes.	Days accumulating.	Actual Hours.	Date when weighed.	Weight of Manure.	Condition of Manure.
			SQ. FT.	DAYS.			LB.	
1	Nellore	2	84	78	In working days—13 hours. In holidays—16 hours.	5th December 1882 ..	9,200	Well decomposed.
2	Mysore	2	84	79		5th, 6th December 1882 ..	6,300	Do.
3	Nellore and Aden ..	2	84	80		6th, 7th " " ..	7,000	Do.
4	Mysore	2	84	58		15th November 1882 ..	6,850	Not well decomposed.
5	Do.	2	84	84		11th December " ..	6,630	Tolerably good.
6	Aden	2	84	81		8th " " ..	4,900	Well decomposed.
7	Mysore	2	84	53		9th, 10th November 1882.	7,040	Tolerably good state.
8	Half-bred young bullocks	2	84	96		23rd December 1882 ..	5,620	Well decomposed.
9	Punganūr and Aden.	2	84	96		23rd " " ..	6,050	Do.
10	Aden	2	84	65		15th, 22nd November 1882.	5,140	Not so good.
11	Nellore	2	84	82		9th December 1882 ..	8,936	Indigo straw not well decomposed.
12	Nellore and Aden ..	2	84	67		23rd, 24th November 1882.	7,340	Tolerably good.

The cattle of the Nellore breed would weigh each 700 to 800 lb. ; those of the Mysore breed, each from 500 to 600 lb., and the Adens from 300 to 400 lb. each. About one-third of the fodder of the animals was green. The cattle-boxes were kept always well bedded, and being roofed over no rain water could get amongst the manure. It will be noticed that, much the largest weight of manure was collected in the cattle-boxes occupied by the Nellores, and that in those in which the Adens were, only about half the weight of manure was obtained.

65. The next experiment was made in top-dressing indigo :—

No. of Plot.	Area.	Manures.	PRODUCE.		PRODUCE PER ACRE.		AVERAGE PRODUCE PER ACRE.	
			Seed.	Straw.	Seed.	Straw.	Seed.	Straw.
	SQ. FT.		LB.	LB.	LB.	LB.	LB.	LB.
1	484	20 lb. Saltpetre	24	95	2,160	8,550	..	..
5	484	20 lb. do.	20	71	1,800	6,390	1,980	7,470
3	484	200 lb. Sulphate of lime	23	89	2,070	8,010	..	..
7	484	200 lb. do.	18½	62½	1,665	5,625	1,867	6,817
2	484	Nothing	21	77	1,890	6,930	..	..
4	484	Do.	19	74	1,710	6,660	..	..
6	484	Do.	16	71	1,440	6,390	..	..
8	484	Do.	17	67	1,530	6,030	1,642	6,502

Several other manural experiments were begun ; but the highly unfavorable season prevented them from being brought to maturity.

66. In Field No. 7, which is intended to be laid out as experimental grounds, some further trials were made in testing the natural condition of the soil, in continuation of those noticed at paragraph 100 of the last report. It will be observed that the outturn of grain varied quite as greatly as did the outturn of pulse. The land is, therefore, clearly unfitted yet for experimental cropping. Efforts will be made by mixing the soils to produce greater uniformity in their condition. The eastern portion of the field comprising six plots will be rejected for experimental cultivation, as altogether unfitted for the purpose. The results of these inquiries show how very necessary it is, before commencing any experimental cropping, that the character of the soil should be thoroughly ascertained. The soil of the eight plots, it is proposed, eventually, to utilize for experimental cropping would, to the ordinary agriculturist, appear very uniform in character and composition ; but, as the results of these trials show, there is a very wide difference in the producing powers of the soils constituting the different major and minor plots. There is, of course, no field which produces on every square yard of its

EXPERIMENTAL FIELD No. 7.

FIRST YEAR—CROP, HORSE GRAM—(<i>Dolichos Uniflorus</i>).						SECOND YEAR—CROP, YELLOW CHOLU—(<i>Sorghum Vulgare</i>).					
Plot No. 1.			Plot No. 2.			Plot No. 1.			Plot No. 2.		
1.	L.B.		2.	L.B.		1.	L.B.		2.	L.B.	
Green plants .. 48			Green plants .. 85			Dry straw .. 20			Dry straw .. 44		
Dry straw .. 37			Dry straw .. 45.5			Grain .. 1.75			Grain .. 3.5		
Pulse .. 7			Pulse .. 7								
3.	L.B.		4.	L.B.		3.	L.B.		4.	L.B.	
Green plants .. 151			Green plants .. 106			Dry straw .. 54			Dry straw .. 80		
Dry straw .. 29.5			Dry straw .. 25.5			Grain .. 3.75			Grain .. 8.25		
Pulse .. 5.75			Pulse .. 5.75								
5.	L.B.		6.	L.B.		5.	L.B.		6.	L.B.	
Green plants .. 114			Green plants .. 74			Dry straw .. 56			Dry straw .. 56		
Dry straw .. 31			Dry straw .. 21.5			Grain .. 4.5			Grain .. 4.25		
Pulse .. 8			Pulse .. 4								
Produce of No. 1.			Produce of No. 2.			Produce of No. 1.			Produce of No. 2.		
Green plants 588 lb.			Green plants 758 lb.			Dry straw 310 lb.			Dry straw 434 lb.		
Dry straw 180.5 "			Dry straw 201.2 "			Grain 26 "			Grain 41.75 "		
Pulse 37.5 "			Pulse 31.4 "								
Plot No. 5.			Plot No. 6.			Plot No. 5.			Plot No. 6.		
1.	L.B.		2.	L.B.		1.	L.B.		2.	L.B.	
Green plants .. 78			Green plants .. 108			Dry straw .. 30			Dry straw .. 56		
Dry straw .. 27.5			Dry straw .. 30			Grain .. 2			Grain .. 6.25		
Pulse .. 5.25			Pulse .. 6.75								
3.	L.B.		4.	L.B.		3.	L.B.		4.	L.B.	
Green plants .. 74			Green plants .. 64			Dry straw .. 48			Dry straw .. 80		
Dry straw .. 16.25			Dry straw .. 16.5			Grain .. 2.5			Grain .. 5.75		
Pulse .. 4			Pulse .. 5.25								
5.	L.B.		6.	L.B.		5.	L.B.		6.	L.B.	
Green plants .. 76			Green plants .. 107			Dry straw .. 40			Dry straw .. 60		
Dry straw .. 28			Dry straw .. 21.5			Grain .. 3.75			Grain .. 6		
Pulse .. 5			Pulse .. 5.5								
Produce of No. 5.			Produce of No. 6.			Produce of No. 5.			Produce of No. 6.		
Green plants 507 lb.			Green plants 605 lb.			Dry straw 314 lb.			Dry straw 500 lb.		
Dry straw 139.75 "			Dry straw 185.25 "			Grain 26.25 "			Grain 48 "		
Pulse 31.75 "			Pulse 31.12 "								

surface exactly the same yield, and it is this irregularity in outturn, even in apparently uniform crops, that makes the practice of determining the yield of a large area by the yield of a few square yards of apparently average crop, so reprehensible. The next statement gives the results of these tests.

LIVE STOCK.

67. *Cattle*.—The cattle generally were healthy throughout the year. There was one death from anthrax which created some alarm, as it was feared that this virulent disease had obtained a footing on the farm amongst the Aden stock. Very energetic means were taken to combat the disease by the Inspector of Cattle Diseases; the whole of the cattle were removed from their sheds and placed in temporary sheds erected about half a mile from the farm buildings, the bedding and manure in the cattle sheds at the time was all removed and burnt, and the sheds were thoroughly cleansed, fumigated and lime-washed; and not again used until some time afterwards. No other case of anthrax appeared, but, a case suspiciously like one of "Rinderpest" occurred, also, amongst the Aden cattle; this case also received energetic treatment and, with a successful result.

68. *Aden Cattle*.—The herd now consists of 7 bulls, 5 cows, 1 heifer, 7 bull calves, and 3 heifer calves—total—23. As has been noticed one of the cows died from an attack of anthrax, but otherwise the experiment has progressed, very satisfactorily; the animals are all thriving and are in excellent condition. The bulls are very docile, and are readily trained for any kind of work in which cattle are employed; the older ones are lightly worked in ploughs and carts. From their steadiness in the yoke, the Adens are specially useful for tillage operations between rows of standing crop. Considering their small size, some of the cows have milked remarkably well. The old cow, imported in 1874, still thrives; this somewhat remarkable cow was referred to at paragraph 108 in the last Annual Report; she is now over 15 years of age, and has produced 7 calves since she was imported, and she had a calf at foot at the time. She calved at the end of August 1881, and continued to milk up to 21st of June last. In this milking period (her seventh) the yield of milk was as follows:—

							MEAS.	OILS.
August	..	..	..	..	..	..	4	0
September	..	..	..	..	..	..	93	4
October	..	..	..	..	..	..	113	4
November	..	..	..	..	..	..	103	7
December	..	..	..	..	..	..	95	6
January 1882	..	..	..	..	..	..	95	0
February "	..	..	..	..	..	..	79	5
March "	..	..	..	..	..	..	86	5
April "	..	..	..	..	..	..	89	1
May "	..	..	..	..	..	..	62	2
June up to 21st	..	..	..	..	..	..	20	0
Total ..							843	2

This is a smaller yield than was obtained in the sixth milking period. The cost of maintaining the cow from August 1881, when she calved until she calved again in October 1882, was as follows:—

							RS.	A.	P.
12,300 lb. of green food	..	..	..	..	..	..	41	0	0
1,121 lb. of ground-nut cake	..	..	..	..	..	..	14	0	0
1,564 lb. of bran	..	..	..	..	..	..	44	11	0
20 lb. of salt	..	..	..	..	..	..	0	10	0
220 lb. of cholum	..	..	..	..	..	..	5	9	0
14 lb. of dholl husk	..	..	..	..	..	..	0	3	9
38 lb. of horse-gram	..	..	..	..	..	..	0	11	0
34 lb. of mixed grains	..	..	..	..	..	..	0	13	10
8 lb. of paddy	..	..	..	..	..	..	0	2	2
18 lb. of rice	..	..	..	..	..	..	0	11	6
Attendance and Sundries	..	..	..	..	..	..	20	0	0
Total ..							128	8	3

In accordance with the usual practice, no charge is made for the bedding straw, the manure of the cow being considered as a set-off. During this milking period the cow,

besides yielding the milk recorded, reared a fine bull-calf which, at the end of the period was worth certainly not less than Rs. 40 ; deducting this amount from the cost of maintaining the cow, Rs. 128-8-3, there remains Rs. 88-8-3, as the cost of the 843 measures and 2 ollocks of milk, which is 1 anna and 8 pies per measure. During the five milking periods, beginning with 1877, for which only full statistics are available, the yield of milk was —

				Number of Days between Birth of each Calf, or "Milking Period."			
					MEAS.	OLS.	GALLONS.
Third milking period beginning	May	1877	..	396	832	3	299-41
Fourth do.	do.	June 1878	..	335	694	1	249-68
Fifth do.	do.	Aug. 1879	..	426	831	1	298-96
Sixth do.	do.	July 1880	..	427	965	2	347-21
Seventh do.	do.	Sept. to 8th Oct. 1881	..	403	843	1½	304-39
Average ..				397	833	0	299-93

69. The cow produced her eighth calf on the 8th of October, since which time she has yielded milk as below :—

								MEAS.	OLS.	GALLONS.
October	..	..	..	..	..	..	..	62	0	22-59
November	..	..	..	..	..	..	..	116	0	59-92
December	..	..	..	..	..	..	..	125	0	45-12
January	..	..	..	..	..	..	..	125	0	45-12
February	..	..	..	..	..	..	..	110	3	39-84
March	..	..	..	..	..	..	..	120	0	43-32
Total ..								658	3	255-91

If she continues in health, the present "milking period" will probably give the largest outturn of milk yet obtained from the cow and, as in previous "milking periods" she is rearing a calf.

