

QUEENSLAND AGRICULTURAL JOURNAL

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PART 5.

Agriculture.

AMERICAN COTTON INSECT PESTS.

A United States Government Report states that the growing of cotton in the United States continued to be interfered with materially by the ravages of insect pests, particularly of the boll weevil. The efforts of the National and State Governments have failed to find a means of eradicating this pest. However, by seed selection, plant improvement, and better methods of cultivation and fertilisation, it is possible to curtail very materially the damage that may be done by it. Insect pests of various kinds cause great loss to growers of cotton in a number of foreign countries. It has been discovered that the pink bollworm, which causes so much damage to the Egyptian crop, has obtained a footing in Mexico. The devising of measures to prevent its introduction into the United States from that country is one of the problems prominently before the officials of the United States Department of Agriculture and some of the State Bureaus. Rigid quarantine has been established, and regulations are being enforced to prevent its being brought into the country through commercial channels. The following statement indicating the activities of the boll weevil during the past season has been prepared by the Bureau of Entomology and by the Federal Horticultural Board of the Department of Agriculture:—

Cotton Insect Pests in 1916.—The cotton crop in 1916 in general was not seriously injured by insect pests other than the boll weevil, although reports of damage by the bollworm in North Carolina were numerous. The extensive early spread of the weevil in 1915 was followed by a favourable winter and unusual numbers of weevils were found, especially in the southern portions of the cotton belt. The spread during 1916 was normal, not being especially aided by storms or high winds. The weevils continued moving up to the middle of December, and almost a month after frosts had killed the greater part of the cotton. The most important features of the year were the invasion of 31,000 square miles of territory in Georgia and 4,000 square miles in Tennessee, and the spread of the insect practically to the limits of cotton culture in Oklahoma, Arkansas, and Florida.

The territory invaded in 1916 included 71,800 square miles, the second greatest gain ever made by the weevil in a single year. There were no compensating losses of territory. The total area now infested amounts to 480,940 square miles.

The terribly destructive boll weevil has never made its appearance in Queensland, the Agricultural Department having always been careful that any seed imported from America or elsewhere shall be declared clean by the officials in the above countries—whose duty it is to examine all seeds and plants exported.

GINSENG.

PROFITS FROM "FREAK FARMING."

We have received from Messrs. Bunting Bros., of Toolooa, the following interesting extract from the "Scientific American" for March, 1918, on the cultivation of ginseng, a subject on which several articles have appeared in the "Queensland Agricultural Journal." There is no reason why this singular plant should not be grown in Queensland to as much advantage as in the United States. From all accounts there is undoubtedly a steady market for these medicinal roots in China at very high prices, and it may also be that Chinese merchants in the Southern States would be buyers of the roots, which, as will be seen by the following notes on the subject, are highly prized by the Chinese for their medicinal properties. In July last Mr. Thos. Wood, seedsman, George street, Brisbane, imported a quantity of seed from America, and seedsmen gardeners here are now experimenting with it.

The accompanying photos. of the shaded ginseng fields, and of the flowers and roots, give a good idea of the methods of growing this plant.



PLATE 24.—FIELD OF GINSENG PLANTS IN THEIR FIRST YEAR'S GROWTH.

"Among the unusual industries in America is the cultivation of ginseng, a species of 'freak farming' as it is called by the orthodox tillers of the soil.

"The root of this plant is the Chinese cure for 'all the ills that flesh is heir to.' We are apt to scoff at the notion that it is valuable as a medicine, believing that its use is a superstition handed down for generations in China. But it never fails to excite interest, perhaps because the Chinese dealers are willing to pay almost 9 dollars per lb. for these precious roots, so that the returns from half an acre of land may be easily 6,000 or 7,000 dollars—that is, if you know how to get results.

"The discovery of the plant on this continent was made over 200 years ago. The demand from China increased yearly. Then such energetic hunting began that the plant was in a fair way to become extinct, as no effort was made to see that reproduction took place, and up to about thirty years ago no one thought of cultivating this valuable root. It was even thought impossible. But a few individuals endowed with an unusual amount of faith and patience took it up as a hobby, experimenting until

they finally were successful. Here are a few of the things they had to learn before the industry was launched.

"The plant reproduces from seed, but the seeds are unusual. They will not germinate until the second season, or about eighteen months after harvesting. During this time they must be watched carefully; they have to be kept moist, but not too wet or they will rot, not too dry or they lose all their vitality. These things had to be learned through failure. One method of caring for the seeds is to stratify them in moist sand, in the following manner:—A box not more than 1 ft. deep is used, with holes bored in the bottom. Then alternate layers of the sand and seed are placed in the box (the sand should be about 1 in. thick); then a layer of berries which may touch each other but must be only a single layer; then another strata of sand which must more than cover the seeds; and so on until the box is filled, allowing at least 3 in. of sand at the top, with a layer of moss to hold moisture. The top and bottom of the box are covered with a wire screen and then buried in a shady place where the water will drain off. It is advisable to put a sloping roof over the box to prevent too much moisture; and care should be taken during summer months to prevent the seed from becoming too dry.



