

South



Australia.

---

DEPARTMENT OF AGRICULTURE.

---

ANNUAL PROGRESS REPORT,

*DECEMBER 31st, 1886.*

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BY THE  
GOVERNMENT PROFESSOR OF AGRICULTURE, SOUTH AUSTRALIA.

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*Ordered by the House of Assembly to be printed, June 2nd, 1887.*

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1887.

Department of Agriculture,

Roseworthy, December 31st, 1886.

(Received in Crown Lands Office, January 27th, 1887).

Sir—

I have the honor to submit the Annual Report for the year ending  
December 31st, 1886, regarding the work of the above Department, including the  
Roseworthy Farm and Agricultural College.

I have the honor to be,

Sir,

Your obedient Servant,

JOHN D. CUSTANCE,

Prof. of Agriculture.

To

The Honorable the Commissioner of Crown Lands.

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# ANNUAL REPORT,

## 1886.

### PART 1.

#### SECTION 1.—THE FARM—THE SEASON.

The Season has again been very unfavorable, much more so than the total rainfall would indicate. It will be noticed from the daily register of rainfall that from the 28th April, when we commenced sowing African Baart wheat, until July, the weather was unusually dry, the rainfall during June being so slight that no benefit to the wheat plant could be expected from it, yet the harvest has been a fair one, and considering the season quite satisfactory as far as wheat is concerned. The other crops have suffered considerably. I think the season has been worse than any since the commencement of the farm for summer crops, such as sorghum, maize, mangolds, kale, &c.

#### SECTION 2.—RAINFALL AT THE COLLEGE FARM, ROSEWORTHY, 1886.

	Inches.	Number of days on which rain fell.		Inches.	Number of days on which rain fell.
January .....	1·37	4	August.....	2·92	17
February .....	0·27	4	September ....	2·11	9
March .....	0·00	0	October .....	2·22	14
April .....	1·10	5	November ....	1·14	4
May .....	1·09	8	December ....	0·63	6
June .....	0·33	5			
July .....	2·43	14	Total ..	<u>15·61</u>	<u>90</u>

#### REGISTER OF RAINFALL IN 1886.

*Time of Observation—9 a.m.*

Date.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.	in.
1.....	—	—	—	—	·10	—	—	·02	·78	·14	—	—
2.....	—	·07	—	—	—	·02	—	·18	—	·08	—	—
3.....	—	—	—	—	—	—	—	·05	—	·14	—	—
4.....	—	—	—	—	—	—	—	·06	—	·03	·20	—
5.....	—	—	—	·05	—	—	·26	·10	—	—	—	—
6.....	·46	·08	—	·03	—	—	·44	—	—	—	—	·12
7.....	·73	—	—	—	—	—	—	—	·33	·15	—	·06
8.....	—	—	—	—	—	—	—	·03	·07	·02	—	—
9.....	—	—	—	—	·03	—	—	·05	·06	—	—	·18
10.....	—	—	—	—	·05	·08	—	—	—	—	—	—
11.....	—	—	—	—	—	·12	·11	·14	—	—	—	—
12.....	—	·02	—	—	—	·09	·03	·08	—	—	·02	—
13.....	—	—	—	—	—	—	—	—	·08	—	—	·03
14.....	—	—	—	—	—	—	—	·02	—	—	—	—
15.....	—	—	—	—	—	—	—	·10	—	—	—	—
16.....	—	—	—	—	—	—	—	·31	—	—	—	—
17.....	—	—	—	—	—	—	—	—	—	—	—	—
18.....	—	—	—	—	·04	—	·04	·36	—	—	—	·19
19.....	—	—	—	—	·77	·02	·11	·83	—	·05	—	·05
20.....	—	—	—	—	·02	—	·14	·19	—	·75	—	—
21.....	—	—	—	—	·03	—	—	—	·66	·15	—	—
22.....	—	—	—	·55	—	—	·17	·11	·04	·30	—	—
23.....	—	—	—	·41	—	—	—	—	—	·06	—	—
24.....	·02	·10	—	·06	—	—	·13	—	—	·16	—	—
25.....	—	—	—	—	—	—	·02	—	·04	·07	·85	—
26.....	—	—	—	—	—	—	·30	—	·05	·12	—	—
27.....	—	—	—	—	—	—	·38	—	—	—	·07	—
28.....	—	—	—	—	·05	—	·16	—	—	—	—	—
29.....	—	—	—	—	—	—	—	—	—	—	—	—
30.....	—	—	—	—	—	—	—	·29	—	—	—	—
31.....	·16	—	—	—	—	—	·14	—	—	—	—	—
Totals ....	1·37	0·27	0·00	1·10	1·09	0·33	2·43	2·92	2·11	2·22	1·14	0·63
Total from Jan. 1 .. }												

## SECTION 3.—SERIES A—PLANTS.

Eighty-seven plots were sown in No. 12, and sixty in No. 9, as shown in the following tables. The season, though rather favorable to the early growth of the plants sown in July, owing to the cold and dry weather afterwards, has been unfavorable, only the hardiest plants being able to make any progress, the best of these being Mangold, Kohl-rabi, Lucern, Bokhara Clover, Yellow trefoil, Saintfoin, Yarrow, Foxtail, Burnet, Cocksfoot, Rib grass, Chickory.

I can mention Bengal grain, yellow millet, and the sunflower as being very promising under more favorable conditions.

For sheep feed a most productive herbaceous salt bush, *Atriplex semibaccatum*, is worthy of attention; the seeds were sent to me by Mr. W. Farrer, of New South Wales, who expresses a very favorable opinion of its extraordinary productiveness and drought-resisting capabilities.

It appears to deserve the good opinion expressed of it by Mr. Farrer.

*Experimental Plots.—Paddock No. 12, 1886.*

No. of Plot.	Name.	Date of Sowing.	No. of Plot.	Name.	Date of Sowing.
1	Red or broad clover .....	July 8	44	Mammoth long red mangold ..	July 10
2	Giant saintfoin .....	"	45	Long red mangold .....	"
3	White or Dutch clover .....	"	46	Long yellow .....	"
4	Per. white clover .....	"	47	Red intermediate .....	"
5	Alsike clover .....	"	48	Orange globe .....	"
6	Yellow suckling clover .....	"	49	Golden tankard .....	"
7	Yellow trefoil .....	"	50	Yellow intermediate .....	"
8	Birdsfoot trefoil .....	"	51	German white sugar-beet ....	"
9	Greater birdsfoot trefoil .....	"	52	Early white sugar-beet .....	"
10	Lucern .....	"	53	Green top sugar-beet .....	"
11	Bokhara clover .....	"	54	Red top sugar-beet .....	"
12	Maltese clover .....	"	55	Thousand-headed kale .....	"
13	Sheep parsley .....	"	56	Late drumhead cabbage .....	"
14	Burnet .....	"	57	Maltese clover .....	Aug. 5
15	Chicory .....	"	58	Yam boussingaultia baselloides..	Aug. 17
16	Furze .....	"	59	Masur .....	Aug. 31
17	Yarrow .....	"	60	Kulth .....	"
18	Clover mixture .....	July 9	61	Chural .....	"
19	Grass mixture .....	"	62	Rawan .....	"
20	Rough cocksfoot .....	"	63	Mash .....	"
21	Meadow foxtail .....	"	64	Molth .....	"
22	Broome grass .....	"	65	Mattar .....	"
23	Crested dogtail .....	"	66	Mung .....	"
24	Evergreen rye grass .....	"	67	Bengal gram .....	"
25	Per. rye grass .....	"	68	Sesame .....	"
26	Paceys .....	"	69	Teal .....	"
27	Italian .....	"	70	Caraway .....	"
28	Sutton's giant rye grass .....	"	71	Teosinte reana luxurians .....	"
29	Meadow catstail .....	"	72	Lupins, white, blue, and yellow	"
30	Hard fescue .....	"	73	Pearl millet .....	"
31	Sheep fescue .....	"	74	Black or grey millet .....	Sept. 3
32	Various-leaved fescue .....	"	75	Yellow millet .....	"
33	Meadow fescue .....	"	76	Doura .....	"
34	Common saintfoin .....	July 10	77	Maize .....	"
35	Tares .....	"	78	Holcus .....	"
36	Allringham carrot .....	"	79	Amber cane .....	"
37	Gurnsey parsnip .....	"	80	Standard cane .....	"
38	Early sheepfold cabbage .....	"	81	Teosinte .....	"
39	Early Battersea cabbage .....	"	82	Buckwheat .....	"
40	Purple kohl rabi .....	"	83	Jute .....	"
41	Green-top kohl rabi .....	"	84	Summer hemp .....	"
42	Hartley's swede .....	"	85	Indigo .....	"
43	Berkshire prize yellow globe mangold .....	"	86	Tagoseste .....	"
			87	Sunflower .....	"