70. The cow noticed at paragraph 110 of the last report, which was the first daughter of the old cow just referred to, died from anthrax in August; the death of the cow was greatly to be regretted, as she was a very fine specimen of the breed. Another daughter of the old cow, referred to at paragraph 111 of the last report, produced a calf on the 29th of January 1881, when she was but 2½ years of age. The quantity of milk she produced in her first milking period is shown below :—

								MEAS.	OLS.	GALLONS.
February	..	..	..	..	..	..	..	37	6	13-62
March	..	..	..	..	..	..	..	59	2	21-38
April	..	..	..	..	..	..	..	61	5	22-24
May	..	..	..	..	..	..	..	66	3	23-96
June	..	..	..	..	..	..	..	66	4	24-00
July	..	..	..	..	..	..	..	64	1	23-14
August	..	..	..	..	..	..	..	63	1	22-78
September	..	..	..	..	..	..	..	62	7	22-69
October	..	..	..	..	..	..	..	73	1	26-39
November	..	..	..	..	..	..	..	72	5	26-21
December	..	..	..	..	..	..	..	73	5	26-57
January	..	..	..	..	..	..	..	116	4	42-05
February	..	..	..	..	..	..	..	52	0	18-77
March	..	..	..	..	..	..	..	55	0	19-85
Total ..								924	4	333-65

The monthly yield of milk has varied considerably, but the total yield of the period promises to be large. The cow was too young when she produced her first calf; her growth has, apparently, been checked thereby; she was fed in the same way as the old cow, and at about the same expense.

71. The three cows imported from Aden in October 1881, referred to in paragraph 107 of the last report, are now in excellent health; they arrived much out of condition and yielded but little milk for some time. One gave birth to a calf on the 26th of October last, and has since yielded milk as shown below:—

							MEAS.	OLS.	GALLONS.
November	..	..	..	..	..	..	65	2	23.55
December	..	..	..	..	..	..	76	4	27.61
January	..	..	..	..	..	..	67	6	24.45
February	..	..	..	..	..	..	59	0	21.29
March	..	..	..	..	..	..	61	3	13.29
Total ..							329	7	110.19

The oldest of the three imported cows "Banu" produced a calf on the 26th of February last, and has since yielded milk as below:—

							MEAS.	OLS.	GALLONS.
March	..	..	..	..	..	..	77	7	23.11

The youngest of the three cows has not yet calved. These cows are all fed alike.

72. *Kerry Cow*.—This cow was referred to at paragraph 112 of the last report. She calved on the 6th of October 1881, having milked up to the date of calving. Her yield of milk during this period is shown in the next table:—

							MEAS.	OLS.	GALLONS.
October	..	..	..	..	..	..	66	5	24.05
November	..	..	..	..	..	..	97	1	35.06
December	..	..	..	..	..	..	98	5	35.60
January	..	..	..	..	..	..	96	1	34.70
February	..	..	..	..	..	..	71	0	25.62
March	..	..	..	..	..	..	74	5	26.94
April	..	..	..	..	..	..	75	6	27.34
May	..	..	..	..	..	..	51	2	18.49
June	..	..	..	..	..	..	47	3	17.10
July	..	..	..	..	..	..	31	3	11.32
August	..	..	..	..	..	..	3	2	1.17
Total ..							713	1	257.39

The cost of maintaining the cow was about one rupee per month more than the cost of maintaining an Aden cow; due chiefly to the larger quantity of fodder she consumes. She also reared a calf in her "milking period." She calved again on the 28th of October last, and has since yielded the undermentioned milk:—

							MEAS.	OLS.	GALLONS.
November	..	..	..	..	..	..	128	6	46.48
December	..	..	..	..	..	..	159	0	57.40
January	..	..	..	..	..	..	155	0	55.95
February	..	..	..	..	..	..	138	0	49.81
March	..	..	..	..	..	..	134	0	48.37
Total ..							714	6	258.01

If this large yield continued, the outturn of the present "milking period" will be very large. The cow is rearing a fine calf by an Aden bull.

73. *Nellore Cows*.—These were referred to in the last report at paragraph 114. The next table shows the yield of milk of the white cow "Seetha."

						MEAS.	OLS.	GALLONS.
January	1882	..	..	..	..	36	1	13.04
February	"	..	..	..	..	80	1	28.92
March	"	..	..	..	..	86	2	31.13
April	"	..	..	..	..	82	4	29.78
May	"	..	..	..	..	86	7	31.36
June	"	..	..	..	..	85	5	30.91
July	"	..	..	..	..	64	7	23.42
August	"	..	..	..	..	71	2	25.72
September	"	..	..	..	..	69	0	24.98
October	"	..	..	..	..	69	4	25.09
November	"	..	..	..	..	58	4	21.11
December	"	..	..	..	..	46	0	16.60
January	"	..	..	..	..	28	2	10.19
Total						864	7	312.25

From the grey cow "Lutchimee" milk was obtained as below:—

						MEAS.	OLS.	GALLONS.
January	1882	..	..	..	..	42	6	15.43
February	"	..	..	..	..	84	1	30.37
March	"	..	..	..	..	82	1	29.64
April	"	..	..	..	..	85	3	30.82
May	"	..	..	..	..	85	4	30.86
June	"	..	..	..	..	80	7	29.19
July	"	..	..	..	..	67	4	24.36
August	"	..	..	..	..	70	7	25.58
September	"	..	..	..	..	73	3	26.48
October	"	..	..	..	..	73	0	26.35
November	"	..	..	..	..	62	5	22.60
December	"	..	..	..	..	58	2	21.02
January	1883	..	..	..	..	45	0	16.24
February	"	..	..	..	..	25	7	9.34
March	"	..	..	..	..	14	4	5.23
Total						951	6	343.51

The cows are fair specimens of the breed; they are large and each needs about one-third more food than suffices for an Aden cow; indeed the cost of the keep of one of these cows is not less than 30 per cent. higher than that of an Aden cow. These cows are not nearly so docile as are the Adens; three or four of the latter may safely be penned together without being tied up; but the Nellore cows must either be tied up, or placed in separate pens. As there is a good demand at the farm, during greater part of the year, for all the milk produced, it is but seldom necessary to make butter; but for experimental purposes, and, for the information of the students, butter has occasionally been made, and, some experiments have been tried in making ghee and cheese.

74. *Butter-making*.—A new churn called the Brighton churn was tried. It is on the principle of the Barrel churn; it was tried in competition with an ordinary atmospheric churn; the following are the results:—

No.	Names of Churns used.	Quantity of Milk issued.	Time occupied in the first Churning.	Quantity of Butter obtained.	Time occupied by the second Churning.	Quantity of Butter obtained.	Total amount of Butter obtained.
		OLLOCKS.	MINUTES.	OL.	MINUTES.	OL.	OL.
1	Brighton Churn	6½	15	1	7	1½	1½
2	Atmospheric Churn	6½	9	2	3	2½	2½

75. The results obtained with the atmospheric churn were much the most favorable; this churn appear to be peculiarly well suited to the requirements of South India. Other experiments produced very similar results.

76. *Ghee*.—The following are the results of some of the experiments made at the farm in ghee-making :—

Milk drawn.	From which Cow.	Quantity of milk used.	Time occupied in first Churning.	Quantity of Butter obtained.	Time occupied in second Churning.	Quantity of Butter obtained.	Total time occupied.	Total quantity of Butter.	Time occupied in making Ghee.	Quantity of Ghee obtained.
<i>Morning.</i>		MS. OL.	MINUTES.	LB. OZ.	MINUTES.	OZ.	MINUTES.	LB. OZ.	MINUTES.	OZ.
29th Nov. 1882 ..	Kerry Cow ..	2 4	25	0 6½	10	1	35	0 7	30	3½
30th " " ..	Do. ..	1 2	16	0 4½	4	20	20	0 5½	13	2½
30th " " ..	Do. ..	5 0	25	1 4½	10	35	35	1 5½	..	10½

In making ghee the butter is first made as follows; first the can or vessel containing the freshly-drawn milk is placed in an earthenware vessel of boiling water for about five minutes; the milk, after thus being exposed to a temperature of about 212 degrees, is poured into another vessel, and butter-milk is added, from two to three drops in hot weather, to a teaspoonful in cold weather, per quart of milk, and the vessel with the milk is put aside for 24 hours, and, is then churned. The yield of butter averages from about 1½ to 2 ounces per quart of milk, but of course varies considerably. The butter is melted in an open vessel over a slow fire; the heat coagulates the casein which, with other impurities, sinks to the bottom of the vessel; boiling is continued for from fifteen to twenty minutes, when most of the water is evaporated, and the ghee, clear and bright, rests on the heavier sediment covering the bottom of the vessel. The ghee, when cold, is carefully poured off, leaving the sediment behind, and is fit for immediate use, or for storing. The outturn of ghee varies with the quality of the butter and the purity of the ghee made; an average outturn is 50 to 60 per cent. of the weight of the butter used, when the butter has been made from the milk of the cow. The yield of ghee from buffalo butter is higher. Ghee is not usually made when a fair price can be obtained for milk or butter. A viss (3 lb. 2 oz.) of ghee sells for usually only about Rs. 1-2-0, and to make this, not less than 6 lb. of butter, or 48 quarts of milk of the cow, would be needed. In nearly all the large towns of Southern India cow's milk will sell readily at Annas 2 per quart and butter at Annas 12 per pound. Thus the milk that would be required to make a viss of ghee worth Rs. 1-2-0 would, as fresh milk, sell for about Rs. 6, and if churned would yield butter worth Rs. 4-8-0.

77. *Cheese-making*.—Attention having been directed to the properties of the berries of the *Withania coagulans* for curdling milk in cheese-making, it was thought desirable to try the properties of a nearly allied plant *Withania somnifera*, a well known plant in South India, where *Withania coagulans* is unknown. In some experiments the following coagulating agents were used :—

- (1) Churn milk (Lactic acid).
- (2) Lime-juice (Citric acid)
- (3) Tamarind-juice (Tartaric acid).
- (4) Pueria berries (*Withania somnifera*) (acid not determined).
- (5) Bilimbi fruit (*Averrhoa bilimbi*) do.
- (6) Milky juice of *Epicarpurus orientalis* (Prayam) do.

The milk was heated to about 100° F., and after cooling the curdling agents were added to the different portions set aside for the experiments. The curd on being sufficiently formed was broken up and the whey separated as far as this was possible; the broken curd after a little salt had been added was put into a roughly made cheese press. In one set of experiments twenty-one ollocks of milk were taken and kept aside until the milk was faintly acid to test-paper. The milk was then gently heated to 110° F. and divided into seven portions of three ollocks each. To the first were

added twelve drops of churn milk, to the second twelve drops of lime-juice, to the third twelve drops of tamarind-juice of the consistency of the milk itself, to the fourth about a teaspoonful of the extract of the Pueria berries, to the fifth twelve drops of the juice of the bilimbi fruit, to the sixth the raw juice of twelve Pueria berries, and to the seventh about one drop of the milky juice of *Epicarpurus orientalis* (Tamil—Prayam or Cootty pela). All these agents were tested with blue litmus paper, and they had a distinctly acid reaction. In three hours, the milk treated with the milky juice of the Prayam plant was found to have changed into a very firm cylindrical block of curd with a layer of clear supernatant whey. There is not a doubt but that this is quite equal to rennet, it does not in the least affect the flavor of the cheese nor does it require any preliminary preparation; and it is procurable at all times. The plant is very common, and there are some growing wild on the farm. When the curd produced by this coagulant was put into a dish, it at once formed a circular disc without the least disintegration. The curd was then cut up with a clean bamboo spatula; the greater part of the whey then drained off, and the curds were then evenly mixed up with finely powdered salt at the rate of $3\frac{1}{4}$ ounce to 1 gallon of the curds, and put under the press. The quantity of cheese thus obtained from three olocks of milk was $2\frac{3}{4}$ ounce or about $6\frac{1}{2}$ ounce, per Madras measure of milk. The quantity of the salt added was found to have been excessive; probably half the quantity would have been quite sufficient. The milk treated with the churn-milk took five hours to curdle, and the curds were not firm, and the curds in the other experiments were even more inferior. It appears that the firmness of the curds depends, not on the strength of acidity in the curdling agent, but on the strength of some fermentative principle in it. The extract of the Pueria berries was prepared by simmering half an ounce of the berries in one olock of water for about four hours on slow fire. The next statement shows the results of some experiments with berries of the *Withania somnifera* and some other curdling agents.