PLATE 25.—GINSENG FIELD IN SEPTEMBER OF FIFTH YEAR, WHEN THE SEEDS ARE RIPE.

"The patience of the ginseng-grower is further tried by the fact that after the seed germinates and the little plants begin to grow it takes five years before the root (which is of greatest importance) is matured sufficiently for use. As it requires such a small area in which to raise a profit-securing quantity, the soil of that area can be worked over and just the right substances added to make the ground suitable for this plant. The growers went direct to the forests and analysed the soil, and claim that almost any sort of ground can be made into proper ginseng soil. That which is most easily prepared is of rather a coarse texture, clay loam mixed with sand, which drains naturally. As the area is small, sand can be added to heavy clay ground to make it porous and mellow.

"The transplanting of the small roots is very important, as is also the digging of the mature roots for the market. At the end of the fifth season's growth the roots are marketable.

After careful digging the roots are washed free from mud, the safest way being to spray them gently with a hose. They are then placed in a warm room with plenty of air. All the fibrous rootlets will become brittle as the ginseng dries. Finally they can be rubbed off without injuring the skin. Roots that are hard command a poor price. A short, stubby root is preferred, rather light in colour, sponge-like to the touch, and light in weight compared to the size. We have been told so often that the

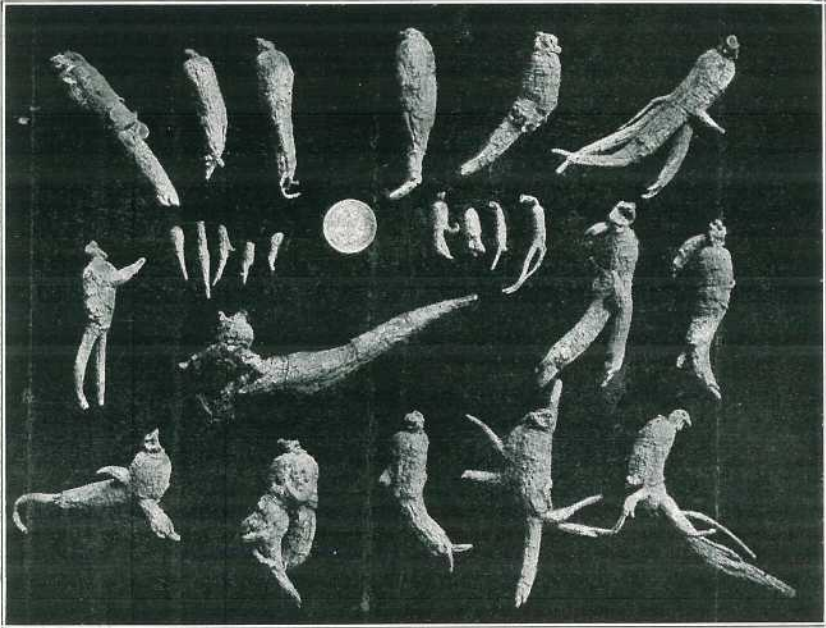


PLATE 26.—A COLLECTION OF GINSENG ROOTS OF TYPICAL SHAPES AND SIZES. (The medal, the size of a silver dollar, gives a good idea of the size of the roots.)

Chinaman favours the root that most resembles the human form (for these very often produce queer little shapes like manikins) that we have come to believe that their supposed preference is part of the ginseng 'superstition.' But the dealers claim that this is not the case. The short single root is preferred by them. Our own doctors are beginning to think that this is no superstition after all, and that ginseng is of great value medicinally. Experiments are being made continually.²

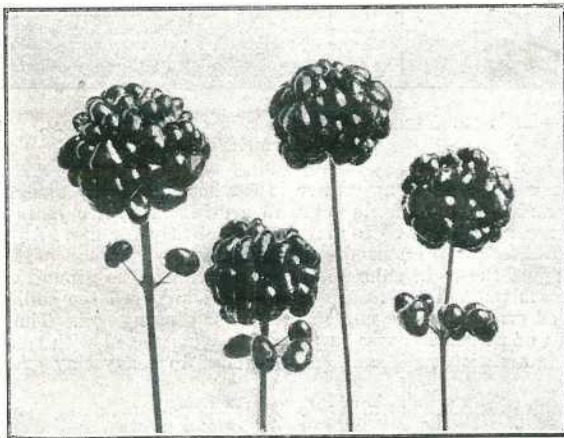


PLATE 27.—MATURED SEED HEADS, THREE-QUARTER SIZE.

LIBERTY MILLET.