## Experimental Plots.—No. 9A, 1886.

No. of Plot.	Name.	Date of Sowing.	No. of Plot.	Name.	Date of Sowing.
1	Red or broad clover .....	July 19	31	Wood grass .....	July 19
2	Red clover or cow grass .....	"	32	Brome grass .....	"
3	Maltese clover .....	"	33	Crested dogstail .....	"
4	Hybrid clover (giant) .....	"	34	Rough cocksfoot .....	"
5	White or Dutch .....	"	35	Hard fescue .....	"
6	Per. white .....	"	36	Meadow fescue .....	"
7	Alsike .....	"	37	Sheep fescue .....	"
8	Yellow suckling .....	"	38	Tall bearded fescue .....	"
9	Yellow trefoil .....	"	39	Various-leaved fescue .....	"
10	Birdsfoot trefoil .....	"	40	Floating sweet grass .....	"
11	Greater birdsfoot trefoil .....	"	41	Yorkshire fog .....	"
12	Lucern .....	"	42	Annual rye grass .....	"
13	Bokhara clover .....	"	43	Evergreen rye grass .....	"
14	Rib grass .....	"	44	Perennial rye grass .....	"
15	Sheep parsley .....	"	45	Pacey's rye grass .....	"
16	Broom .....	"	46	Italian .....	"
17	Burnet .....	"	47	Sutton's giant .....	"
18	Chicory .....	"	48	Reed canary grass .....	"
19	Furze .....	"	49	Meadow catstail .....	"
20	Fenugreek .....	"	50	Smooth-stalked meadow .....	"
21	Crimson clover .....	"	51	Rough-stalked meadow .....	"
22	Late red trifolium .....	"	52	Annual meadow .....	"
23	Extra late trifolium .....	"	53	Wood meadow .....	"
24	Native grass (J. Shakes) .....	"	54	Water meadow .....	"
25	Late white trifolium .....	"	55	Bay or evergreen .....	"
26	Yarrow .....	"	56	Spurry .....	"
27	Creeping or marsh grass .....	"	57	Saintfoin .....	"
28	Sweet-scented vernal .....	"	58	Mungaroo grass .....	"
29	Meadow foxtail .....	"	59	Nos. 1 & 2 grass seed (J. Bonnier)	"
30	Tall oat grass .....	"	60	Salt bush .....	"

## SECTION 4.—SERIES B.—VARIETIES OF WHEAT, ETC.

Forty-six varieties of wheat were sown at the same time, May 11th, on adjoining plots; the first to ripen being Daud Khani, No. 1, a red chaff beardless wheat, which should be worth cultivating; next in early maturity were Mundi wheat, Daud Khani, No. 3, and Chili Rodi, No. 2.

The Indian, Soft White, and Baart wheats come next in early maturity. The opinion of many practical farmers, who inspected the Baart wheat during the season, supports the previously good report I had given of this wheat. I have no doubt that next year a large breadth of it will be sown.

The Early Baart wheat gave the best return per acre this season, namely, nineteen and a half bushels, without manure; this was after lucern. The Soft White, under more favorable conditions, would, I believe, prove to be a valuable wheat; five acres yielded fifteen bushels per acre under ordinary conditions, without manure. These are the two wheats that should be carefully grown on the farm, so as to keep up a supply of pure and clean seed for distribution.

No. of Plot.	Name.	Date of Sowing.	No. of Plot.	Name.	Date of Sowing.
<i>Oats.</i>			<i>Barley.</i>		
1	Black Tartarian .....	May 10	1	Golden Melon .....	May 10
2	Winter or Tawney .....	"	2	Empress .....	"
3	Racehorse White .....	"	3	Peerless White .....	"
4	White Tartarian .....	"	4	Chevalier .....	"
5	Victorian White .....	"	5	Prize Barley (Carter's) .....	"
6	Swiss Oats .....	"	6	Winter .....	"
7	Naked Oats .....	"	7	H. P. Chevalier .....	"
8	Waterloo Oats .....	"	8	Cape Barley .....	"
9	White Foreign .....	"	9	Gall's Prolific .....	"
10	Triumph .....	"	10	Giant .....	"
11	Black Devon .....	"			
12	Cluster Oats .....	"		<i>Wheat.</i>	
13	New Zealand Oats .....	"	1	Kessingland Red .....	May 11

## Varieties of Wheat, &amp;c.—continued.

No. of Plot.	Name.	Date of Sowing.	No. of Plot.	Name.	Date of Sowing.
<i>Wheat—continued.</i>			<i>Wheat—continued.</i>		
2	Red Lammas .....	May 11	25	Wheat, 25 years old.....	May 11
3	Browick Red .....	"	26	Steinwedel Wheat .....	"
4	Triumph White .....	"	27	White Bearded.....	"
5	Square Head Red .....	"	28	Black Bearded .....	"
6	Rivetts .....	"	29	Red Beardless .....	"
7	Champion .....	"	30	Late Red .....	"
8	Velvet Chaff.....	"	31	New Zealand Purple Straw....	"
9	Hunter's White .....	"	32	Soft Red .....	"
10	Golden Drop.....	"	33	Hard Red .....	"
11	Red Chaff .....	"	34	Mundi .....	"
12	Chidham .....	"	35	Daud Khani, No. 1 .....	"
13	H.P. Wheat .....	"	36	Chilli Rodi .....	"
14	Mammoth .....	"	37	Daud Kani, No. 3. ....	"
15	Royal Prize Red .....	"	38	Revitt's White .....	"
16	Prize Talavera .....	"	39	Normandy .....	"
17	Fill Bag .....	"	40	Scotch Wonder.....	"
18	Talavera .....	"	41	Californian .....	"
19	Purple Straw.....	"	42	Persian .....	"
20	Indian .....	"	43	Oregon .....	"
21	African Baart .....	"	44	White Karachi.....	"
22	Soft White .....	"	45	Calcutta, No. 1.....	"
23	Ward's Prolific.....	"	46	Bombay, No. 1.....	"
24	Purple Straw (Marchant) ....	"			

## SECTION 5.—FARM CROPS.

In Paddock No. 1 the African bearded wheat was drilled on two half-acre plots, May 5th, one half acre being drilled in rows sixteen inches apart, with eleven pounds of seed; the other half acre in rows eight inches apart, with twenty-two pounds seed. These two plots were harvested by the stripper, December 1st, yielding—

	Bush.	lbs.
No. 1.—Eleven pounds seed .....	7	10
No. 2.—Twenty-two pounds seed .....	8	17

The advantage per acre is on the side of the heavier seeding by some two bushels; but in a more favorable season it is probable that this result might be reversed.

In Paddock No. 5, four half-acre plots were drilled with Purple Straw wheat, at intervals as stated in the following table, to ascertain what would be the actual result from difference in time of sowing:—

Paddock No. 5.—Half acre experimental plots, each drilled with Purple Straw wheat, 45lbs. per acre—

	Bush.	lbs.
Plot No. 1.—Sown May 31st .....	yield 6	33
Plot No. 2.— " June 21st .....	" 7	10
Plot No. 3.— " July 12th .....	" 5	3
Plot No. 4.— " August 10th .....	" 3	26

*The Roseworthy Improved Early Baart Wheat* was sown by the drill on April 28th, in rows eight inches apart, 30lbs. of seed per acre. The weather was very dry during May and June, yet the young plant looked green and healthy; when early in July, being favored with about three-quarters of an inch of rain, it grew vigorously, and before harvest was much admired by many farmers who visited the farm, most of them giving an order for one bushel of the wheat for seed. The crop was harvested by the stripper, November 22nd, yielding  $19\frac{1}{2}$  bushels per acre.

*Soft White Wheat* was drilled May 11th, on one acre two roods, in No. 5, in rows eight inches apart, 30lbs. of seed per acre; harvested November 30th, yielding 15 bushels per acre.

*Indian Wheat.*—Five acres of this wheat were drilled May 7th, in eight inch rows, 45lbs. of seed being used per acre; it was harvested December 1st, yielding  $11\frac{1}{2}$  bushels per acre. The straw was very short this season.

*Ward's Prolific.*—One acre two roods were drilled, adjoining the other wheats in No. 5, on May 11th, in rows eight inches apart, 30lbs. of seed per acre; harvested December 10th, yielding 13 bushels per acre, but the sample not so good as any of the other wheats, being very small grain, much shrivelled.

The result may be stated thus—

Early Baart .....	$19\frac{1}{2}$ bush. per acre.
Soft White .....	15 "
Indian wheat .....	$11\frac{1}{2}$ "

Though

Though the straw of the Soft White and Indian is at present short and much weaker than the Early Baart, which would, if cut early, give a heavy crop for hay.

*Steinwedel's Wheat*.—A sample of this was sent to me by Mr. Steinwedel, which in due course was sown, and appears to be a very good wheat indeed, a variety of purple straw. The grain this season fell out before harvesting more than it should have done. The small quantity sown will give us sufficient seed for a fair trial next season.

*Farm Crops.*

Name.	Paddock.	Date of Sowing.	Acreage.			Remarks.
			A.	R.	P.	
Wheat—						
Purple Straw.....	5	May 12 to 18	75	0	0	Harvested December 14th to 31st; yield, 832 bushels.
N. Zealand Purple Straw	5	May 26	3	0	0	Harvested December 13th; yield, 38 bushels—12 bushels 40lbs. per acre.
African .....	5	May 10	7	2	0	Harvested December 10th; yield, 112 bushels 30lbs.—15 bushels per acre.
Soft White .....	5	May 11	1	2	31	Harvested November 30th; 15 bushels per acre.
Ward's Prolific.....	5	May 11	1	2	31	Harvested December 10th; 13 bushels per acre.
Indian .....	5	May 7	5	0	7	Harvested December 1st; yield, 58 bushels.—11½ bushels per acre.
Roseworthy Early Baart	12	April 28	3	2	0	Harvested November 22nd; yield, 67 bushels—19½ bushels per acre.
African .....	1	May 5	1	0	0	Harvested December 1st; yield, 15 bushels 27lbs.
Barley—						
Chevalier .....	3	April 29	2	3	14	Harvested November 24th; 22 bushels per acre.
Chevalier .....	3	April 29	9	0	0	Harvested November 29th; 13 bushels per acre.
Peas—Dun .....	5	May 28	3	0	0	
“ Princess Royal ....	12	May 20	0	1	0	Gathered green for College; 4 bushels saved for seed.
Mustard .....	1	May 5	1	0	0	Season too dry; only a poor crop of seed.
Potatoes .....	12	July 31	0	2	0	Fair considering the season.
Carrots.....	12	April 26	0	2	0	Did very well, being on sandy soil, manured.
Parsnips .....	12	April 26	0	2	0	Fair crop.
Cabbage .....	12	April 26	0	2	0	Very good.
Sorghum .....	1	—	—	—	—	
“ .....	5	Sept. 15	1	2	0	Sorghum has not been so successful this year; only a poor crop compared with previous years.
“ .....	11	Sept. 15	1	0	0	
“ .....	6	Sept. 24	10	6	0	
Mongold long red .....	1	August 3	3	0	0	Best crop of mangolds this year on the farm.
Yellow Globe .....	1	August 11	3	0	0	Poor crop; weather too dry.
Long red.....	8	August 9	3	0	0	Ditto.
Thousand-headed Kale ....	1	April 26	1	0	0	First crop, fair; second, very poor.
Cattle Cabbage .....	1	May 5	1	0	0	
Vetches .....	1	April 24	2	0	0	

SECTION VI.—EXPERIMENTAL VINEYARD.