Number.	Cow.	Date.	Morning or Evening milk and time of Milking.	Quantity of Milk taken for Experi- ment.	How may heated.	Time allowed for Cooling.	Quantity of Agent used for Curdling.	Agent used for Curdling.	Time taken for Curd- ling.	Time taken for Strain- ing.	Time in Press.	Time in completing.	Date when completed.	Weight obtained.
1	Kerry Cow.	19-4-83	MORNING 6-30 A.M.	2 measures.	2 hours	1 hour	Few drops.	Butter-milk	4½ hours	3½ hours	12 hours.	23 hours.	11-4-83..	14½ oz.
2	Do.	11-4-83	Do.	2 do.	2 do.	1 do.	Do.	Lime-juice	5½ do.	3 do.	12 do.	23½ do.	12-4-83..	12
3	Do.	12-4-83	6-35 A.M.	2 do.	2 do.	1 do.	10 berries.	Withania Somni- fera.	..	3 do.	11½ do.	..	13-4-83..	11½
4	Do.	13-4-83	6-30 A.M.	2 do.	2 do.	1 do.	Do.	Do. squeez- ed in water and that water applied.	4½ do.	H. M. 3 25	11½ do.	22½ do.	14-4-83..	10½
5	Do.	14-4-83	6-40 A.M.	2 do.	2 do.	1 do.	Do.	Do.	5 do.	3 hours	11½ do.	22½ do.	15-4-83..	11½
6	Do.	15-4-83	6-35 A.M.	2 do.	Not heated	Not heated	Few drops added.	Butter-milk at 6-45 A.M.	H. M. 11 35	H. M. 11 40	12 do.	H. M. 35 15	16-4-83..	11½
7	Do.	16-4-83	6-30 A.M.	2 do.	2 hours	1 hour	Whithania Somnifera. Ten berries squeezed in water and that water ap- plied for curdling in all these experiments.		4 hours	4 hours	12 do.	23 hours.	17-4-83..	10½
8	Do.	17-4-83	6-35 A.M.	2 do.	2 do.	H. M. 1 5			4 do.	4 do.	12 do.	23 do.	18-4-83..	10
9	Do.	18-4-83	6-30 A.M.	2 do.	2 do.	1 hour			H. M. 3 45	H. M. 3 50	12 do.	H. M. 22 35	19-4-83..	11
10	Do.	19-4-83	6-40 A.M.	2 do.	2 do.	H. M. 1 5			3 45	4 5	12 do.	22 50	20-4-83..	10½
11	Do.	20-4-83	6-30 A.M.	2 do.	2 do.	1 hour			4 hours	4 hours	12 do.	23 hours.	21-4-83..	10
12	Do.	21-4-83	6-30 A.M.	2 do.	2 do.	H. M. 1 3			4 do.	H. M. 3 57	12 do.	H. M. 22 57	22-4-83..	10½
13	Do.	22-4-83	Do.	2 do.	2 do.	1 hour			4 do.	3 55	12 do.	22 55	23-4-83..	11

It has been found that the best results are obtained with Prayam leaves when using 16 leaves to one measure of milk. The great drawback to the use of this curdling agent is the necessity of taking the milk to be curdled, to the tree, as, the minute globules of juice at the fracture where the leaf is broken from the branches, drop off in removing the leaves to the dairy. These experiments will be continued. It may be possible to collect from the leaves of Prayam bush, the coagulating agent, and to store it for future use. Experiments were made with HCl, as a curdling agent; by using this acid, milk curdles at once and the curd can be put under the press about three hours after applying the acid. It has been found that from 8—10 cubic centimeter of acid diluted with two or three times its bulk of water produces the best results.

78. The general results of the experiment was the production of a firm solid curd, some specimens of which had a fairly good taste and resembled inferior cheese. This half dried curd however differed as widely from cheese, as does the juice of freshly crushed grapes differ from wine. There is apparently no practical difficulty in preparing and drying curd for immediate consumption, but, the great difficulty is to prepare curd in a way to fit it for keeping the requisite time to undergo the ordinary changes which the cheese manufacturer includes under the term "ripening." In England this occupies several months; but the so-called cheese made in these experiments could not at the time when the experiments were made (the hot season) be kept for a week, putrefaction set in so rapidly accompanied by luxuriant fungoid growth. Perhaps the addition of some antiseptic, boroglyceride, for instance, may improve the keeping quality of newly made cheese. This matter is now engaging attention. On the average about three measures of milk were required to make 1 lb. of the cheese and if, the ripening processes could be conducted satisfactorily to completion, which could readily be done at Bangalore, or at any of the hill stations, cheese might be produced for sale at under half a rupee per pound. Of course where milk can be sold at 4 annas per measure, it will not pay to make cheese even when it is possible to cure cheese.

79. *Boroglycerine*.—Professor Barff, M.A., of London, who has long been engaged in making experiments with different antiseptic agents in preserving food was good enough to send a small supply of boroglyceride for experimental use on the Farm. Boroglyceride is a definite chemical compound formed from glycerine and boracic acid. The value of both borax and glycerine as antiseptic agents has long been recognised; both arrest the fermentation of germs and prevent decomposition and both agents seem perfectly devoid of any deleterious influences when used in food. The following may be noticed among the many experiments that have been made:—

To a measure of fresh milk weighing 40 oz., three-fourths of an ounce of boroglycerine, previously made into a semi-liquid by adding a spoonful of hot water, was mixed through the milk, which was allowed to stand in an open vessel until the following morning when the cream was removed and both it and the milk were perfectly sweet. On the next morning 48 hours after the experiment began the milk was found to be still perfectly sweet and some more cream had risen to the surface which with that previously removed, was made into butter. The experiment was closed on the fifth day when both milk and butter were found still perfectly free from rancidity. The temperature during the time this experiment was carried on is shown in the next table:—

Date.						Maximum Temperature. DEGREES.	Minimum Temperature. DEGREES.
26th	...	...	...	...	...	106	81
27th	...	...	...	...	...	104	81
28th	...	...	...	...	...	104	81
29th	...	...	...	...	...	99	78
30th	...	...	...	...	...	100	75

80. The next statement gives the results of some experiments made during the cold season.

Number of Experiment.	Date of Experiment.	Morning or Evening Milk.	Quantity of Milk taken for Experiment.	Quantity of Butter obtained.	Quantity of Butter taken for Experiment.	How treated.	Observations and Date of.
1	2nd January 1883.	Morning and evening milk mixed.	MEAS. 5	oz. 20	oz. 12	Put into a dish and immersed in a solution composed of 1 part boroglyceride and 80 parts water.	10th January 1883. The butter projected slightly above the level of the liquid; this portion was yellow, the portion immersed was white. The taste and smell of the butter were unobjectionable. 20th January 1883. Color of the butter unchanged. Taste good, but smelt rather unpleasant, but the portion above the solution is beginning to putrefy and fungus is appearing on it.
2	Do. ..	Do. ..	5	20	8	$\frac{1}{2}$ oz. of boroglyceride mixed with 8 oz. of butter.	10th January 1883. The quality of the butter has been well preserved, both the taste and color are good. 20th January 1883. The taste of the butter is defective, the color remains good excepting that it is less uniform.
3	3rd January 1883.	Morning milk.	2 $\frac{1}{2}$	10	8	Not mixed with boroglyceride the butter was kept as usual.	10th January 1883. Taste fairly good, but smell bad. Color yellow on the outside, but white inside. 20th January 1883. Quite unfitted for food, smell and taste very bad.

81. Other experiments were kindly undertaken by J. Mills, Esq., Veterinary Lecturer in the Agricultural College, who has favored me with the following report:—

To W. R. ROBERTSON, Esq., Agricultural Reporter to Government.

SIR,—With reference to your letter, No. 1807, dated 11th December 1882, I have the honor to submit the report therein called for on the use of boroglyceride as an antiseptic. For results of experiments by submersion see attached return.

2. I am of opinion that it is a most valuable antiseptic, and from its non-irritating, non-corrosive, and soluble nature, it far surpasses either carbolic acid or Phenyle, but on the other hand it is inferior to those agents as a disinfectant and deodorizer, in fact it has little or no power as either.

3. As a dressing for wounds and ulcers, it is eminently well suited; it brings about rapid granulation; therefore is highly useful as an application where there has been loss of structure or sloughing. It stimulates ulcers and brings about a healthy re-action with subsequent healing of the part.

4. From its non-poisonous nature, I find that it will not destroy maggots, nor will it prevent them entering a wound, therefore when applied to a part it must be carefully covered over with lint or cotton-wool.

5. It being perfectly harmless enhances its value considerably; because it can be used with the greatest safety by the most inexperienced and ignorant.

6. It is best used in the crude form laid on as a paste, but for slight wounds it may be dissolved in from 10 to 15 or 20 parts of water.

7. At the Veterinary Hospital it has been applied to all kinds of cases, and I decidedly consider it is a most invaluable antiseptic to wounds, &c., and as agent for the preservation of morbid specimens.

No.	Article.	Strength of Solution.	Open or closed Vessel.	Date of		Number of Days.	State.	Remarks.
				Submersion.	Removal.			
1	Shell fish	1 to 20	Closed ..	January 14th.	May 21st ..	128	Perfectly fresh.	
2	Vegetables:—(potato, onion, carrot, turnip, and green chille).	1 to 20	Do. ..	Do. 19th.	Do. 21st ..	123	Do. ..	Coloring matter of the chillie slightly faded.
3	Parasite (Lumbaice).	1 to 10	Do. ..	Do. 20th.	February 20th.	31	Decomposed.	This specimen never kept well from the first, although perfectly fresh when submerged.
4	Mutton chop ..	1 to 30	Do. ..	February 1st.	Do. 21st.	21	Perfectly fresh.	Was cooked and eaten.
5	Lungs and heart (horse).	1 to 50	Open ..	Do. 1st.	Do. 2nd.	2	Decomposed.	Difficult to keep owing to the air in the lungs.
6	Foot and fit lock (horse).	1 to 50	Do. ..	Do. 1st.	Do. 4th	4	Perfectly fresh.	Was taken out daily for dissection.

From these experiments it would appear that by using boroglycerine, dairy produce and animal substances can be preserved perfectly fresh for a long time if kept in closed vessels. This new preserving agent promises to be of much value in this country, especially for use in the dairy. At present when butter is made, the milk is always sour, and is therefore unfitted for use in feeding calves; but, when mixed with boroglycerine, the cream can be removed, while the milk is sweet and it may then be given to calves.

82. *Common Salt*.—As usual, salt formed a constituent of the food of all the stock of the Farm. Doubts, however, have frequently arisen as to whether the salt issued daily for the stock was invariably consumed by them; the coolies can so readily appropriate the salt for their own use. To prevent this, and to afford the means of judging whether salt is always added in the food of the stock, it was determined to redden the salt by mixing with it $2\frac{1}{2}$ per cent. of red ochre. The presence of the colored salt in the food is readily ascertainable; while, the color does not prejudice the stock in any way against the salt, which from its red color is unlikely to be used as an ingredient in human food. The red ochre is used in such a small quantity it will do no harm whatever to the stock that consume it; while, its cost is but trifling. It is very desirable that salt should be available in this country free of duty for the use of stock and for use as manure. Were a certain quantity of salt colored and set apart for sale where common salt is sold, ryots would have no excuse for not giving their animals salt; and, there can be no doubt but that, the mortality amongst live stock at certain seasons of the year could be considerably lessened by the moderate use of salt in their food. The Salt Revenue need not suffer by the issue of colored salt free of duty for agricultural use any more than it does in Germany where salt is also a Government Monopoly, and in that country colored salt is always available for agricultural use duty free.

83. *The Food of the Stock*.—As usual, the cattle and sheep were fed chiefly on groundnut-cake; this was obtained under a contract for the year at Rs. 6-10-0 per candy delivered at the Farm. Wheat bran was used to some extent, but its average selling price, 36 lb. per rupee, is considerably in excess of its value. From the large demand for bran near Madras for horses, and its very limited production, it has from being a waste product of the flour mill become valuable produce.

84. *Dholl Husks*.—The husks of Dholl (*Cajanus Indicus*) were used with considerable success, especially in the food of the milch cows. It was found that, when the cows were getting a daily allowance of dholl husks, their outturn of milk was invariably larger than when no husks were given.

85. *Sheep*.—There was no contagious disease amongst the sheep. The lambs of 1882 are in a fine lot, they exhibit most of the characteristics of the half-bred rams

that were used. The two half-bred rams have thriven well; but they are now too old for breeding, the wool yielded by these half-bred rams weighed only about 3 lb. per head, but in bulk it was as much as in England would weigh 5 or 6 lb. It has not yet been possible to make any satisfactory arrangements for getting out Merino rams from Queensland; but the matter will not be lost sight of whenever a favorable opportunity may present itself, for the Saidápet flock has now reached the stage of improvement at which the use of Merino rams will be likely to be productive of much good.