The following report of the work so far accomplished in this direction, by the kind assistance Mr. Thomas Hardy, has been written for me by Mr. Robin, a former student at the College, who is the author of the next section also, the “Garden Plots” :—

The Experimental Vineyard was commenced in August, 1885, but owing to the loss through the prolonged drought succeeding planting, a fresh start and re-arrangement has been made, the number of vines having been increased to 264, all of which have been supplied by Mr. Thomas Hardy. The vines are planted at a distance of ten feet by eight feet, which allows of the free use of the cultivator.

The rows consist of twenty each of the following wine grapes :—Shiraz, Mataro, Reisling, Verdat, Pride of Australia, Frontignac, and Carbonet; the remainder of the rows being filled up with table and raisin grapes, chiefly Muscat Alexandria, Gordo Blanco, Doradilla, and Goulais.

The soil is of a very dry calcarous nature, with marly and limestone subsoil, but the vines are making strong and healthy growth, and appear to have fairly established themselves. It is hoped that the planting of an experimental vineyard in such an unfavorable locality may be the means of inducing many farmers to pay some attention to this important industry; and the adaptability of each kind being proved, will furnish a useful guide to those who intend planting in the drier portions of the quality.

SECTION



## SECTION 7.—STUDENTS' GARDEN PLOTS.

A portion of the College grounds is measured off into forty-two plots, one or more being allotted to each of the students, on condition that, if not kept in order, they are at any time liable to forfeiture. Their general neatness shows that this condition has been, without exception, thoroughly complied with. Besides affording healthy recreation, the plots have been put to a variety of uses, by which they illustrate the special tastes of their respective owners. Some have been used for ornamental purposes, and rendered gay with choice flowers throughout the year; others for the growth of seeds, whilst others again have been devoted to experimental research; thus supplementing in a practical manner the instruction gained in the College.

Perhaps the most interesting experiments are those relating to the cultivation of plants often recommended, but at present little known, although of agricultural importance in many parts of the world, and amongst these the following have been grown very successfully under ordinary farming conditions:—Rosemary, Lavender, Rue, Sage, Balm, Carraway, Gold of Pleasure (oil producing), Sunflower, Safflower, Opium Poppy, Tobacco, Caper, Teazle, Earthnut, Bengal and other Indian Grams, Dolickos Bean, Buckwheat, Dhourra, Yellow and Grey Cholum, Lupin, Maltese Clover, Kidney Vetch, Boussingaultia or Scammel's Yam, Goats Rue, and Tagosaste.

The three last mentioned in particular deserve the notice of farmers, being extremely hardy, drought-resisting fodder plants. The capabilities of an Australian Perennial grass (*Ehrarta Stipoides*), of low-spreading habit and superior quality, are being tested by one of the students, the results so far being most encouraging.

## PART 2.

## SECTION 8.—SUMMARY.

With the fifth annual report of the Roseworthy farm, I have the honor to present a summary of the results obtained during the past five years, and some information put in a clear and simple form for the use of practical farmers.

*Wheat.*—Twenty-seven varieties were experimented with the first year at the farm, the second year thirty-five varieties, of which Indian wheat and African bearded were reported as good wheats. During the third year (1884) twenty-six varieties were sown. The Indian wheat, No. 35, gave good results, 20lbs being sown on a rood of poor unmanured land June 23rd, arrived at maturity before purple straw sown May 15th, and harvested by the stripper, yielded 6 bushels 32lbs., say 24 bushels dressed wheat per acre. I also reported favorably of No. 33, African bearded wheat, which yielded at the rate of 39 bushels per acre (1884).

The following year thirty-nine varieties of wheat were sown, the Early Baart, Soft White, Indian, Ward's Prolific, Purple Straw, and Scotch Wonder being reported the best for that season. Twenty-one pounds of Early Baart were drilled on one acre, in rows 15in. apart, on May 19th; the crop was harvested November 20th, by the stripper, and yielded 16 bushels 30lbs., being a good sample, weighing 67lbs. per bushel.

During the past year (1886) fifty-four varieties of wheat were sown, the Early Baart, Soft White, and Indian wheats being grown on the farm under ordinary conditions can be strongly recommended to farmers as worthy of a fair trial.

One hundred and eighty-one experiments have been carried out with varieties of wheat, besides half acre, acre, and larger plots on the farm. The results obtained from these experiments justify the conclusion, that by attention to the kind and quality of the seed used, careful preparation of the land and seed bed, and proper cultivation of the young plant, much larger returns per acre may be obtained.

## SECTION 9.—PLANTS.

From the 520 experiments that have been carried out with plants under the different seasons, we may conclude that in many districts such plants as mangolds, 1,000-headed kale, cattle cabbage, yellow millet, maize, sorghum, rape, mustard, Bokhara clover, lucern, peas, &c., can be successfully and properly grown, because providing, as some of the above-mentioned plants do, an abundant supply of food for stock, the land may thereby be much improved for wheat-growing.

It is certain that farmers cannot continue to grow wheat profitably without paying some attention to the condition of the land, the requisite food supply for the wheat plant must, in some way or other, be available; the cheapest way undoubtedly being the growth of cruciferous and leguminous crops, fed off by sheep, combined with good cultivation of the land, as a preparation for the wheat crop.

## SECTION

## SECTION 10.—MANURES.

Some 157 experiments have been carefully tried with regard to the effect of manurial substances. Taking the results obtained as a guide, combined with information regarding the composition of soil obtained from various districts, generally speaking the great deficiency appears to be phosphates and potash. The result of the application of phosphatic manures has always been an increased yield; and it is only reasonable to say that a cheap supply of soluble mineral phosphates would be of immense advantage to farmers, and also to the colony.

Farmyard manure, seaweed, ashes, and all refuse should, where possible, be carefully preserved and applied to land intended for root or fodder crops, these crops being horse-hoed, the land would be brought into good condition for wheat growing.

The value of manurial substances when properly preserved and applied is, I believe, becoming more generally recognised. The effects of manure on various crops have been clearly shown to the students and to visitors by the crops on the experimental plots this season, notably the effect from superphosphate, guano, and farmyard manure.

The important question to be considered is the cheap supply of dissolved mineral phosphate on an extensive scale, because I am confident that farmers would use it in large quantities could it be procured for say £3 to £4 per ton.

## SECTION 11.—STOCK.—PIGS.

The pig account from commencement to 31st December, 1886, is given below. The amount charged for food and attendance it should be noticed is an estimate only, as food has not been purchased for pigs.

## PIG ACCOUNT.

1882.	Dr.	£	s.	d.
To Expenditure .....		22	1	0
Three months' attendance and food for three pigs .....		5	0	0
1883.				
To attendance and food .....		25	0	0
1884.				
To Expenditure .....		10	2	10
Attendance and food .....		100	0	0
1885.				
To Expenditure .....		1	18	7
Attendance and food .....		100	0	0
1886.				
To Attendance and food .....		25	0	0
Balance .....		7	1	2½
		<u>£296</u>	<u>3</u>	<u>7½</u>
	Cr.			
1884.		£	s.	d.
By Pigs sold .....		85	0	0
1885.				
By Pigs sold .....		87	2	9½
1886.				
By Pigs sold .....		60	0	10
Valuation of thirty-four pigs .....		64	0	0
		<u>£296</u>	<u>3</u>	<u>7</u>

## SHEEP.

## SHEEP ACCOUNT.

August, 1883, to December, 1884.	Dr.	£	s.	d.
To Expenditure .....		150	4	1
1885.				
To Expenditure .....		9	0	10
1886.				
To Expenditure .....		2	18	0
Balance, being return for food and attendance .....		177	3	3
		<u>£339</u>	<u>6</u>	<u>2</u>
	Cr.			
August, 1883, to December 31st, 1884.		£	s.	d.
By Sale of sheep and wool .....		92	19	4
1885.				
By Sale of sheep and wool .....		72	18	2
1886.				
By Sale of sheep and wool .....		90	13	8
Valuation of 140 ewes, at 6s.; 75 lambs, at 5s.; four rams, at £3. ....		82	15	0
		<u>£339</u>	<u>6</u>	<u>2</u>

## PART 3.

## SECTION 12.—THE AGRICULTURAL COLLEGE.

The second year of College work commenced on Wednesday, February 3, 1886, when twenty-eight students assembled with the view of thoroughly mastering the difficulties of scientific and practical farming.

Twenty-eight students with only one lecture-room and one sitting-room, or study, necessitated the senior students using the dining-room for work, &c., which was rather inconvenient both to students and teachers.

During the fourth session twenty-six students were taught in three classes. The instruction during the two years received by the fourth class, comprised—Agriculture, Agricultural Chemistry, Book-keeping, Surveying, Mensuration, Levelling, Botany, Chemistry, Geology, Farm Work, &c. The session finished with the following remarks by Professor Custance to the students:—

To-day brings to a close two years work by the fourth class. It is my pleasing duty to congratulate you upon the success of your work, and to congratulate the friends of agricultural education upon the success of the College in completing the course laid down when we started work two years ago. At the beginning of the present year we had twenty-eight students, twenty-six are now in residence, and altogether thirty-seven students have attended the College during the past two years. We have been favored during the session with lectures from the Chief Inspector of Stock, the Government Veterinary Surgeon, and Mr. Cole (of Messrs. James Martin & Co., Gawler), and our thanks are due to those gentlemen for their kind assistance.

Our thanks are also due to Mr. J. H. Angas, for an enjoyable and interesting visit to Hill River. Messrs. James Martin & Co. were good enough to invite the students to inspect their works at Gawler, and offered a prize of £5 for the best essay describing the agricultural implement works. Mr. Eastwood obtained the prize, Mr. Robin obtaining a second or special prize.

Speaking generally of the fourth class, I think it only right to say that a better class of steady hard working students I do not wish for. It is gratifying to review the two years you have been at the College, and find nothing but pleasure in contemplating the time we have worked together, not finding in the retrospect anything to mar in the slightest degree our future friendship and mutual confidence. I trust, gentlemen of the fourth class, that you will ever remember I have confidence you will do your best to prove that your education here has been a reality; that you will do your best to prove that scientific agriculture is at the same time the faithful guide and devoted sister of practical agriculture; that you will endeavor to dispel as far as possible the remaining clouds of distrust as to the value of knowledge in connection with the business of farming.

Speaking on behalf of the College teaching staff, we wish each one of you a prosperous and successful life, hoping that experience may mature the knowledge you have gained, and enable you to do good work, which will be appreciated and valued in the years to come throughout the length and breadth of South Australia.

## SECTION 13.—CLASS LIST—CHRISTMAS, 1886.

## RESULTS OF SESSIONAL EXAMINATIONS.

## CLASS 4.—Total possible Marks, 1,300.

TRELOAR.....	1,172
WILSON .....	1,126
EASTWOOD.....	1,117
HILL .....	1,068
ROBIN .....	1,024
BROCK .....	993
STUCKEY.....	990
YOUNG .....	983
COTTON .....	877
WRIGHT .....	819

## CLASS 2.—Total possible Marks, 1,300.

TILLY .....	1,179
BEE .....	1,139
CLARK .....	1,085
GOODHART.....	1,043
WATSON .....	1,002
MORRIS .....	910
HILL .....	859
GREEN .....	854
SOLOMON .....	801
HINCKLEY .....	678

## CLASS 1.

GLEESON.....	1,111
McKIRDY.....	1,070
GRIERSON .....	959
TURNER .....	800
FLINT .....	784
BENHAM .....	688

AGRICULTURE.

## AGRICULTURE.

## Class 4—200 Marks.

TRELOAR .....	165	BROCK .....	145
WILSON .....	162	COTTON .....	140
ROBIN .....	160	HILL .....	135
EASTWOOD .....	155	STUCKEY .....	130
YOUNG .....	146	WRIGHT .....	120

## Class 2—300 Marks.

CLARK .....	260	HINCKLEY .....	220
TILLY .....	258	GOODHART .....	214
WATSON .....	255	HILL .....	210
MORRIS .....	234	GREEN .....	208
BEE .....	231	SOLOMON .....	201

## Class 1—300 Marks.

McKirdy .....	264	TURNER .....	220
GLEESON .....	253	FLINT .....	201
GRIERSON .....	241	BENHAM .....	195

## PRACTICAL AGRICULTURE.

## Class 2—100 Marks.

BEE .....	100	CLARK .....	45
HINCKLEY .....	65	WATSON .....	44
TILLY .....	65	HILL .....	40
GOODHART .....	60	SOLOMON .....	40
MORRIS .....	50	GREEN .....	20

## Class 1—100 Marks.

GRIERSON .....	80	TURNER .....	45
McKIRDY .....	60	FLINT .....	40
BENHAM .....	50	GLEESON .....	15

## CHEMISTRY.

## Class 4—200 Marks.

EASTWOOD .....	156	YOUNG .....	104
TRELOAR .....	154	BROCK .....	97
ROBIN .....	151	HILL, RICHARD .....	83
WILSON .....	151	STUCKEY .....	66
COTTON .....	139	WRIGHT .....	58

## Class 2—200 Marks.

TILLY .....	193	GREEN .....	129
GOODHART .....	174	MORRIS .....	127
BEE .....	153	WATSON .....	120
CLARK .....	151	SOLOMON .....	100
HILL, ROLAND .....	147	HINCKLEY .....	70

## Class 1—200 Marks.

GLEESON .....	200	TURNER .....	122
McKIRDY .....	173	FLINT .....	120
GRIERSON .....	155	BENHAM .....	105

## MENSURATION AND SURVEYING.

## Class 2—100 Marks.

BEE .....	93	WATSON .....	61
TILLY .....	83	HILL, ROLAND .....	58
GOODHART .....	82	GREEN .....	54
SOLOMON .....	72	MORRIS .....	25
CLARK .....	67	HINCKLEY .....	3

## MENSURATION.

## Class 1—100 Marks.

GLEESON .....	100	FLINT .....	61
GRIERSON .....	95	TURNER .....	53
McKIRDY .....	91	BENHAM .....	30

## NATURAL PHILOSOPHY.

## Class 2—100 Marks.

TILLY .....	100	WATSON .....	71
GOODHART .....	96	MORRIS .....	63
BEE .....	95	HILL, ROLAND .....	41
CLARK .....	90	SOLOMON .....	37
GREEN .....	81	HINCKLEY .....	30

NATURAL PHILOSOPHY—*continued.*

## Class 1—100 Marks.

GLEESON .....	94	GRIERSON .....	69
TURNER .....	80	FLINT .....	66
McKIRDY .....	75	BENHAM .....	53

## MECHANICS.

## Class 2—100 Marks.

{ BEE .....	100	WATSON .....	81
{ GOODHART .....	100	HILL, ROLAND .....	70
{ TILLY .....	100	SOLOMON .....	68
CLARK .....	91	MORRIS .....	61
GREEN .....	82	HINCKLEY .....	32

## Class 1—100 Marks.

GLEESON .....	100	GRIERSON .....	56
McKIRDY .....	66	TURNER .....	51
FLINT .....	64	BENHAM .....	36

## BOOK-KEEPING.

## Class 2—150 Marks.

BEE .....	150	GOODHART .....	110
CLARK .....	150	SOLOMON .....	97
MORRIS .....	150	HINCKLEY .....	95
TILLY .....	150	HILL .....	90
WATSON .....	150	GREEN .....	85

## Class 1—150 Marks.

McKIRDY .....	140	GRIERSON .....	116
GLEESON .....	140	TURNER .....	100
FLINT .....	120	BENHAM .....	100

## MINERALOGY.

## Class 4—100 Marks.

ROBIN .....	100	WRIGHT .....	72
TRELOAR .....	92	BROCK .....	70
{ EASTWOOD .....	88	YOUNG .....	69
{ WILSON .....	88	HILL, RICHARD .....	66
COTTON .....	76	STUCKEY .....	58

## GEOLOGY.

## Class 4—100 Marks.

ROBIN .....	100	BROCK .....	78
WILSON .....	96	HILL, RICHARD .....	76
TRELOAR .....	94	WRIGHT .....	55
EASTWOOD .....	84	YOUNG .....	54
COTTON .....	82	STUCKEY .....	51

## Class 2—100 Marks.

TILLY .....	100	WATSON .....	80
CLARK .....	100	GOODHART .....	78
BEE .....	92	HILL, ROLAND .....	76
{ GREEN .....	81	SOLOMON .....	74
{ MORRIS .....	81	HINCKLEY .....	53

## Class 1—100 Marks.

GLEESON .....	89	{ BENHAM .....	38
McKIRDY .....	74	{ TURNER .....	38
GRIERSON .....	44	FLINT .....	28

## BOTANY.

## Class 4—150 Marks.

ROBIN .....	150	BROCK .....	122
TRELOAR .....	143	STUCKEY .....	122
EASTWOOD .....	143	YOUNG .....	120
WILSON .....	140	COTTON .....	119
HILL .....	131	WRIGHT .....	110

## Class 2—150 Marks.

WATSON .....	140	BEE .....	125
CLARK .....	131	MORRIS .....	119
TILLY .....	130	GREEN .....	114
GOODHART .....	129	SOLOMON .....	112
HILL .....	127	HINCKLEY .....	110

BOTANY

## BOTANY—(continued).

## Class 1—150 Marks.

McKIRDY.....	127	TURNER .....	91
GLEESON .....	120	FLINT .....	84
GRIERSON.....	109	BENHAM .....	81

## DIPLOMA EXAMINATION.

## AGRICULTURE.

## (200 Marks.)

TRELOAR .....	165	BROCK .....	145
WILSON .....	162	COTTON.....	140
ROBIN .....	160	HILL.....	135
EASTWOOD .....	155	STUCKEY .....	130
YOUNG .....	146	WRIGHT .....	120