86. The number of sheep in the flock, and the number of deaths in the year, along with similar data for each of the previous nine years, appears in the following statement:—

—	1873-74.	1874-75.	1875-76.	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	1881-82.	1882-83.
Average number of flock ..	207	221	257	275	295	274	251	160	92	92
Number of deaths ..	16	24	21	11	31	34	55	136	4	12
Percentage of deaths ..	7.73	10.9	8.9	4	10.5	13.14	21.9	85	4	13
Rainfall .. Inches ..	48.07	68.98	38.14	20.88	65.55	33.16	56.95	57.16	44.28	49.81

The death-rate is higher than last year due to the large proportion of old sheep in the flock.

87. The next statement shows the live-stock maintained in the year, the percentage of deaths, and the cost per head of purchased food:—

—	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	1881-82.	1882-83.
Live-stock maintained, calculated as country cattle ..	132	135	123	125	102	76	111
Stock as country cattle for 100 acres of cultivable land ..	82.5	84.37	84.24	88	83.65	63.33	105.7
Percentage of deaths ..	7.6	12.9	8.9	8.8	16.2	4	7.5
Cost of purchased food a-head per mensem ..	AS. P. 8 6	AS. P. 10 6	AS. P. 14 5	AS. P. 12 1	AS. P. 12 6	AS. P. 8 9	AS. P. 1 6 6

IMPLEMENTS AND TOOLS.

88. The demand for improved implements and tools was greater last year than in any previous year since the farm was opened. It was unfortunately impossible to supply all that were applied for. Efforts were made to induce private firms and individuals to manufacture agricultural implements and tools but, these efforts were in several cases attended with but little success; the demand is a new one in this part of India, and before the industry can be carried on successfully, a considerable capital must be sunk in providing the necessary machines, tools and other appliances. Messrs. Massey and Co., Engineers of Madras, have shown much enterprise in setting apart a portion of their works for the manufacture of agricultural implements, machines, tools, &c., and these gentlemen are now engaged in this new industry with a good prospect of establishing it on a sound basis. Messrs. Oakes and Co., of Madras, are also engaged in the trade, having become the local agents for several extensive firms of implement manufacturers. Dr. Dhanakoti Raju, of the Tangal Works, Saidápet, has begun to manufacture iron ploughs, and A. Sankaralingum Auchary, "Locksmith" of Oindigul, is now also engaged in the work. It was hoped that Messrs. Groves and Co., Agricultural Engineers of Coonoor, would have been able to make ploughs, &c., for sale on the Nílgiiri Hills, in Coimbatore, &c., and pattern ploughs were sent to them; but, Messrs. Groves and Co. found that the cost of labor and materials were too high at Coonoor to admit of implements, being made there at the price at which they can be made on the plains. It is hoped that, at the Famine Orphanage at Karúr, it will be possible to make up ploughs for local requirements. Patterns of ploughs are sent from the farm on loan to any respectable person desiring to make similar ploughs, and this privilege has been availed of in several instances; while a considerable number of ploughs have been sold as patterns.

89. The next statement shows the implements and tools sold during the year :—

Districts.	Improved Country Ploughs.	Swedish Ploughs No. 29 A.	Single-stilted Swedish Ploughs.	Iron Ploughs of various kinds.	Drag Harrow, Grib- ber and Bullock Hoe.	Parts of Ploughs.
Madras	4	4	1	9	..	6
Chingleput	2	..	..	..	1	1
Madura	5	2	..	1	..	8
South Arcot	2	1	1	1	1	1
North Arcot	9	..	1	2	..	..
Tanjore	32	..	..	..	..	..
Tinnevely	2	1	..	3	..	1
Coimbatore	2	..	..	..	..	2
Salem .. .. .	..	6	..	..	..	..
Nilgiris .. .. .	..	..	1	..	1	..
Mysore	4	..	1	3	3	2
Bangalore	4	3	..	..	2	7
Nellore .. .. .	..	..	..	..	..	1
Cuddapah	6	..	1	..	1	..
Bellary .. .. .	..	..	1	..	..	..
Kurnool	5	26	..	2	..	25
Kistna	1	8	..	3	..	..
Godavari .. .. .	..	..	1	..	..	..
Hosur .. .. .	..	2	..	..	1	6
Bhandara .. .. .	..	..	1	..	1	..
Raichore	1	..	..	..	..	..
Sholapore .. .. .	..	..	1	1	..	..
Bombay .. .. .	..	6	1	..	..	25
Jampur .. .. .	..	..	1	..	..	..
Cawnpore	2	2	1	..	..	6
Total ..	81	61	13	25	11	91

90. At the close of the year the registered applications for ploughs remaining to be met, included 122 ploughs of different kinds.

91. The Swedish plough having proved so successful in one or two districts (*vide* paragraph 122 of the last report) 270 were imported, of which most were distributed over the Presidency, one in each taluk. This matter will be found noticed in the portion of the report referring to district operations. The ploughs thus distributed for experimental trial are not included in the above statement.

92. The plough referred to in the latter portion of paragraph 126 of the last report has come much into favor for wet land cultivation for which it is fairly well suited; while, its draught is within the power of an ordinary pair of cattle. The plough is less than 30 lb. in weight and being made entirely of iron excepting the pole; it is compact and durable. Messrs. Massey and Co., Engineers, of Madras, have undertaken to make them at Rs. 126-8-0 per score which is a very moderate price.

93. Modifications have been introduced in several of the ploughs experimented with during the year which, it is hoped, will render them more efficient and better adapted to the requirements of South Indian farming. This, is the legitimate work of an Experimental Farm and not the manufacture of ploughs for sale. Until recently the Farm was compelled to engage in the manufacture of ploughs for sale; persons desirous of introducing improved ploughs could not procure them without incurring much trouble and expense, excepting through the agency of the Farm. However as, this is no longer the case, it is proposed in future to confine the work of the Farm Workshops chiefly to the manufacture of new implements that appear to be worthy of

a trial and to afford the necessary aid in adapting implements to the requirements of Native agriculture or in modifying and improving Native implements. When a good pattern implement has been obtained, copies can be multiplied to any extent by Messrs. Massey and Co. or any of the firms and individuals before mentioned, and possibly, other enterprising men will be willing to engage in the industry.

94. The new implement referred to in paragraph 128 of the last annual report has proved a very useful one for stirring the soil deeply; for sub-soiling, it is a most efficient implement, it will stir moderately free soil to a depth of from 15 to 16 inches—a greater depth than can be reached by any other implement on the Farm. It is strong, simple in construction and moderate in cost. A copy on a large scale has been made for use in stirring deeply black cotton soils.

95. The next statement shows the cost of making up at the Farm, the four kinds of ploughs in greatest demand:—

Description of Ploughs.	Materials.	Labor.	Supervision, Interest, &c.	Total Cost.
	RS. A. P.	RS. A. P.	RS. A. P.	RS. A. P.
Single-stilted Swedish Plough—				
Coal	1 4 0			
Iron	7 8 0			
Wood	0 2 0			
Sundries (paint)	0 8 0			
	9 6 0			9 6 0
Smiths' labor	5 0 0			
Carpenters' labor	0 8 0			
		5 8 0		5 8 0
Add 10 per cent. of cost for wear and tear of tools and interest on capital			1 7 9	1 7 9
Ten per cent. for supervision			1 7 9	1 7 9
Total ..				17 13 6
Improved Country Plough with Iron Stilt—				
Coal	0 7 0			
Iron	2 15 0			
Wood	0 8 0			
Sundries	0 3 0			
	4 1 0			4 1 0
Smiths' labor	2 0 0			
Carpenters' labor	0 4 0			
		2 4 0		2 4 0
Add 10 per cent. of cost for wear and tear of tools and interest on capital			0 10 1	0 10 1
Ten per cent. for supervision			0 10 1	0 10 1
Total ..				7 9 2
Improved Country Plough with Wooden Stilt—				
Coal	0 7 0			
Iron	2 11 0			
Wood	0 11 0			
Sundries	0 3 0			
	4 0 0			4 0 0
Smiths' labor	2 0 0			
Carpenters' labor	0 7 0			
		2 7 0		2 7 0
Add 10 per cent. of cost for wear and tear of tools and interest on capital			0 12 1	0 12 1
Ten per cent. for supervision			0 12 1	0 12 1
Total ..				7 15 2
Primitive Plough—				
Coal	0 12 0			
Iron	4 0 0			
Wood	1 0 0			
Sundries	0 6 0			
	6 2 0			6 2 0
Smiths' labor	2 8 0			
Carpenters' labor	0 8 0			
		3 0 0		3 0 0
Add 10 per cent. of cost for wear and tear of tools and interest on capital			0 14 7	0 14 7
Ten per cent. for supervision			0 14 7	0 14 7
Total ..				10 15 2

96. The concession referred to at paragraph 123 of the last report was availed of to a larger extent than last year, the total expense incurred on this account having been Rs. 64-2-0 which is 16 per cent. on the price of the implements sold.

97. Of the consignment of 250 ploughs imported in November, a number were sold with a quantity of spare working parts, for which Rs. 990 were received and credited under "Implements," Saidápet Experimental Farm.

98. Messrs. Ransome, Head and Co. of Ipswich, sent to the Farm ploughs of three varieties, which they had specially made to suit South Indian requirements and which they were anxious to have tried at Saidápet. The ploughs are distinguished as W.K.S. (modified form), K.W.S., and W.S.R.A.W. The plough W.K.S. is a small one; it is made of wood and has iron working parts; it is neat and compact and weighs only 28 lb. The plough K.W.S. is made of iron, it weighs 52 lb.; but, is without a wheel or a coulter; these if, added will increase the weight about 12 lb. and add to the cost of the plough. Plough W.S.R.A.W. is a wooden plough with iron working parts; it also, is well made and compact and its weight is 53 lb. The following are the results of some trials made with these and other ploughs:—

Name of Plough.	FURROW AVERAGE.		Cross Section of Furrow in square inches.	Average Draught.
	Width.	Depth.		
	INCHES.	INCHES.		L.B.
1. Ransomes' iron plough B.F.I.	9-25	5-62	51-98	196
2. Ransomes' wood plough W.K.S.	6-58	4-66	30-66	145
3. Ransomes' iron plough K.W.S.	9-00	6-33	56-97	289
4. Ransomes' wood plough W.S.R.A.W. ..	11-25	7-75	87-18	392
5. Newly-imported Swedish plough 29 B ..	9-58	5-5	52-69	172

The soil of the field in which the ploughs were tried was a sandy loam in good condition and was in a favorable state for ploughing. Plough W.K.S. (modified form) cut a first-class furrow; but, the plough is scarcely strong enough for ordinary work. Plough K.W.S. loosens the soil very well and made a fairly good furrow but the draught was heavy due partly to the abruptness of the mould-board and to the absence of a wheel; being entirely of iron, the plough is better adapted for general use. Plough W.S.R.A.W. will plough deeply and cut a good furrow but, the draught is very heavy. The mould-board of this as well as that of K.W.S. need alteration. The ploughs will be worked on the Farm in view to giving them a full trial.

99. Messrs. Ransomes and Co. sent to the farm also a large iron plough which they had constructed specially for stirring deeply black cotton soils. Only one or two trials have yet been made with this plough. The following are the results of an experiment made with it, and two others, working under similar conditions:—

Name of Plough.	Width of Furrow.	Depth of Furrow.	Area of Furrow Section.	Draught	Weight of Plough.
	INCHES.	INCHES.	SQ. INCHES.	L.B.	L.B.
Ransomes' new plough	11-2	6-16	68-99	560	164
Swedish plough 29 B	7-5	7-25	54-37	450	94
Ransomes' small iron plough ..	7-8	6-5	50-70	406	97

The new plough has a digging breast in addition to the ordinary mould-board. When working with the digging breast it turned the soil over very efficiently, but not to a great depth. The furrow slice was very wide indeed much wider than seems to be necessary. The plough is certainly not adapted for deep ploughing that is, deeper

than 6 inches. However it will be experimented with fully in the black cotton soils of Bellary, to which place the plough has been sent for trial by Messrs. Massey and Co., the local agents for Messrs. Ransomes and Co.

100. The ploughs, it will be seen require some improvements but they exhibit a considerable advance on any English ploughs yet sent to this country for the use of ryots.

101. Models of the double mhote are still in request and a number were supplied free of charge to applicants. This water-lift is still the best that has been experimented with on the farm. Efforts are being made to reduce its cost and to get a more durable material for making the mouth-pieces of the buckets—points that still need careful attention.