## PLOUGHING.

## (100 Marks.)

EASTWOOD .....	100	STUCKEY .....	70
TRELOAR .....	95	COTTON.....	55
HILL .....	90	YOUNG .....	55
WILSON .....	90	WRIGHT .....	55
BROCK .....	80	ROBIN .....	55

## PRACTICAL AGRICULTURE.

## (300 Marks.)

EASTWOOD .....	300	YOUNG .....	230
TRELOAR .....	300	BROCK .....	200
WILSON .....	300	WRIGHT .....	200
HILL.....	300	ROBIN .....	150
STUCKEY .....	235	COTTON.....	150

## AGRICULTURAL CHEMISTRY.

## (300 Marks.)

TRELOAR .....	264	HILL .....	237
EASTWOOD .....	260	YOUNG .....	232
WILSON .....	260	STUCKEY .....	210
ROBIN .....	259	WRIGHT .....	205
BROCK .....	240	COTTON.....	202

## BOOK-KEEPING.

## (200 Marks.)

ROBIN .....	200	YOUNG .....	158
STUCKEY .....	190	COTTON.....	154
BROCK .....	181	WILSON .....	145
TRELOAR .....	168	HILL.....	142
EASTWOOD .....	167	WRIGHT .....	105

## EXTRA SUBJECTS.

## SURVEYING, GEOLOGY, BOTANY.

## (200 Marks.)

	Surveying.	Geology.	Botany.
BROCK .....	—	147	—
COTTON .....	—	176	—
EASTWOOD .....	135	—	—
HILL .....	—	—	164
ROBIN .....	—	—	200
STUCKEY .....	155	—	—
TRELOAR .....	—	—	180
WILSON .....	—	169	—
WRIGHT..	—	—	134
YOUNG .....	—	—	162

## RESULTS

## RESULTS OF FINAL EXAMINATIONS.—CHRISTMAS, 1886.

TOTAL POSSIBLE MARKS, 1,300.

WILLIAM GEORGE TRELOAR (Watervale) .....	1,172
THOMAS ALLAN WILSON (Merriton) .....	1,126
MILTON EASTWOOD (Curramulka) .....	1,117
RICHARD HILL (Warooka, Yorke's Peninsula) .....	1,068
ALLISON BEDFORD ROBIN (Adelaide) .....	1,024
HENRY BROCK (Wallaroo) .....	993
EDWARD ERNEST STUCKEY (Millicent) .....	990
ROBERT J. YOUNG (Snowtown) .....	983
EDWARD WITHERAGE COTTON (Adelaide) .....	877
A. E. AMAND-WRIGHT (Glenelg) .....	819

The above-mentioned Students having passed a satisfactory final examination are recommended to the Hon. the Commissioner of Crown Lands for the College Diploma.

The following Students are recommended to the Hon. the Commissioner for the following awards:—

WILLIAM GEORGE TRELOAR, Angas Gold Medal.  
 THOMAS ALLAN WILSON, Angas Silver Medal.  
 MILTON EASTWOOD, the College Prize.  
 RICHARD HILL, Prize for Practical Farming.  
 ALLISON BEDFORD ROBIN, Prize for Botany, and a Prize for Practical Gardening.  
 HENRY BROCK, Prize for Farm Diary and Book-keeping.

JOHN D. CUSTANCE, Principal.

## PART 4.

## SECTION 14.—INFORMATION FOR FARMERS.

*Root Crops and Fodder Crops.*—The advantage of growing these crops is not confined to the produce obtained, but is one of the best means of cleaning and preparing the land for wheat or barley; mangolds may be grown, say on one acre, well manured with good farmyard manure, which in a fair season would produce from twenty to twenty-five tons of very useful food, when pulped and mixed with straw or hay chaff. From the experience obtained at Roseworthy, the best manner of cultivating the crop appears to be—

*For Sheep,* to feed on the ground. When sowing wheat to leave a few acres of land on one side of the paddock unsown; at the beginning of August to drill this piece of land with mangold seed, at the rate of about two pounds of seed per acre.

After the wheat is harvested the mangolds should be hurdled off, and the sheep, when in the stubble, allowed to feed a strip of the mangolds, this they will do, especially if the long red mangold be grown. The hurdles may be shifted from time to time, thus giving the sheep a fresh piece of mangolds to feed on.

*For Cows, Horses, &c.*—A piece of land near the homestead should be fallowed, and by repeated rolling and harrowing, if necessary, brought to a good tilth; the deeper this land has been stirred without bringing the subsoil to the surface the better; then a heavy dressing of farm-yard manure should be given, the manure being spread and ploughed in with a single plough as quickly as possible. This will be accomplished say by the beginning of July. The weather being favorable about the end of July or beginning of August, the land can be harrowed, light rolled, and drilled with two pounds mangold seed per acre. As a good hand drill may be purchased at Gawler for one guinea, there need be no difficulty about drilling one acre of mangold seed. The rows may be thirty inches apart; the young plants should be singled as early as possible, afterwards thinned to about a foot or fifteen inches apart in the row. The horsehoe must be used to keep the land clean and well pulverised. Should it be required to keep some through the summer, a furrow may be ploughed nearly covering the mangolds from each side of the row.

*Thousand-headed Kale* may be cultivated with the object of growing large heads for cutting, or for feeding off by sheep, like rape, mustard, &c. For large heads the ground must be deeply stirred, the surface well pulverised, farmyard manure applied, and weather being favorable, the seed drilled during April, in rows about 45 in. apart. Half a pound of seed is enough for one acre. The young plants may be thinned when about 6 in. high, and afterwards to about three feet apart in the row.

*Large Drumhead Cattle Cabbage* on good soil will produce a heavy crop of useful food. The cultivation is the same as that described for kale; deep cultivation and plenty of farmyard manure are required for a good crop. About three hundredweight of common salt per acre should be applied for this crop, also for mangolds.

Cabbage may be preserved if desired by the process of ensilage; it is pulped and firmly pressed down in a pit, which may be hermetically sealed by clay. On good soils fifty tons per acre may be grown.

*Swede*

*Swede Turnip*.—For this crop the land, after the usual preparation and manuring, should be reduced to a perfect tilth for the reception of the seed, which should be drilled during April, in rows about thirty inches apart; one pound of seed per acre will be ample. The plants must be singled as soon as possible, and thinned to say eighteen inches apart in the row, on good land. Constant and deep stirring with the horschoe is advantageous to the crop.

*Carrots*, as a change of food for horses and cows, may be grown best on sandy land. The seed may be sown during April, in rows about sixteen inches apart; three pounds of seed per acre being required it is an expensive crop to harvest, but very useful for cows when butter-making is an object.

*Kohl-rabi* may be cultivated in the same way as the Swedish turnip.

*The Vetch*, or *Tare*, for early feed is a valuable crop, suitable for horses and cows. The seed may be drilled or broadcasted at the rate of three bushels per acre, early in April; half a bushel of oats or wheat may be sown with the vetches. It should be cut for forage when in blossom.

*Sainfoin* is an excellent preparatory crop for wheat, and a useful forage crop in situations where lucern will not flourish, from the calcareous nature of the subsoil. Four bushels of the rough seed are required, or thirty pounds of clean seed per acre. It should be mown the first year; on good land it may remain for three or four years.

*Rape*.—For sheepfeed on soils having plenty of organic matter, when well manured produces heavy crops of succulent food, much relished by sheep. It may be sown during April, at the rate of six to ten pounds per acre. Superphosphate is the best artificial manure for rape.

*White Mustard* is a quick-growing crop, suitable for sheepfeed, or for ploughing in as green manure. From fifteen to twenty pounds of seed per acre may be sown broadcast during April; if the weather be favorable it will be ready for sheep in about ten to twelve weeks from sowing.

*Maize*, when grown with the advantage of irrigation, is a very successful fodder crop, well adapted for the silo. A fair crop may be grown in a good season without irrigation.

*Sorghum saccharatum*, or *Chinese Sugar Cane*, is one of the hardiest summer fodder crops, as it may be cut several times during the season. The ground should be deeply stirred and well manured some time previous to sowing, which takes place at Roseworthy during September; frost will kill the young plant. Sorghum is valuable for chaffing with straw.

*Planter's Friend*, or *Sorghum Kaffrarium*, was originally obtained from the south-eastern coast of Africa; it is a valuable fodder plant.

*Early Amber Cane* is a variety of sorghum, first produced in the State of Indiana.

*Yellow Millet* has been successfully grown for grain and fodder. It is suitable for irrigated land, yielding heavy crops; if unirrigated, will produce three or four cuttings of nutritious green fodder.

*Reana luxurians* on good soil, with irrigation, will produce more green fodder per acre than any other similar plant. Probably this would be worth growing for ensilage, as the quality of the fodder is inferior to yellow millet and sorghum.