102. A single mhote was erected side by side with a double mhote, the former was found to require a pair of cattle to work it and the latter was worked by a single bullock. It was found that the two lifts raised nearly the same amount of water, but while the draught of the double mhote was only about 70 lb., that of the single mhote was nearly 400 lb. which is considerably above the power of an ordinary pair of cattle in a full day's work, and must cause rapid deterioration in the cattle.

RYOT DEPUTATIONS.

103. The Farm was visited by several deputations of ryots from the districts during the year, and a considerable number visited the Farm during the time the exhibition was open.

MISCELLANEOUS.

104. *Estate Works.*—A new sluice was constructed in the Mylapore Tank by which to obtain water for the irrigation experiment to be instituted next year, thus, supplying a long-felt want. The embankments for carrying the water have been partly constructed and it is hoped that the ground will be all laid out in experimental plots, with the necessary measuring cisterns and drainage gauges, before the close of the present year. Arrangements have been made for the erection of new Commisariat Slaughter-house on a site distant from the Farm, and for the transfer of the present Slaughter buildings to the Farm. A piece of land bounded on the west and north by the Mount Road and Roshunbaugh village, on the south by the Nullah, and on the east by casuarina and guava plantations has been fenced off and transferred to the Inspector of Cattle Diseases. The Veterinary Hospital is situated on the land, but is quite isolated, from the Farm. Part of field No. 1 was sub-soil drained in the usual way; the Farm buildings, hedges, roads, and water-channels were maintained in good repair.

105. *Pisciculture.*—Through the kindness of the Hon. H. S. Thomas, the Farm was supplied with some young *gourami* which had been bred in a pond in the Government House Park, at Madras. The young fish were placed in two tanks which had previously been thoroughly dragged and the predaceous fish killed. Aquatic plants were planted in both tanks. It is yet too early for any opinion to be formed regarding the experiment. The fish on attaining sufficient size will be put in the preserved portion of the Adyar river. The *gourami* is a valuable fish and it is hoped that the experiment will prove successful. Beyond preventing unauthorized netting with small mesh nets, nothing has been done to increase the supply of fish in the upper portions of the Adyar belonging to the Farm; but the fish have multiplied enormously while, the better kinds are more numerously represented, the "Valay," it is satisfactory to note, is found in fewer numbers than was the case formerly; which probably, is to be attributed to the periodical nettings at which all the predaceous captured are killed. The stock of fish maintained in the portions of the Adyar preserved by the Farm must contribute greatly to keep up the stock of fish throughout the whole river.

106. *Sericiculture.*—Some small experiments were made with silkworms. The eggs were received from the North-West Provinces, Kashmir and China; the former, were the most successful. The worms from the Kashmir and China eggs were very sickly and most of them died without making cocoons. Probably the reason of this was

the lateness of the season when the eggs reached Saidápet, and the consequent high temperature at the time, a temperature considerably higher than that of the localities from which the eggs were obtained. The experiment with eggs from the North-West Provinces was more satisfactory, but far from successful. A number of the worms made cocoons but, they were small and very light in weight. Of the eggs from the moths bred during the experiment a small quantity was sent to the Tinnevely District and the remainder kept for further experiments. The worms had always an abundance of mulberry leaves. Arrangements are being made for repeating the experiment next season with eggs to be obtained from the North-West Provinces.

107. *Model Farm.*—Orders have been issued for the establishment of a Model Farm on the Saidápet estate, to be worked on *commercial* principles. These instructions will be carried out next season. If, it is necessary that such an undertaking should be taken in hand it is, at the least, very undesirable that it should be instituted under such unusual circumstances, and special conditions, as must be encountered at Saidápet.

108. *Finances.*—The usual cash statements appear below.

SAIDAPET EXPERIMENTAL FARM.

Statement of the Accounts of the Saidápet Farm for the Year 1882-83.

Balance Sheet, 31st March 1883.

<i>Liabilities.</i>				<i>Assets.</i>			
	RS.	A.	P.		RS.	A.	P.
Capital	25,925	10	11	Valuation on 31st Mar. 1883...	26,114	7	0
Due to sundry persons ...	437	8	0	Due by sundry persons ...	248	11	11
Total ...	26,363	2	11	Total ...	26,363	2	11

Cash Account for 1882-83.

<i>Receipts.</i>				<i>Expenditure.</i>			
	RS.	A.	P.		RS.	A.	P.
Capital advanced by Government during the year ...	5,237	4	1	Establishment ...	1,436	12	2
Implements and Machines ... *	2,333	9	10	Cooly Labor ...	2,999	15	4
Live Stock ...	1,217	13	2	Implements and Machines ...	2,530	9	5
Crops ...	1,854	9	0	Live Stock ...	1,822	12	0
Sundries ...	187	4	3	Seeds ...	525	3	10
Total ...	10,830	8	4	Manures ...	511	0	4
				Despatching seeds ...	592	9	3
				Contingencies ...	411	10	0
				Total ...	10,830	8	4

Profit and Loss Account.

	RS.	A.	P.		RS.	A.	P.
Establishment ...	1,419	12	2	Implements and Machines ...	286	7	11
Despatching seeds ...	592	9	3	Capital for balance ...	4,261	7	7
Labor ...	505	11	7				
Crops ...	1,041	13	5				
Live Stock ...	743	15	10				
Sundries ...	244	1	3				
Total ...	4,547	15	5	Total ...	4,547	15	6

* Includes Rs. 990 received for Swedish ploughs.

Valuation of Saidápet Farm and Estate on the 31st March 1883 compared with that made on the 31st March 1882.

	Valuation of Stock on the 31st March 1882.			Increase in the Year.			Decrease in the Year.			Valuation of Stock on the 31st March 1883.		
<i>Farm.</i>	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.	RS.	A.	P.
Live Stock (a) ...	2,880	8	0	678	4	5	...	...	...	3,558	12	5
Fruit and Fuel Trees and Crops ...	17,072	0	0	0	5	10	...	...	...	17,072	5	10
Manures ...	110	1	0	...	...	...	7	2	7	102	14	5
Implements (b) ...	5,014	7	0	365	15	4	...	...	...	5,380	6	4
Total ...	25,077	0	0	1,030	4	5	...	...	...	26,114	7	0
<i>Estate.</i>												
Land ...	35,000	0	0	...	...	...	...	...	...	35,000	0	0
Buildings (c) ...	22,800	0	0	...	...	...	300	0	0	22,500	0	0
Wells and Channels ...	7,000	0	0	...	...	...	...	...	...	7,000	0	0
Total ...	64,800	0	0	...	...	...	300	0	0	64,500	0	0

(a) Includes live stock and cattle food. Increase due to births, &c.

(b) Increase due to the purchase of implements and machines and value of the stock of spare working parts of the Swedish ploughs.

(c) Decrease due to the less value of Farm bungalow.

PART IV.

DEPARTMENTAL.

Office-work.—The correspondence, and other work of the office continue to increase; the office establishment is on far too small a scale to admit of work being despatched with sufficient promptitude and regularity. Arrears of work are steadily accumulating in spite of long office-hours and few holidays. The Agricultural Exhibition made a considerable demand on the office staff which was only partly met by temporary additional assistance. The number of official letters issued in the year was, including 803 Agricultural Exhibition letters, 3,771; in the previous year, the number was 2,187. These numbers do not include departmental and demi-official letters of which there were written upwards of 2,500. This, shows a very large increase in the general interest taken in the work on which the department is engaged, and is, so far, a ground for congratulation but, it is greatly to be hoped that means will soon be provided for meeting the so rapidly increasing demand on the office establishment. The subjects on which information was sought, were generally very similar to those stated in previous reports, but it may be noted that a much greater interest is now taken in improved implements and machines. The increase in the number of letters received from native land-holders and cultivators was fully 50 per cent.

* 2. *Agricultural Reportership to Government.*—Under the arrangements prescribed in Government Orders 350 and 351 of the 29th of March 1882 Mr. Robertson in November became Agricultural Reporter to the Madras Government, in addition to his other offices. No change has yet been made in the working of the department except that, it is now controlled by the Director of Revenue Settlement and Agriculture, instead of, directly by the Board of Revenue.

3. *Exchange of Publications.*—The publications received during the year in exchange for those of this department were the same as those received in the previous year, *vide* paragraph 36 of the last report.

4. *Personnel.*—Mr. C. Benson, M.B.A.C., Assistant Superintendent, Government Farms, was absent on furlough until the 9th of November when he returned to Madras and resumed his duties; since then, he has been employed as Agricultural Lecturer in the School of Agriculture. Mr. Kaspar Schiffmayer, Assistant Superintendent, Government Farms, was in charge of the Saidapet Farm during the year; it had been arranged that his connection with the department should terminate at the close of the year, but this arrangement could not then conveniently be carried into effect. Mr. C. K. Subba Row, Deputy Superintendent, was in charge of the Botanical and Experimental grounds during the year; he was also employed in the School of Agriculture, for some time in conducting Tutorial Agricultural classes, and afterwards as First Master, during the absence on leave, and afterwards on the death, of Mr. Ganapathy

Iyer, the First Master. He was also employed in connection with the Agricultural Exhibition. Mr. J. G. Young who for many years had been Overseer of the Saidápet Farm was appointed Keeper of the Veterinary Hospital in May, and the duty of the Farm Overseer has since been performed by Mr. S. Ramasawmy Iyer, a passed Student of the School of Agriculture. Mr. Ponnurunga Pillay, Farm Storekeeper, was appointed Superintendent of Guindy Park, and his place has been filled by Mr. S. Rajagopal Moodelly. There has been no change in the office establishment, each member of which, has worked well, under the too long continued adverse circumstances, mentioned at paragraph 37 of the last General Report.

5. *Finances.*—The following statement shows the income of the Department and the Expenditure on various objects during the year :—

Receipts.				Expenditure.			
	RS.	A.	P.		RS.	A.	P.
Balance on the 1st of April 1882 ..	2,71,582	3	11	General Supervision ..	23,284	12	5
Surplus Pound Fund ..	29,185	14	5	Saidápet Experimental Farm ..	10,830	8	4
Saidápet Experimental Farm ..	* 5,593	4	3	School of Agriculture ..	24,813	3	9
School of Agriculture (Rents and Sale of Books) ..	334	13	3	Estate Charges and Improvements ..	2,486	9	9
Inspection of Cattle Diseases ..	120	12	1	Inspection of Cattle Diseases ..	8,808	11	3
				Value of, and freight on, Swedish ploughs, &c., imported for District operations, and freight and boat-hire on seeds, &c., distributed ..	7,189	11	2
				Balance in favor of the Department on the 1st of April 1883 ..	2,29,273	7	3
Total ..	3,06,816	15	11	Total ..	3,06,716	15	11

* Includes Rs. 990 received for Swedish ploughs.

6. The next statement shows the Income and Expenditure of the Department for the year, and, for the previous three years :—

Items.	1879-80.	1880-81.	1881-82.	1882-83.
	RS.	RS.	RS.	RS.
Receipts—				
Provincial Grant ..	20,000	20,000	20,000	...
Surplus Pound Fund ..	44,219	41,694	46,832	29,086
Departmental Receipts ..	4,212	4,003	4,992	6,049
Total ..	68,431	65,697	71,824	35,135
Expenditure—				
General Supervision ..	16,034	17,196	21,468	23,285
Saidápet Experimental Farm ..	10,773	7,637	10,198	10,830
School of Agriculture ..	28,798	15,401	20,325	24,843
Estate Charges and Improvements ..	3,499	3,531	2,811	2,487
Inspection of Cattle Diseases ..	...	...	...	8,809
District Operations ..	...	...	...	7,190
Total ..	59,104	43,765	54,802	77,444

27th July 1883.

(Signed)

W. R. ROBERTSON, M.R.A.C.,
Agricultural Reporter to Government.

APPENDIX I.

Statement showing the Monthly Rainfall during 1882-83 compared with the Average of the previous Thirteen Years.

Month.	1882-83.		AVERAGE OF 13 YEARS.	
	Rainfall.	Wet Days.	Rainfall.	Wet Days.
April ... ..	...	...	·32	·5
May ... ..	...	...	3·50	1·8
June	·95	3	2·40	5·9
July	2·80	15	3·68	8·6
August	5·63	13	4·87	9·6
September	3·59	7	6·22	8·7
October	8·34	12	10·53	12·6
November	28·47	16	13·56	13·0
December	·03	1	4·21	5·9
January ... ..	...	...	·79	1·4
February ... ..	...	...	·88	·5
March ... ..	...	...	·27	·5
Total ...	49·81	67	51·23	69·0

APPENDIX II.