## SECTION 15.

The following table, compiled for the students at Roseworthy, may be useful as a reference to the practice adopted on the Roseworth farm:—

Name.	Time to Sow.	Distance between Rows.	Distance between Plants.	Quantity of Seed to Sow per Acre.
		Inches.	Inches.	
Kale .....	April	45	30	$\frac{1}{2}$ lb.
Swedes .....	"	30	18	1 lb.
Kohlrabi .....	"	30	18	1 lb.
Carrots .....	"	16	9	3 lbs.
Cattle cabbage .....	"	45	24 to 30	$\frac{1}{2}$ lb.
Mustard .....	"	16	12	4 lbs. for seed.
Mustard (white) .....	"	—	—	15 lbs. for feed.
Rape .....	"	16	—	10 lbs.
Kale for sheep .....	"	15	—	2 lbs.
Vetches .....	"	8	—	3 bushels.
Turnips (white) .....	Feb. to Aug.	15	8	1 lb. (drilled).
Rye .....	April	—	—	2 bushels.
Lucern .....	April to June	8	—	15 lbs.
Bokhara clover .....	"	8	—	12 lbs.
Mangolds .....	July or Aug.	30	18 to 24	2 lbs.
Sorghum .....	September	16 to 24	9	6 lbs. for seed.
Sorghum .....	"	8	—	12 lbs. for fodder.
Maize .....	"	30	12	$\frac{1}{2}$ peck (small).
Millet .....	"	15	—	3 lbs.

SECTION



## SECTION 16.—ENSILAGE.

Silage may be made by putting green fodder into a properly constructed silo, or even an excavation made in the ground, and covered with wood pressed down by sand, earth, stones, &c., or by stacking the green fodder, and applying pressure by mechanical or other methods.

Sweet ensilage of good quality has been made by stacking green fodder in the open air, applying the requisite pressure by one of the several mechanical arrangements used for that purpose.

It is important that whatever plan be adopted, what is known as sweet ensilage should be produced, and to do this it is requisite that the temperature of the ensilage must be not less than 123° Fah.

I quote the following remarks by the judges of the Silo and Silage-stack Competition, 1885-6, a full account of which may be found in the journal of the Royal Agricultural Society of England, 1886:—

*The Economy of Silage-making.*—This after all is the crucial point to be determined, either by special experiments in silage feeding, or by the combined experience of its use by farmers throughout the country. The object of farming generally is to obtain the largest amount of digestible nutrients at the least cost, and also the least injury to the soil. There can be no doubt as to the economy of silage-making in localities where it is difficult or risky to make hay, or where good crops of roots cannot be grown regularly. But in other localities where good hay and roots can be secured, it is doubtful if this process will supplant the root crop which enables the farmer to keep his land clean, and therefore in good condition to grow large crops of corn and “seeds.”

The chief advantage of silage-making against haymaking is its comparative independence of the weather; that the fodder is handled while green without any risk of the tender and nutritious leaves being lost on the ground as in haymaking; that the resulting silage is succulent and palatable; and that on purely grazing farms it is now possible to obtain a portion of the grass crop for winter use in such a state as to equal the effect of summer-fed grass for the purposes of the dairy.

We are of opinion that the question of satisfactorily ensiling green crops has received ample confirmation. With regard to stack silage, we find that the practice of ensiling green crops at a very small expense is satisfactorily established, and the system may be carried out at a small outlay, say £12 to £15 for a stack consisting of from 40 to 100 tons.

We think that both silos and apparatus for stacks are desirable, and that both can be used with advantage.

*Silage Stacks.*—Mr. Johnson's Silo Stack.—On November 20th we visited this gentleman's silage stack at Oakwood Croft, near Darlington. This was composed of autumn-sown tares, seeds, and clover, all put into one stack, 19ft. long, 17ft. wide, 11ft. to the eaves, and 17ft. high to the peak of the ridge. The system of pressing is the ensilage stack-press, invented by the exhibitor. The general description of the stack is, that it is built in the open air, the top peaked and thatched like an ordinary hayrick; the cost of the press for the 130 ton stack was £18, which is the selling price. The pressure is obtained by a flexible galvanized iron rope. In general the silage was sweet and particularly good. Mr. Johnson gave us the record of his diary during the time of his filling the stack. It appeared from this record that for some time the temperature varied from 160° to 170°, and fell on August 5th to 165°, in consequence of extra pressure being put on.

In evidence before the Ensilage Commission, Sir John B. Lawes, in answer to questions gave the following information:—

Would not food softened by the silo be more easily assimilated into the system of the animal than food not softened?—No; animals have a great power of acting upon dry food. Asked whether the produce of an acre of forage made into ensilage was of more or less value than the same produce made into hay, Sir John Lawes replied, that for dairy purposes the ensilage certainly would be the most valuable, but he should not say so for ordinary purposes for food. He did not think that a farmer could keep more stock with ensilage than without it, area for area. You do not see your way to keep a larger herd of stock by ensiling?—No; I think my mangolds would give more food per acre than I should get out of the average silage crop.

The most satisfactory plan with regard to ensilage is for farmers to try it for themselves, either by the silo or stack system. The crop intended to be put in the silo should be cut when in flower; the best crops to grow for the purpose being vetches, oats, rye grass, green rye, maize, clover, &c. Green rye should be cut when in ear, but before blossoming.

The weighing of the silo may be done with sand or carth, and should not be less than 120lbs. to the square foot.

## SECTION 17.—LECTURE ON AGRICULTURE.

Under the auspices of the Kapunda and Light Agricultural Society, Professor Custance, Principal of the Agricultural College, Roseworthy, delivered a lecture on agriculture in the institute hall, Kapunda, on Tuesday evening, June 15. Owing to the ample publicity given and the personal exertions of the committee the hall was crowded to the doors. The principal farmers of the district, we are glad to say, were present in great numbers, and these with the townspeople, including a fair proportion of ladies, to whom the announcement was made in the advertisement that the lecture would prove interesting, made up an audience numerically representative, which must have been exceedingly gratifying to the committee after the trouble they had taken to ensure the lecturer a reception to which he was entitled in one of the largest agricultural districts in the colony. Mr. H. T. Morris, J.P., President of the Society, presided, and the following gentlemen, also representing the society, occupied seats on the platform:—Messrs. W. Lewis, J.P., J. Shakes, J.P., W. M. Shannon, J.P., J. Scandrett, J. Prior, M. Conlan, J. Thomas, and D. Shannon. Amongst this group were also to be seen Mr. D. Moody, M.P., for Light; Mr. W. Copley, M.P., for Frome; and his Worship the Mayor of Kapunda. The proceedings were varied by selections of vocal and instrumental music, contributed by Mrs. Nairn, the Misses Coles, Nairn, and Scandrett, and Mr. A. Shakes. The

The Chairman, in opening the proceedings, said it was his pleasing duty to introduce Professor Custance, who had kindly responded to the request of the agricultural society to give a lecture in Kapunda. The Professor was both a practical and scientific farmer, and therefore great interest would attach to what he said. It had been said that the man who could make two blades of grass grow where only one had grown before was a benefactor to his race; this and more had been done by Professor Custance, who would tell them that evening how the same result would follow all who applied the teachings of science and common sense to agriculture. The lecturer, however, would speak for himself. It would be of interest to know that the society under whose auspices the lecture was given was second in importance in the colony to the premier society in Adelaide, thanks to the hearty co-operation of the residents in the district. He was very pleased to see such a large gathering, because he thought the purpose for which they were assembled was one of the functions of agricultural societies, to acquire and disseminate useful knowledge relating to farming. He had received an apology for non-attendance from Mr. J. Bosworth, who was unable to attend through an engagement necessitated by an election meeting held in another part of the district. He would not detain them longer, but call on the Professor to deliver his lecture.

Professor Custance on rising was received with cheers. He said he stood before them that evening under rather awkward and painful circumstances. A few days ago he had the pleasure of receiving a copy of that well-known paper the *Kapunda Herald*. He thought he might say he was never more astonished when he read something in that paper, in part of the announcement of the lecture, that the lecture would be most interesting to ladies. (Laughter.) He never knew before that an agricultural lecture would prove interesting to ladies. At the time he asked himself if he could formulate an excuse for getting out of coming to Kapunda altogether, but could not satisfactorily do so. So here he was, and putting joking aside, he was under engagement to talk to them about farming. The first division of the lecture would enumerate some popular errors regarding that industry, and he was quite sure it would take a person with some amount of courage to accomplish the task which he had ventured to set himself. There were a number of errors, however, some of us had fallen into in regard to farming. It was not so many years ago people believed the sun actually moved. The majority did not believe that now, but that the earth moved round the sun. As such popular errors prevailed in times past, he thought he could show in the same way at the present time some few mistakes are made in connection with agriculture. The first error in proof of the assertion just made was this—it was believed by some that any sort of wheat is good enough to sow. There were perhaps one or two persons in this district who would be inclined to disagree with him on that point. He had been told by farmers that any wheat was good enough to sow. They said if you take the worst wheat and sow it you will get just as good a crop as if you sowed with the finest seed. That was a mistake. You will not get as good a crop by sowing poor wheat as if you sowed plump, full, sound grain. He spoke as a practical man, and he would do wrong if, when he found error existing, he did not show where the mistake lay. They ought to take great trouble to get the best grain they could. He drew attention to this, and at the close of his address would discuss the point with any one wishing to dispute what he said.

Another mistake was that harrowing the young wheat plant was injurious in this climate. He made the assertion most emphatically that when this was done the effect was good. Another error was that shallow ploughing was quite good enough in this colony. He wanted to prove to them this was a sad mistake indeed. Some farmers would tell them that the shallower they ploughed the better, and that if the ploughing was shallow they would get a good crop. If they ploughed only two or three inches deep they made the soil in time in such a state that the plant was robbed of food, and under such conditions the chances of its growing were reduced. The subsoil should not be brought to the surface, but be stirred by some implement as deeply as possible. By continual shallow ploughing a crust was formed which prevented the entrance of the rain and the atmosphere, and the beneficial influences which follow the action of the rain and the air on the soil. They shut away from the plant that food which the soil if broken through furnished, and which would be valuable for the plant to grow upon. They knew the roots of the wheat plant under proper conditions penetrated the soil two or three feet deep. How could the roots do so if the ground were not prepared. If the roots came in contact with the crust they stopped there, because they could not get further. Most emphatically he said good crops could not be relied on unless the soil was properly prepared.