Statement showing the Weekly Rainfall during 1882-83 with the Average of the previous Thirteen Years.

Weeks.	1882-83.		AVERAGE OF THE PREVIOUS 13 YEARS.		Weeks.	1882-83.		AVERAGE OF THE PREVIOUS 13 YEARS.	
	Rainfall.	Wet Days.	Rainfall.	Wet Days.		Rainfall.	Wet Days.	Rainfall.	Wet Days.
1st Week.	..	..	·17	·15	27th Week	2·00	3	2·13	2·77
2nd ..	..	..	·00	·07	28th ..	1·74	3	1·29	1·68
3rd ..	..	..	·03	·16	29th ..	1·41	3	2·79	2·74
4th ..	..	..	·00	·07	30th ..	2·92	2	3·17	3·05
5th ..	..	..	1·18	·45	31st ..	·27	1	1·83	2·39
6th ..	..	..	·08	·23	32nd ..	2·39	3	2·71	2·71
7th ..	..	..	·13	·46	33rd ..	7·65	4	4·28	4·23
8th ..	..	..	1·00	·54	34th ..	9·02	5	2·94	3·16
9th ..	..	..	·11	·31	35th ..	9·44	5	3·17	2·45
10th ..	·09	1	·53	·52	36th ..	..	..	1·81	1·68
11th ..	..	..	·92	1·38	37th ..	..	..	·50	1·61
12th ..	·61	1	·34	1·23	38th ..	..	..	·58	1·15
13th ..	·85	1	·39	1·76	39th ..	..	..	·47	·92
14th ..	·89	5	·64	1·29	40th ..	..	..	·31	·26
15th ..	1·15	4	·77	1·85	41st ..	..	..	·05	·07
16th ..	·15	1	·30	2·05	42nd ..	..	..	·39	·62
17th ..	·46	3	·69	2·06	43rd ..	..	..	·13	·38
18th ..	·43	4	1·33	2·22	44th ..	..	..	·51	·38
19th ..	1·00	4	1·34	2·54	45th ..	..	..	·28	·15
20th ..	·39	2	1·25	2·15	46th ..	..	..	·03	·07
21st ..	1·38	3	·75	1·93	47th ..	..	..	·12	·30
22nd ..	2·15	3	1·11	2·07	48th ..	..	..	·23	·15
23rd ..	2·83	4	1·89	2·44	49th ..	..	..	·05	·07
24th ..	·06	1	1·60	2·31	50th ..	..	..	..	..
25th ..	·58	1	1·58	1·64	51st ..	..	..	..	..
26th ..	..	..	·95	1·03	52nd ..	..	..	..	..

APPENDIX III.

Statement showing the Number of Stock maintained during each Month of the Year 1882-83.

	1882.										1883.		
	April.	May.	June.	July.	August.	September.	October.	November.	December.		January.	February.	March.
Cattle	44	44	44	44	43	43	46	46	46		46	46	44
Sheep	115	102	94	94	90	86	87	87	86		86	89	88
Equivalent as country cattle of 300 lb. live weight	104.4	102.6	101.4	101.4	98.9	98.3	104.4	104.4	104.3		104.3	104.7	105.6

2 Country Cattle = 1 Farm Cattle.
5 Sheep = 1 Country Cattle.

APPENDIX IV.

Cost of Purchased and Farm-grown Food supplied to the Live Stock during the Year 1882-83.

	WORKING CATTLE.			COWS AND CALVES.			SHEEP.			Amount supplied.	Value.	
	Amount.	Value.		Amount.	Value.		Amount.	Value.				
	LB.	RS.	A. P.		RS.	A. P.		RS.	A. P.		RS.	A. P.
Ground-nut Cake ..	29,592	414	4 7	15,890 $\frac{1}{2}$	222	7 6	14,017	196	10 2	59,499 $\frac{3}{4}$	833	6 3
Bran	1,502	30	0 8	10,118 $\frac{1}{2}$	809	8 0	2,537 $\frac{1}{2}$	50	9 9	14,168 $\frac{1}{2}$	890	2 5
Dholl-husk	3,674	55	10 8	6,965	105	8 6	..	..	..	10,639	161	3 2
	oz.									lb. oz.		
Salt	814 13	25	2 5	419.4 $\frac{1}{2}$	12	15 1	300.6 $\frac{1}{2}$	9	4 4	1,534 8 $\frac{1}{2}$	47	5 10
Grains	1,614	40	5 7	2,336 $\frac{1}{2}$	508	6 7	95 $\frac{1}{2}$	2	6 6	4,046	551	2 8
Cotton Seed	217	6	6 10	1,264 $\frac{1}{2}$	31	9 10	..	..	..	1,481 $\frac{1}{2}$	37	0 8
Corcapilli Seed ..	..	..	..	..	..	..	210 $\frac{1}{2}$	13	2 6	210 $\frac{1}{2}$	13	2 6
Horse-grass	60	1	3 2	916	18	5 3	581 $\frac{1}{2}$	11	10 1	1,557 $\frac{1}{2}$	31	2 6
Arrowroot tubers ..	686	3	6 8	1 flour	0	4 7	..	..	..	686	3	11 3
Brinjals	84	2	10 0	..	..	..	..	..	..	84	2	10 0
Sweet Potatoes ..	40	0	3 2	..	..	..	..	..	..	40	0	3 2
Rice	20	0	13 4	335 $\frac{1}{2}$	13	15 11	27 $\frac{1}{2}$	1	2 6	383 $\frac{1}{2}$	15	15 9
Maize .. .. .	..	..	..	355	17	12 0	..	..	..	355	17	12 0
Total .. .. .	..	579	3 1	..	1,740	13 3	..	284	13 10	..	2,604	14 2
Deduct one-third charged to Manure.	..	193	1 0	..	580	4 5	..	94	15 3	..	868	4 8
Net Charge .. ..	..	386	2 1	..	1,160	8 10	..	189	14 7	..	1,736	9 6
Cost per Head per Mensem .. ..	..	1	5 9	..	4	10 10	..	0	2 9	..	1	6 6

APPENDIX V.

Statement of the Accounts of the Madras Agricultural Department for the Year 1882-83.

Expenditure.

	RS.	A.	P.	RS.	A.	P.
1. General Supervision—						
Establishment	20,560	15	4			
Travelling Allowance	473	7	0			
Stationery	353	10	0			
Exhibition of Improved Ploughs ..	20	13	0			
Contingencies	1,353	1	4			
Allowance to Surgeon for Medical Charge	522	13	9			
				23,284	12	5

* Includes Rs. 353 5-4, pay to Agricultural Reporter, to be debited separately—*vide* G.O., No. 777, Revenue, dated 23rd June 1883.

	RS.	A.	P.	RS.	A.	P.
2. Saidápet Experimental Farm ... ..	.....			10,830	8	4
3. Educational (School of Agriculture)—						
Establishment	3,659	2	7			
Stipends and Scholarship	4,398	7	2			
Lecture Fees	10,260	0	0			
Prizes	12	0	0			
Chemicals and Laboratory Apparatus.	203	14	3			
Books	144	11	8			
Contingencies	961	3	0			
Botanical Grounds	893	4	9			
Veterinary Hospital Ordinary Estab-						
lishment Charges	1,201	1	6			
Medicines, &c., for the Veterinary						
Hospital	200	0	7			
Maintenance of Buildings	1,779	10	3			
Repair of Veterinary Hospital						
Keeper's Quarters	287	12	10			
Travelling Allowance for Stipendi-						
ary Students	841	15	2			
				24,843	3	9
4. Estate Charges and Improvements—						
Repairs to Superintendent's Quarters.	729	13	5			
Repair and Improvement to Farm						
Buildings	954	0	7			
Repair and Improvements to Roads.	161	7	3			
Sundry Repairs and Improvements ...	367	1	2			
Extension and Repair of Water						
Channels	274	3	4			
				2,486	9	9
5. Inspection of Cattle Diseases—						
Establishment	5,423	5	3			
Travelling Allowance	1,342	1	6			
Stipends for Veterinary Students ...	1,288	8	10			
Medicines for distribution to districts.	399	9	2			
Office Furniture	120	0	0			
Contingencies	235	2	6			
				8,808	11	3
Transfers—						
Value of, and freight on, Swedish						
Ploughs, &c. ... ..	.....			6,838	4	10
Freight and boat hire on seeds, &c.,						
distributed ... ..	.....			351	6	4
				77,443	8	8
Adjusted balance at the beginning of the						
year	2,71,582	3	11			
Income—						
Receipts from the Surplus Pound						
Fund during 1882-83	29,085	14	5			
Saidápet Experimental Farm	5,593	4	3			
School of Agriculture (Rents and Sale						
of Books, &c.)	334	13	3			
Inspection of Cattle Diseases	120	12	1			
				3,06,816	15	11
Balance in favor of the Department on						
the 1st of April 1883 ... ..	.....			2,29,273	7	3

(Signed)

W. R. ROBERTSON, M.R.A.C.,
Agricultural Reporter to the
Government of Madras.

STATEMENT showing the Acreage of Crops sown in the
ENCLOSURE No. 2. District, in the Month of 188 . (1883-84).

[illegible]

Statement showing the Acreage of Crops sown in the

District, in the Month of

188

(1883-84)—(Continued).

[illegible]

N. B..—Brief remarks on the season would be very useful.

ENCLOSURE No. 3.

Cattle Disease Inspection.

DEPARTMENT.—I assumed charge of the department on the 18th of August 1882, therefore the report I am now about to submit cannot be looked upon as complete as far as the statistical part goes; that is, the complete statistics for the year.

The department is now composed of inspector of cattle diseases one, deputy inspector of cattle diseases one, probationary local cattle disease inspectors nine, but when complete, according to G.O., No. 1917, of 12th December 1881, it will consist of 27 local cattle disease inspectors in addition to the inspector and deputy inspector.

There can be little doubt as to the utility of such a department for the prevention of animal plagues in general, which cause such large losses annually both to Government and cattle-owners; and it must be admitted that great good will be done when it is properly organized and in thorough working order, even in spite of the many difficulties which have to be contended with.

The mode of working is as follows: each collectorate is supplied with 100 doses of medicine for the most prevalent diseases and a half-gallon tin of phenyle for disinfecting and dressing purposes. This supply is always kept up, thus ensuring aid being at hand until assistance can be sent from head-quarters.

The deputy inspector is kept continually itinerating and has worked well; in fact, no one could have done more than he has during the time he has been my immediate subordinate. His work, especially in the Trichinopoly and Kistna districts, where two of the worst outbreaks of the year took place, left nothing to be desired. He thoroughly understands the work and would be difficult to replace.

The probationers have, with few exceptions, adapted themselves very well to their work; in fact, much better than I anticipated, because there are many menial duties to be performed by them which I certainly thought would be the stumbling block to their employment in the capacity of cattle inspectors; this, however, I have been agreeably surprised in, and there is no difficulty in getting them to do what they are told; of course, when they are beyond my immediate controlling power, they may act somewhat differently, but it is to be hoped not, nor do I think, from what I know of them, that they will.

Their teaching is thoroughly practical, and particular attention is paid to instruct them in any subject in which they are found deficient. Every precaution is taken to see that they have a thorough knowledge of contagious cattle diseases, and the best and most recent and scientifically approved and accepted means of treating, arresting and preventing them.

HOSPITALS.—This institution was opened on the 1st June 1882, and has been working most successfully ever since.

Building.—These consist of surgery class-room, stables, dissecting shed, shed for out-door classes and hospital-keeper's quarters.

Working.—The hospital with instruments and drugs is under the immediate charge of the hospital-keeper.

The following books are kept:—

- (1) A register in which the description, result of treatment, &c., of each patient is entered;
- (2) A record for entering the full particulars of cases;
- (3) A recipe book wherein all medicines expended are carefully noted;
- (4) A clinical chart book in which are recorded the variations of temperature, pulse, and respirations of all cases of any interest.

No operations, however trivial, are performed without the use of chloroform; this is done for two reasons—(a) to alleviate suffering, and (b) to teach the probationers and the students of the Agricultural College humanity.

During the past six months 72 practical demonstrations were given to the probationers and students, including 13 operations and 19 *post-mortem* examinations, for particulars of which see returns Nos. 1 and 2.

During the seven months under report, 51 cases were treated at the hospital, of which 29 were discharged cured, one relieved, 10 died, 3 remain, and 8 were destroyed, some of which were old and worn out and unfit for further work, while others were hopelessly incurable, and their merciful destruction was a justifiable duty, which, in every instance, was performed by a means which inflicted the least possible suffering, for particulars of which see return No. 3.

It is much to be regretted that a large percentage of the cases were brought for treatment when they were beyond human aid; the consequence was that many of the animals died, and some had to be destroyed as incurable. This was especially the case with those sent in by the presidency magistrates under Act VIII of 1867. I have no doubt but that the results would have been far more satisfactory had the owners sought medical aid in time.

Full advantage was taken of the deaths, and *post-mortem* examinations were made in every case, partly with a view to discover and illustrate morbid conditions, and partly to teach the students the anatomy of the various organs of the body.

Pharmacy.—In the pharmacy 3,751 doses of medicine for the various forms of cattle disease were sent out up to 31st March 1883 to the districts, of which Kistna had the largest share on account of the serious outbreak of disease which occurred there. The doses were put up in tins, to which a label was affixed in English and the vernaculars of the various districts containing full instructions regarding their use and mode of exhibition.

With few exceptions the drugs employed are indigenous to India, are cheap, and can be procured locally.

This is especially done for the purpose of illustrating to the cattle-owners the benefit which can be derived from a judicious use of the resources they have always at hand in their own bazars, and to prevent them, as far as possible, from pinning their faith on drugs other than those found in their own country, and not always to be had.

Sanitation.—The sanitary arrangements of the hospital are carried on under the most approved principles. No animals are admitted which are suspected of being affected with a contagious disease, and all stable litter, dressings from wounds, &c., are carefully burnt in one of my cinerators, which is erected at a remote corner of the compound. When a patient dies, or is discharged from the hospital, the stall in which it stood is thoroughly white-washed and disinfected before again being re-occupied.

During the year a considerable number of morbid specimens have been collected for the college museum and are being prepared and set up.

The hospital has a well-wooded compound, about ten acres in extent, with a garden in which the following plants have been grown:—

Guinea-grass	.. ..	<i>Panicum jumentorum.</i>
Maize	.. ..	<i>Zea Mays.</i>
Chinese Sargarcane	.. ..	<i>Sorghum saccharatum.</i>
Aloes	.. ..	<i>Aloe indica.</i>
Aniseed	.. ..	<i>Pimpinella anisum.</i>
Ginger	.. ..	<i>Zingiber officinale.</i>
Chillies	.. ..	<i>Capsicum Annuum.</i>
Thorn apple	.. ..	<i>Datura stramonium.</i>
Turmeric	.. ..	<i>Curcuma longa.</i>

The guinea-grass is grown for use of patients, and the medicinal plants for teaching purposes.

Establishment.—This consists of hospital-keeper, peon and two malies. Their general conduct has, on the whole, been satisfactory.

The veterinary hospital being a new institution, few people beyond Saidápet are aware of its existence, and still fewer are those that know anything about its usefulness, and the almost gratuitous treatment given there. Hence the small number of admissions, other than those from the Government farm, during the year. It is, however, to be hoped that as the existence of this, the only institution of its kind in the presidency, and the advantages afforded by it are more widely known among the public, it will be better patronized to the mutual advantage of owners of stock and the students who are being trained at it.

Experiments have been conducted with the following medicinal agents:—Little's soluble phenyle, Barff's boro-glyceride, chloride of sodium, and an unofficial drug termed Rudrakshum (*Eleocarpus genitras*). With phenyle and boro-glyceride, the results have been well defined and definite; with chloride of sodium the experiments were not extensive enough to draw any conclusive deductions from, but were sufficiently encouraging to continue them at some future date. For particulars of experiments, see Appendices Nos. 1 and 2.

The chloride of sodium was given to determine a most important point, viz., to test its value as a preventive as well as a curative agent in the more deadly forms of cattle diseases. The deputy inspector was accordingly directed, in February last, to give salt a fair trial and report on the results. He conducted the experiments in the Kistna district, where there was an extensive outbreak of rinderpest at the time, and considers that the results have so far been satisfactory, and I am convinced that the day will yet come when common salt will play an important part in the prevention of cattle diseases, not only in India, but throughout the whole civilized world. With regard to the latter, I am not in a position to give an opinion as to its use, because my experiments with it are not complete, nor have they extended over a sufficiently long period for me to draw any deductions from them which could be looked upon as correct; therefore will reserve a report on it for some future date.

It may not be out of place to give a brief description of the Rudrakshum above referred to: this is the native name given to a tree technically named the *Eleocarpus genitras*, a member of

the natural order Eleocarpaceæ. The part used medicinally is the nut. In March last the Head Assistant Collector of Devála informed me that this nut had been employed in the hills, with good success, by an European coffee planter in cases of rinderpest which occurred on his estate, that the natives of those parts employ it extensively as a specific for that disease, and that the dose of it is one nut of an average size ground to powder and mixed in about a pint of gruel. He further desired me to give a trial to the drug, which I gladly accepted. Rudrakshum nut is regarded in a religious light by the natives, and worn by them on occasions of divine worship. I am told that the same nut is sometimes employed by natives as a specific for epileptic fits. I have, therefore, sent 300 doses of 40 grains each (the average weight of a nut) to each of the districts affected with rinderpest, with a view to test its efficacy.

EDUCATIONAL.—Since my connection with the Agricultural College, I have delivered, up to the end of the official year, 220 lectures, including 58 practical demonstrations on the following subjects:—Zoology, Physiology, Anatomy, Materia Medica, and Therapeutics, Pharmacy, Pathology, Dietetics and Parturition.

The lectures are rendered as simple and interesting as possible by means of models, diagrams and the black-board.

The practical classes are carried on at the hospital, where the students are taught the use of the various instruments, to compound and administer medicine, dress wounds, take clinical observations, perform minor operations, conduct *post-mortem* examinations, shoeing, &c. I find that they take a great interest in the work and make very good assistants. They are somewhat timid at first in handling animals, but that wears off after a time.

SLAUGHTER-HOUSES.—By the kind permission of the President of the Madras Municipal Commission, I have been enabled to inspect, from time to time, all the slaughter-houses within the municipal limits. From November 1882 to the end of the last official year, seventeen inspections were made—Meersaibpett was visited five times, Triplicane and Ráyapuram twice, Choolay and Perambúr four times. The result has been most beneficial both to the public and to my probationers.

The probationers have had ample opportunities of studying the various morbid appearances, and they can now without difficulty distinguish disease; the officers in charge of the slaughter-yards are now also better able to discern between what is health and disease.

There is no doubt but that this system of inspecting slaughter-houses frequently and at uncertain times will, if continued, produce excellent results.

The principal diseases observed in the animals slaughtered are—

- | | |
|--------------------------|--------------------------|
| (1) Catarrhal fever. | (4) Amphistomum conicum. |
| (2) Congestion of lungs. | (5) Tuberculosis. |
| (3) Tape-worm (Tænia). | |

STATISTICS.—These have, of course, only been compiled from the 1st September 1882, *i.e.*, the first month after I assumed charge of the department. The district visited most severely by cattle plague has been Kistna, where no less than 21,486 attacks were reported, or 2·82 per cent. on the total of its cattle, 60·65 per cent. of which died. Now, if we look at the statistical return marked No. 4, it will be observed that the deaths in cattle stand at 19,590 and sheep at 840. These figures represent only the cases reported to this office, but I am confident many deaths occur which we never hear anything of. At the same time it may not be without some interest to calculate the loss in money which has taken place within the period that these statistics embrace, *viz.*, seven months. If we take the cattle all round at an average, say, of Rs. 10 per head, and the sheep at one rupee, the net loss in money has been Rs. 1,96,740, which is a very serious matter. Kistna alone suffered to the extent of Rs. 1,30,390.

In the Trichinopoly district sheep-pox for a time was somewhat severe, but its progress was promptly checked; not, however, until 60 per cent. of those attacked had died.

Anthrax heads the list as being the most fatal malady, claiming no less than 73·40 per cent. of its victims, sheep-pox follows with a death-rate of 60 per cent., next is rinderpest with 5,994 per cent., and lastly, epizootic apthæ which only kills 12·16 per cent.; the average for all diseases being 59·36 on the total of animals attacked, which only shows the necessity there is for a cattle disease prevention department.

From return No. 5 (see appendix) it would appear that disease was at its height in the months of December 1882 and January 1883, during which period there was the least rainfall, when no less than twenty districts in the former and twenty-one in the latter month were affected. This, I consider, is in a great measure due to the sudden change of the season from wet to dry, and the cold which prevails in those months. This conclusion will be borne out by the fact that disease began to subside as the warmer and more genial weather commenced.

The most prevalent malady has been rinderpest, which visited the presidency no less than forty-six times; epizootic apthia follows; then comes anthrax, which made its appearance only six times.

It must be observed that the cattle disease statistics received in this office often fail to specify the nature of the disease; hence a separate column has been opened for "cattle diseases not specified." I am inclined to think that the diseases comprised under this head must probably be anthrax and rinderpest; for these are, especially the former, difficult of detection.

ENCLOSURE No. 4.

RETURN No. 1 showing the operations performed since the opening of the Hospital up to 31st March 1883.

Operation.	NO.
Castrations	6
Puncture of rumen	2
Firing	1
Removal of placenta	1
Do. of mammary tumour	1
Do. of portion of penis and breaking up stricture	1
Puncture of cornea for filaria oculi	1
Total ...	13

ENCLOSURE No. 5.

RETURN No. 2 showing the *Post-mortem* Examinations made since the opening of the Hospital up to 31st March 1883.

<i>Post-mortem</i> Examinations.	NO.
Anthrax	2
Catarrhal fever	1
Cholera (fowl)	1
Hydrophobia	1
Tumour rectal	1
Impaction of omasum	1
Pneumonia	2
Pleuro-Pneumonia	1
Anchylosis	1
Fracture, cervical	1
Tuberculosis	1
Ringbone	1
Emphysema of the lungs	1
Poisoning	1
Old and worn out	3
Total ...	19

ENCLOSURE No. 8.

No. 5.—Analysis of the "Rainfall and Health of Cattle Statement" from 1st September 1882 up to 31st March 1883.

Month.	NUMBER OF DISTRICTS AFFECTED WITH				Total Number of Districts affected.	Average Rainfall in Inches.	Remarks.
	Rinder-pest.	Anthrax.	Epizootic Aphtha.	Cattle Disease not specified.			
September 1882 ..	5	1	4	6	16	4.65	It will be observed that no less than 44 outbreaks were so vaguely reported that no clue could be obtained as to their precise nature which, if statistics are to be kept anything like correct, calls for remedy.
October ..	6	1	4	7	18	4.31	
November ..	6	2	3	8	19	8.78	
December ..	7	1	4	8	20	1.10	
January 1883 ..	8	1	5	7	21	0.11	
February ..	6	..	4	4	14	0.21	
March ..	8	..	3	4	15	0.55	
Total ..	46	6	27	44	123	19.71	

ENCLOSURE No. 9.

Appendix No. 1.—*Little's Soluble Phenyle.*

It has been extensively experimented with for the last six months.

I am of opinion it is a most valuable disinfectant, deodorizer and antiseptic, and has a peculiar power of checking tympany in cattle by neutralizing the gas contained in the stomach or by arresting the fermentive process which is the cause of its production.

I have no hesitation in saying that, as a disinfectant, it is in no way inferior to the far more costly article, carbolic acid, and has a great advantage over the latter agent by being to an extent non-corrosive and readily soluble in all proportions of cold water; whereas, on the other hand, carbolic acid is highly corrosive and will not mix with cold water, which is decidedly against it.

Internally, it has been largely employed in the districts in the treatment of cattle diseases in doses of 60 minims, and the deputy inspector reports most favorably on it.

Externally, as a dressing to the skin when infested with parasites, it will produce in a short time a most wonderful result. I have seen ticks (*Acarida magna*) leaving the bodies of sheep and dogs like rats deserting a sinking ship. As a dressing of this kind it should be used in the proportion of 1 to 40 or 60 parts of water.

As an application to wounds and ulcers it may be employed mixed with from 30 to 40 parts of water.

For disinfecting and deodorizing purposes it will be found useful, either mixed with white-wash, one ounce to the gallon, or with 80 to 100 parts of water, and freely sprinkled about.