He did not wish to advocate anything that would not pay the farmer, but it would pay him to cultivate the soil. Unless he did this he could not expect a crop. The plant must get food from the soil, and the more soil it has to draw its food from the better will be the crop. He had not time to enter into details then, but he wanted to convince them that deep cultivation was the best thing they could do, and shallow the worst. The next error is that manure can take care of itself. The manure heap was one of the most important things on the farm, and ought to be preserved. It need not be used solely for wheat. There are other crops which can be grown which will pay better than five bushels of wheat per acre. It will pay farmers to use manure, and therefore they should take care to preserve it. Cover the heap in summer with earth so that the requisite substances in it are retained. Some persons had the idea that farmyard manure was all the better for going through the process of washing and drying, and this would be done effectively if the rain and sun were allowed free access to it, in which case the necessary qualities in the manure would be destroyed. Another popular error was that implements and machinery are very much improved by being left out in the paddock where they were used last season. It seemed to him that was a mistake, and that it would be better to keep them under cover away from atmospheric influences as much as possible. They would also be better for the application of a little paint occasionally.

He had been told it was a great mistake to grow such crops as kale, mangolds, maize, and sorghum as food for stock in summer; that it would not pay. He said it would pay to sow these crops in the summer. In England if a man did not grow crops to store for winter use, he would not be considered fit to be at liberty. And in this colony they ought to provide food for the stock in summer. He was speaking of farmers who were working for a living. Such crops as he had mentioned could be grown where there was sufficient rainfall. Many thought that a stack of good wheat straw was not worth the trouble of putting together. This was one of the worst errors he knew of. Mixed with a little of the growths he had mentioned it made admirable fodder, and therefore should be preserved. It would enable each farmer to keep more stock on his farm than he does at present. Many would be blessing themselves that their stock was limited as it is at present, but the possession of a stack of good straw in a season like this would save a tolerable sized haystack.

Many farmers had told him that a good sample of malting barley could not be harvested with a stripper. This was a mistake. He spoke from his own experience. He did not want to advocate anything theoretical but what was also practical. At the present time we were paying for barley for malting £50,000 to somebody to grow it for us. We can grow it, and it can be reaped with a stripper, and 4s. 6d. per bushel is the price

price obtainable in Adelaide for it. At Roseworthy they had grown it, and sent it down to a brewery in Adelaide, who said it was as good as they needed, and would give 4s. 6d. per bushel for as much of it as could be supplied. The stubble also was even better than wheat straw.

He anticipated discussion on the next point. In regard to red rust he had been told during the last five years by good intelligent men who had made money by farming in this colony, that red rust was caused by the atmosphere. Red rust was a plant which grew on the wheat plant, a parasite of rapid growth, which required a certain amount of moisture. It grew from spores, and though he believed it might be impossible to stop it altogether, to some extent it might be prevented. Another annoyance to which farmers were subjected was the ravages of what they called take-all. He was very much amused at a discussion a little while ago, in which a number of farmers came to the conclusion that this was caused by flies, salt, &c. This was a mistake. It was a fungoid growth of decomposed matter in the soil, and when they knew the origin of an evil they were on the right road to prevent it. If by treatment they prevented this disease, that was an argument he would use for the adoption of a different system of farming.

He hardly liked to mention the next error. He did not know how far it extended, but travelling about different parts of the colony a good deal as he did, he knew the impression existed that a farmer was one who occupied land. The occupation of land does not constitute a farmer. Another error was very common, and that was that the Professor of Agriculture in South Australia has so much spare time that he can attend to every request for lectures, and visit all over the colony, and manage the College at Roseworthy, and teach the students at the same time. One man could not be in two places at the same time. He mentioned this because some people were offended because he did not comply with their very kind requests.

They came then to the next part of the lecture. What is farming? That is, practical farming, and what is meant by scientific farming? Farming was a business that required to be studied. A practical farmer was one who from his youth had learnt farming; one who understood stock, who understood farming implements and machinery, who understood how to treat his land in order that it would produce the greatest amount of profit, keeping it free from weeds, and maintaining or increasing the fertility at the same time. That was his definition of a farmer, and it involved a great deal.

Then they came to the point, What is meant by scientific farming, or the application of true science to farming? Wrong ideas prevailed here. Some persons said science as applied to farming was all nonsense, and what was wanted was practical farming. Of course they were perfectly entitled to their ideas, as were those who thought differently from them. To make what was meant very clear, he would give an illustration. Of course everyone knew that water will freeze. When they ascertained the exact temperature at which water solidified, that was science. Some farmers knew that if they did certain things they would get certain results, but they did not know more. When they knew the reasons for these results they became scientific farmers, and as it was they all were to a certain extent. A little consideration would enable them to see the value of exact knowledge to farmers. It was just what they required in this colony, because if they considered the variety of opinion held by practical farmers they would see that they did need accurate knowledge. That was one reason why he would give some consideration that evening to the why and wherefore of what they saw on farms.

What is farming? The answer to that question was best given by reference to what was done in other countries. They might say, that won't apply here. The principles were true here as anywhere else; the local circumstances had simply to be considered. The most noted farmers some time back were to be found in Flanders, who were driven from their homes and settled in England, and introduced the best system of farming, and contributed greatly to make English farming what it now is. These people cultivated a large number of crops. The land was never allowed to be idle, and the best crops were grown. They stirred the soil as deeply as they could, weeds were not allowed to grow, and the manure was not wasted. They kept all the stock they could. They gave back to the land all they took from it.

In this colony we did not come up to the highest standard of farming. It has been profitable to farm carelessly in the past. It was not profitable now, nor would it be in the future. Some might say we can't grow these crops. If we can't alter the system of growing solely wheat and hay we can't farm profitably. Something must be done. We cannot continue the present system. There is a dire necessity for constant and proper cultivation, that the land may be in a proper condition to supply the requirements of plants, and give increased production. Farming is an occupation in which a man can employ the very best abilities he possesses. It was a mistake to suppose that intelligence was not required in a farmer. There was a very wide field for the exercise of all the skill and intelligence which could be brought to show how farming could be made more profitable. If it could not be done it was a very serious matter for South Australia. He believed it could be done by more attention to exact knowledge, or what might be termed scientific farming. That, however, he would refer to in the second part of the lecture.

After an intermission of five minutes and some music,

Professor Custance resumed his address. He said he closed the first part of his lecture by saying that things had come to such a pass that it was absolutely necessary for something to be done to bring about a more satisfactory state of affairs as far as farming was concerned. They knew the important influence which successful agriculture had on the people of this colony. The present circumstances were such that the question of what could be done to obtain more produce and more profit from the land was the most important subject that could be discussed, involving as it did the comfort and prosperity of all. If some of the points he defined did not fully meet their approval, he hoped they would give him credit for suggesting something which he thought would benefit the colony.

What are the possibilities of farming in South Australia? Of course it must be distinctly understood that certain localities are specially suited for the production of certain crops or other products, and the remarks under this head must not be taken as applicable everywhere. They must be accepted generally. Nor did he think any one thing would accomplish great results, but attention to many little things in connection with farming would, he believed, do much to improve the position of the farmer. What were some of these little things? He spoke with the experience of five years' work in this colony, certainly under favorable circumstances; but they must not imagine the present run of bad seasons was going to continue for ever. There was more or less depression existing throughout the world, and brother farmers were feeling it as much as they were, but from a different cause.

He said most plainly that the cultivation of the land as carried out in the greater part of South Australia was not what it ought to be. He courted discussion, and did hope that those who disagreed with him would point out where they thought he was wrong. As a practical farmer, he thought we ought to grow other crops than wheat, for the reason that by so doing we would be put in possession of more feed for stock, and the farmers would secure more saleable produce. The growth of these crops prepared the land in the most inexpensive way, and made it better able to grow more wheat, and would enable the farmer to more

more profitably employ his labor throughout the year. To enumerate some of these crops, they were barley, peas, gram, flax, mangolds, kale, cattle cabbage, turnip, maize, and sorghum. There were others, but he could not mention them all. Some farmers had proved they could grow a good malting barley. If they could not get a good sample, the straw mixed with a little green stuff made very good fodder for cows and sheep. Stack the straw. It would pay better, however, if they could secure a good milling sample, as it could be harvested with the stripper, and readily sold. Then again there was peas. The straw of this plant was the most valuable of all straws, better even than barley or wheat straw.

Gram, he was sure, would grow successfully in this colony. It was something similar to peas, and like other leguminous crops was a splendid preparatory crop for wheat. If either the grain or straw of these leguminous plants was not required, which was very unlikely, it would be better instead of fallowing, as at present, to sow the land with these crops, and the same purpose would be attained in a much more satisfactory manner. In some districts flax would thrive; Roseworthy, for instance, where the plant was indigenous. If there was a paper factory here the cultivation of this plant would prove very profitable indeed. The straw is worth £4 10s. per ton in England, and it makes the very best sample of newspaper. It will pay to grow to send to London a great deal better than wheat. He did not say such favorable conditions would last, he only spoke as things were now. All the farmer had to do was to cut the straw, put it on his wagon, and take it to market. It would also pay to grow for the seed. They must not forget he was talking about the possibilities of farming, and he mentioned this point as being one of the possibilities. He hoped something practical would follow his suggestions. Why could not a paper factory be established here? Why should they not make their own paper instead of allowing another country to make it for them?