ENCLOSURE No. 10.

Appendix No. 2.—*Barff's Boro-Glyceride.*

I am of opinion that it is a most valuable antiseptic and from its non-irritating, non-corrosive and soluble nature, it far surpasses either carbolic acid or phenyle, but, on the other hand, it is inferior to those agents as a disinfectant and deodorizer; in fact it has little or no power as either.

As a dressing for wounds and ulcers it is eminently well suited; it brings about rapid granulation; therefore is highly useful as an application where there has been loss of structure or sloughing. It stimulates ulcers and brings about a healthy reaction with subsequent healing of the part.

From its non-poisonous nature I find that it will not destroy maggots, nor will it prevent them entering a wound; therefore when applied to a part, it must be carefully covered with lint or cotton wool.

It being perfectly harmless, enhances its value considerably, because it can be used with the greatest safety by the most inexperienced and ignorant.

It is best used in the crude form laid on as a paste; but for slight wounds, it may be dissolved in from 10 to 15 or 20 parts of water.

At the veterinary hospital it has been applied to all kinds of cases, and I decidedly consider it is a most invaluable antiseptic to wounds, &c., and as an agent for the preservation of morbid specimens.

ENCLOSURE No. 11.

RETURN showing Number and Results of Experiments with Boro-Glyceride.

—	Strength of Solution.	Open or closed Vessel.	Date of submer-sion.	Date of removal.	Number of Days.	State.	Remarks.
1. Shell-fish	1 to 20	Closed.	1883. 14th Jan.	1883. 21st May.	128	Perfectly fresh.	
2. Vegetables (potato, onion, carrot, turnip and green chilly).	1 to 20	Do.	19th „	21st „	123	Do.	Coloring matter of the chilly slightly faded.
3. Parasite (lumbrisi) ..	1 to 10	Do.	20th „	20th Feb.	31	Decomposed.	This specimen never kept well from the first, although perfectly fresh when submerged.
4. Mutton-chop	1 to 30	Do.	1st Feb.	21st „	21	Perfectly fresh.	Was cooked and eaten.
5. Lungs and heart (horse).	1 to 50	Open.	1st „	2nd „	2	Decomposed.	Difficult to keep owing to the air in the lungs.
6. Foot and fetlock (horse).	1 to 50	Do.	1st „	4th „	4	Perfectly fresh.	Was taken out daily for dissection.

ENCLOSURE No. 12.—Map.

Resolution—dated 3rd October 1883, No. 2965.

Submitted to Government.

2. Mr. Robertson's annual report as Agricultural Reporter appears to the Board to contain a great deal of matter that might well have been omitted. They think it would be better if he refrained in future from indulging in the species of generalization to be found at the end of his 33rd paragraph, where he says "a very general belief is springing up that irrigation water is generally far too lavishly used in South Indian Agriculture; but up to the present time no really reliable data have been collected applicable to ordinary conditions." The Board think that Mr. Robertson has much to learn about irrigation from the ryot, and can teach him nothing about it, while they question the general accuracy of his dictum.

3. They are at a loss, too, to follow Mr. Robertson's line of thought when he wrote in paragraph 78 that "of course where milk can be sold at 4 annas per measure, it will not pay to make cheese, even where it is possible to cure cheese." The price of the milk will, doubtless to a great extent, affect the price of the cheese, but if that price includes the cost of the milk and a fair profit, and there is a market at that price, it ought to pay to make cheese.

4. With reference to paragraphs 11 and 12 of the Director's letter forwarding the above report, the Board have since * submitted to Government their proposals for securing the record of the outturn of crops in all villages.

5. The most interesting enclosure to the Director's letter is the report of Mr. Mills, the Inspector of Cattle Diseases, which shows that much useful and really practical work is being performed by him, short as is the time since his office has been constituted. Many of his remarks are full of interests, but none more so than his statement of his conviction that the day will yet come when common salt will play an important part in the prevention of cattle disease. In the opinion of the Board there is no matter which goes so directly to the root of agricultural success in this country and is so intimately bound up with the prosperity of the ryot as the prevention and cure of cattle disease. The ryot's cattle are the chief part of his agricultural capital, and anything that will prevent the enormous annual loss of cattle from disease

which now takes place will not only add greatly to the manure supply of the country, which is the form in which capital most needs to be applied to the soil, but will tend, indirectly perhaps, to improve the breed and enable them to do more work. Intimately connected with this subject is that of the formation of fuel and fodder reserves and grazing grounds to which the Board have recently been devoting much attention, and in connection with which they are now submitting draft rules for the approval of Government framed under Section 26 of the Madras Forest Act.

(True Copies and Extract.)

(Signed) E. GIBSON,
Acting Secretary.

To the Secretary to Government, Revenue
Department, with a map.

Copy to the Director of Revenue Settlement
and Agriculture.

ORDER—dated 19th November 1883, No. 1430, Revenue.

Miscellaneous.

* Circular 31-A, dated 14th May 1883.

2. The revision of the settlement has already been completed † in ten, and is in progress in six, of the twenty-one districts of the presidency. The financial results hitherto attained show an increase of Rs. 12,01,580 or 5·8 on the old revenue assessments. The reports of the Inam and Irrigation Departments will be disposed of in due course. It will suffice here to observe that the Irrigation Revenue Accounts for the nine systems for which capital and revenue accounts are kept, have been completed, and that the best method of exhibiting the harvest yield in future both in irrigational and in ordinary agricultural statistics will be dealt with at the Conference which will consider this and cognate subjects at Calcutta in December next. By a typographical error in the statement of accounts the Cauvery system is said to have repaid 118·8 per cent. instead of 1,118·8 per cent., in surplus revenue on the expenditure incurred on improvements. The Government note with great satisfaction that steps are being taken for the more exact determination of the value to the public revenue of the minor irrigation works of the presidency and await with interest the submission of the statistics referred to in paragraph 9 of Mr. Wilson's letter.

3. No steps can be taken towards the improvement of the village record system until the results of the deliberations of the Conference referred to above are known. The general views of this Government on the subject have meanwhile been recorded in their Order, No. 1357, dated 3rd November 1883.

In regard to the analysis of districts, the Government are of opinion that Mr. Wilson's proposals are well calculated to effect the object in view as described in paragraph 5 of Mr. Buck's letter of the 14th May last, and they trust that it may be found possible to give effect to them without increasing the ordinary revenue establishments.

4. The chief measures of protection against famine referred to in paragraphs 16 and 17 of the Director's letter—namely the irrigational projects for the districts of Ganjam, Madura and Salem, and the scheme of light railways intended to connect the inland tracts of this presidency, which are most subject to famine, with the sea-coast and the deltas of our principal rivers—have been transferred to the Public Works Department. These works will, in the opinion of the Government, prove of the very highest value to the country in times of scarcity or famine.

5. Whilst the Government agree with the Board in thinking that Mr. Robertson's report might have been somewhat condensed, they are of opinion that it contains much useful and interesting information and they are unable to endorse the criticisms which find expression at paragraphs 2 and 3 of the proceedings read above. It has long been an admitted fact that water supplied by direct flow for irrigation is not economized by the ryots to the same extent as when they have to lift it, and any experiments furnishing reliable data as to the quantity of water necessary to mature a crop under varying conditions of soil and climate will be of great agricultural value. The Government note with satisfaction that arrangements have been made for such experiments being conducted and look forward with interest to the results.

6. The Government have already approved the proposed severance of the School of Agriculture from the Farm and the change will be carried into effect at an early date should no financial objections exist.

* G.O., dated 7th November 1883, No. 1373. On the Madras Exhibition* separate orders have been passed. It is hoped that some means will be devised for the destruction of the tobacco parasite which Mr. Lawson has identified as the *Philippa Indica*. The Government agree with the Director in thinking that no further experiment should be made with *Reana luxurians*, in regard to the value of which as a fodder crop several conflicting opinions have from time to time been received. The live-stock on the farm appears, as Mr. Wilson observes, to be excessive, and its proposed partial distribution among the districts is approved.

7. Experiments might be repeated for the purpose of determining the best way of preserving the vitality of seed of the Minnesota cane, for, as Mr. Robertson observes, the test cannot be satisfactory unless the seed treated is exposed to the same extent to which that of the ordinary agriculturist is, to the action of the air and the possible ravages of insects. Further experiments with Nankin cotton have been † ordered. † G.O., dated 10th September 1883, No. 1095. The arrowroot flour referred to in last year's report was sold for 1½ annas a pound. It should be noted what price the product of the current year fetches, for, at this rate, its cultivation can hardly be profitable of itself or by way of example.

8. Mr. Robertson is of opinion that with proper apparatus a roughly prepared fibre for rope-making might be extracted from the Manilla hemp at a sufficiently low price to pay. As such rope sells in Madras at 5 annas per pound, this seems doubtful; but experiments might be made with the apparatus described by † Mons. de Chazal, should the Superintendent be able to make it up on the farm.

9. The Government entirely agree with the Director in thinking that seed of the varieties of *Eucalyptus* which grow on the farm should be distributed in the districts. There seems no reason why this valuable fuel producer should not do at least as well in other localities as in the indifferent soil of Saidápet. The proposed experimental plantation of *Divi Divi* is approved and the commercial results should be carefully noted.

10. The steady improvement in the Saidápet breed of sheep is satisfactory, and the Government hope that the importance of improving the indigenous breed of sheep by judicious crossing will not be lost sight of.

11. Considerable activity was displayed during the year under report in the introduction and distribution of improved agricultural implements. The Government concur with the Agricultural Reporter and Director in thinking they should now retire from the active business of supplying such as are of recognised utility and confine their attention to the introduction of such as are worthy of trial but not as yet recognised as suitable to the wants of the native cultivator.

12. In view of the important questions of principle now under consideration in connection with the future of the Saidápet farm, the Right Honorable the Governor in Council agrees with Mr. Wilson in thinking that the proposed Erode and Chittoor farms should not be proceeded with.

13. The operations of the Cattle-disease Department are satisfactory and much good work appears already to have been accomplished by Mr. Mills and his assistants. The Government are fully alive to the importance of devising some method whereby salt may be made available as an article of diet for cattle and as a manure without detriment to the revenue, and the subject has quite recently come under their consideration*. As observed by * G.O., dated 26th September 1883, No. 1186. Mr. Wilson the difficulty has proved by no means so easy of solution as Mr. Robertson supposes. The inspections of the Madras slaughter-houses by Mr. Mills have doubtless been most useful. Steps should be taken to make the existence of the Veterinary Hospital at Saidápet more generally known.

				Rs.	
• General Supervision	23,285	Rs. 77,444. The statement of account and of profit and loss account of the Saidápet farm in paragraph 108 of Mr. Robertson's report wherein receipts and expenditure are shown as Rs. 10,830 is not clear. It is not stated by whom the valuation of the farm and estate was made. The <i>bona fide</i> receipts of the farm proper appear to be Rs. 4,603, being the sum entered less Rs. 990 received for Swedish ploughs bought and sold for Government by the farm. The expenditure on supervision was Rs. 23,285, on the School of Agriculture Rs. 24,843, on the Cattle-disease Department Rs. 8,809. The expenses of the farm are of course far higher than appear, for the greater portion of the very large sum expended in general supervision is debitable to this head.
Saidápet Farm ...	...	...	...	10,830
School of Agriculture ...	...	...	...	24,843
Estate Improvements and Repairs ...	...	...	...	2,487
Cattle-disease Inspection ...	...	...	...	8,809
District Operations	7,190	Total ... 77,444
Total ...				77,444	

15. On the whole, the operations of the year may be considered satisfactory, and now that such difficulties as were unavoidable in the organization of a new department have been surmounted, the Right Honorable the Governor in Council trusts that uninterrupted progress will be made in the directions indicated in the recent Proceedings of Government passing orders on Mr. Wilson's proposals for its future conduct.

(True Extract.)

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

To the Board of Revenue, with a map.
 „ the Director of Agriculture.
 „ the Director of Government Cinchona Plantations, &c.
 „ the Public Works Department.
 „ the Accountant-General.

No. 1430A.

Copy to the Government of India, Department of Revenue and Agriculture.

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

Exd. W. H. French.

220 Copies.

Govt. of 1883 Madras.

REVENUE.

Issued

Recd.

Encl.

G.O., 19th November 1883,
Nos. 1430, 1430A.

NOVEMBER.

(26) 20

Agricultural Department.

Reviewing report of the — for 1882-83.