The next crop he would mention was mangold wurtzel, and he had every confidence in recommending the cultivation of this plant. A few acres put in in the last week of July or the first week in August, should yield on medium soil fifteen or twenty tons an acre of very useful feed for horses, cattle, and pigs. He tried this crop on the poor soil, manured of course, at Roseworthy, and the yield was as much as twenty tons per acre. Single mangolds weighed as much as forty-five pounds each. He believed they would grow anywhere south of Port Pirie. It was one of the most useful plants that could be grown for fodder. Thousand-headed kale. There was not a crop he could mention as superior to this as a summer fodder crop. The first crop he grew astonished him. He could not have believed it possible that such a crop could have been grown. There was a lot of prejudice existing against the work carried on at Roseworthy, but on showing this crop of kale to a gentleman farmer, whom he prevailed upon to visit the College, he was forced to admit there was something in what scientific farmers were contending for after all. He did not want to sell the kale, preferring to keep it for the College stock; but to show in plain black and white what could be done, he reluctantly parted with the produce of half an acre for £18 odd! Farmers ought to be induced to grow thousand-headed kale.

Cattle cabbage was something similar, and also made admirable fodder. Swede turnips ought also to be cultivated for the same purpose. Then there was maize and all the different sorts of sorghum, which would cut three or four times during summer if each cutting was followed with a little moisture. All the crops he had mentioned mixed in small quantities with straw made grand feed for farm stock; in fact, he would not advocate their being given to any farm stock without being first mixed with straw. If they asked him to suggest which was the best of the sorghums, he would say the amber sugar-cane. It could be cut as often as four times, and being increasingly in demand for sowing, it would pay to grow it for a time for the seed. The seed was worth one shilling a pound. Off a piece of ground the size of the hall in which he was speaking, he had taken 100lbs., which gave a return of £5.

Then there was chicory, for which an advertisement was appearing in the papers from a firm, offering to take as much of it as farmers could grow. Mustard, too, would pay splendidly to cultivate. The Waverley Vinegar Company was prepared to sell seed at ten shillings per bushel, and buy as much of the produce as they liked to grow at the same price. It was no need to prolong the list. The question was, could these crops be grown at a profit, and he maintained that they could, but of course different localities would require different crops. And then they must not forget that whilst the crops are growing the land is being put in better heart for wheat, double the amount of which will be returned when next sown with that cereal. When calculating the cost of growing fodder and other crops, they must not forget this fact. Thousands of acres in this colony were said to be exhausted; the land was exhausted simply because they were in an unhealthy condition for want of something taken out of it.

In certain localities where there was plenty of water dairy farming should be followed energetically, because it could be made profitable. What an inducement there was when they saw butter at 2s. 6d. per lb. He knew they said they could not get 2s. 6d., but that was what the consumer in Adelaide had to pay. Make the butter in favorable times, and by the usual process have it in a condition to sell as fresh when prices rose. (Laughter.) In certain localities, on a farm of 100 acres, it will pay a man better to use that land in the right way, than 1,000 acres farmed as he had seen it in places which he could mention. It did not pay to get only one crop in about seven years. A certain return should be relied upon each year. On every farm there was a certain amount of waste material or refuse, and this, used with a little green feed, would be wasted if there not a few pigs to consume it. There ought to be a few pigs on every farm. He had proved at the College they could be kept at a good profit, and even this year, so far, the balance was considerably on the right side. A small flock of sheep ought, if possible, to be kept, and should return a profit. Poultry also were valuable. If they made £10 here, £20 there, and £5 in another place, the amount of their income was so much increased.

Then a few acres should be devoted to fruit and vegetable gardens. He had it on the authority of Mr. Thomas Hardy, that a few acres of vines would pay a farmer better than wheatgrowing. Amongst the possibilities of farming in South Australia, he would like to remind them that more money could be added to the farmers' incomes if they would grow other things which were of commercial value. For instance, from both rosemary and lavender valuable oils were extracted, which it would pay well to produce. Of course this would necessitate a small distillery. Both Rosemary and lavender were inexpensively cultivated. Irrigation by gravitation wherever practicable should be adopted. It was a very great thing just running the water over the ground was sufficient. It must be properly conducted, and suitable crops grown. If that were done one acre could be made to produce as much as 100 acres not irrigated. It would pay for itself, and it must be used in conjunction with other things. The straw stack would come in handy with irrigated crops. The straw chaffed and mixed with pulped mangold, chaffed maize, or sorghum, in any portion of four or five per hundredweight to a ton of straw and one bushel of salt, trodden down tightly in a shed would keep for months. It was a mistake to go to the expense of ensilage pits. These pits were the right enough.

enough in England, where the damp caused the stuff to get mouldy. The straw must be used in the way he had described.

From what he said he did not wish them to imagine that he desired to put wheatgrowing in the background. He believed wheatgrowing would be more profitable in the next few years than at present. The price would send areas out of cultivation, and the production would be lessened. We could produce wheat as cheaply as it could be produced. Consequently, if by better cultivation a few bushels more per acre could be relied upon, wheatgrowing was bound to be more profitable than it was now. But a change must be made in the present mode of cultivation. They must get early varieties of wheat. They must take a little more trouble with the seed sown, and the seed must be sown thinner. There must be a combination of stock farming with arable cultivation in some districts, and deep stirring of the soil by the cultivator must be insisted upon. With these points attended to good results would ensue. Last year at the College, on an acre of land, not the best, with eight inches of rain from sowing to harvesting, and only twenty-one pounds of seed sown, they reaped sixteen and a half bushels of wheat. Providing the price was fair he was sure wheat could be grown here profitably. But the substance that had been taken out of the soil must be returned.

He would ask them just this question: Considering the present state of affairs in this colony must not something be done? Was there any industry so much as agriculture which could be looked to to bring about a happier state of affairs and restore the colony to prosperity? Must they not put their best foot forward to adopt a better and more profitable system of farming? Should not the work of obtaining, collecting, and spreading information of practical value and importance to the agricultural interests of this colony be supported? Should not the work of agricultural education be helped and encouraged by all intelligent persons—by well-wishers for the future prosperity of agriculture—by all who wished to see South Australia flourishing and her people happy, contented, and prosperous?

The Agricultural College at Roseworthy was established for this purpose eighteen months ago. The objects of the College were well known. For £50 per annum, in two years a young man could go through a complete course of practical and scientific agriculture. It was a mistaken idea that a farmer should not be an educated man. He ventured to say the College had not received the sympathy it ought to have received. He would not be doing his duty as <sup>South</sup> ~~South~~ <sup>Colonial</sup> ~~Colonial~~ <sup>Member</sup> of the College if he did not ask those who looked upon the institution as worthless to alter their opinion. There must be headquarters for the dissemination of knowledge in regard to agriculture, and the College answered that purpose. If they had no such headquarters, then that progress for which they all longed could not take place. He thanked them very much indeed for the attentive hearing they had given him. If his remarks were of practical value he hoped they would profit by them; but in any case he hoped they would be received in the same spirit as they were uttered. The sole purpose which prompted them was a wish to do good to the colony.

Professor Custance resumed his seat amidst prolonged applause. He spoke for upwards of two hours, and his address throughout was attentively listened to by the large audience, who frequently testified their approbation. Occasional interjections were made, however, when practical farmers present disputed the lecturer's conclusions.

## SECTION 18.—CONCLUSION.

The main question affecting the farmers, the question of most importance to him, is what can I do to obtain more profit from my land? After five years' experience as a practical farmer at Roseworthy, I have no hesitation in stating that a number of little things may be done by many farmers that, taken as a whole, would bring profit directly or indirectly, such as the growth of root and fodder crops, the use of good straw with roots for fodder, keeping more stock, dairying, more attention to horse breeding and rearing, irrigation where possible, careful preservation and use of manure, the application of phosphatic manures for wheat, growth of more wheat per acre by a better system of cultivation, more attention to seed wheat, keeping more poultry, deep cultivation, use of drill and horsehoe, conservation of water, growth of such crops as peas, chevalier barley, lucern, &c., &c., and many other things mentioned in my lectures from time to time. Take for example the growth of such plants as rosemary, lavender, peppermint, pennyroyal, rue, tansy, &c. Lavender yields about 42lbs of oil per acre, worth £2 10s. per pound; peppermint yields say 24lbs. of oil per acre, worth 35s. per pound, or about £50 per acre. In some districts these herbs may be readily cultivated, but as far as my knowledge is concerned I do not know of one herb grower in the colony on an extensive scale. Now what can be done to induce farmers to strike out in a new line? They are willing enough, I doubt not, to obtain more profit, and to do that some approximation to what is done by farmers in other parts of the world must be attempted. It is perfectly certain for agriculture to progress in South Australia, efforts must be made to induce a better system of farming, more especially in the best agricultural districts.

Very probably the farm-prize system adopted by the Royal Agricultural Society of England would be of advantage, because the prize farms would serve as examples of what can be accomplished to the neighboring farmers; but a well organised and energetically worked department of agriculture, somewhat after the fashion of the United States department of agriculture, would be the most effectual method of improvement and progress in agricultural practice throughout the colony.

Agriculture is of sufficient value to devote to its service a permanent department, charged with the duty of promoting in various ways the advance of agricultural prosperity throughout the colony. After careful consideration, I feel convinced that the example of other countries in this respect can only be ignored with loss to the colony, and allowing ourselves to be beaten in the race for even an agricultural livelihood, by nations who are sufficiently awake to the fact that they must either make progress their watchword—their determined action—or submit to retrograde in the most important industry (farming) that can employ the most determined efforts of true patriots.