In consequence of the action taken in the United States of America deleting all names of enemy origin, the so-called Giant Panicum (*Setaria Italica*) has been renamed "Liberty Millet." Applicants for this seed will please note.

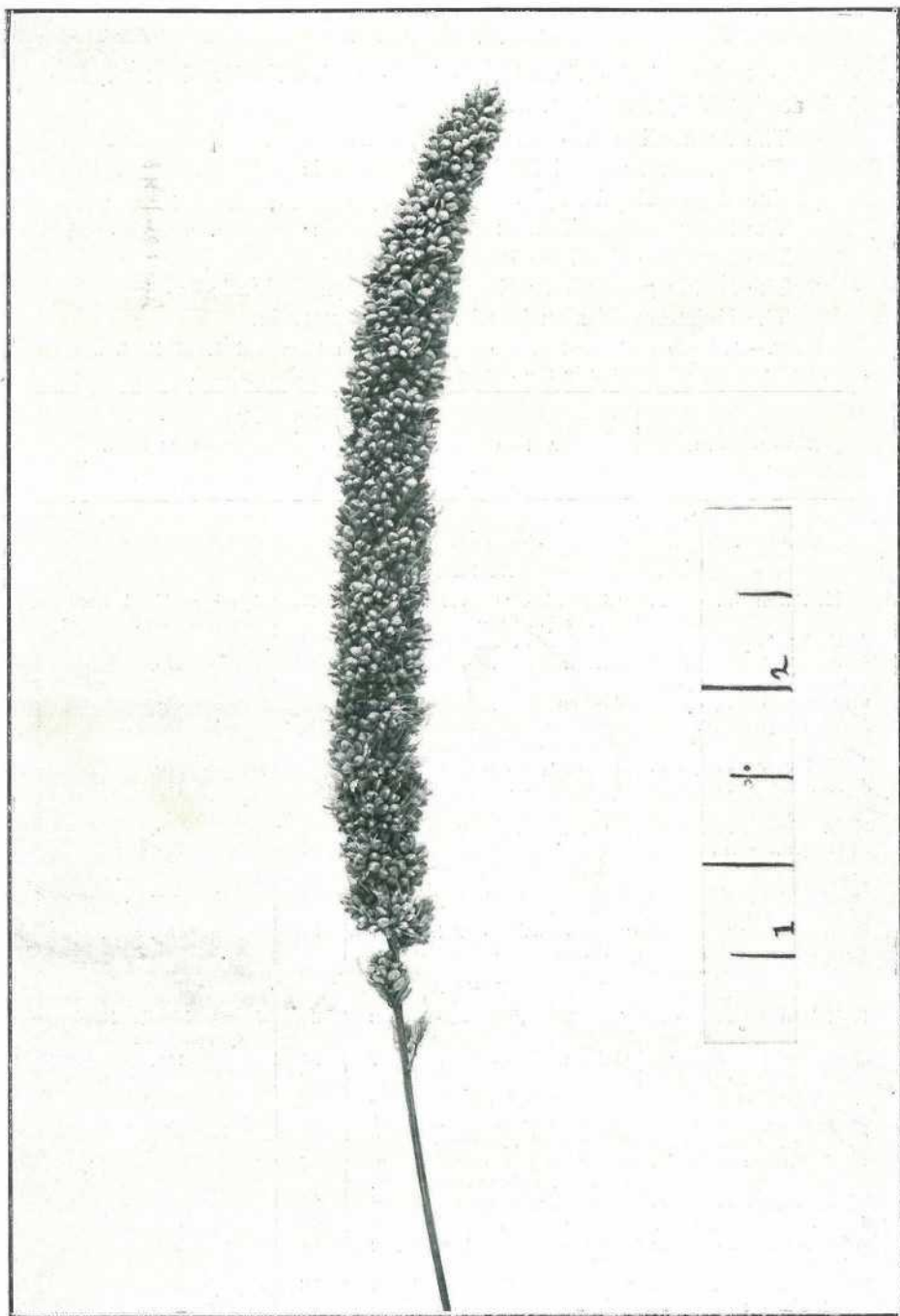


PLATE 28.—LIBERTY MILLET.

Pastoral.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—BEEF AND DAIRY CATTLE.

The Office of the Secretary of the undermentioned Herd Book Societies is 303 Queen street, Brisbane:—

The Australian Hereford Herd Book;
 The Shorthorn Herd Book of Queensland;
 The Jersey Herd Book of Queensland;
 The Illawarra Herd Book of Queensland;
 The Ayrshire Herd Book of Queensland;
 The Milking Shorthorn Herd Book of Queensland;
 The Holstein-Friesian Herd Book of Australia.

NOTE.—Animals registered in the Commonwealth Standard Herd Book are not necessarily eligible for entry in the Jersey Herd Book of Queensland.

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
DAIRY BREEDS.				
AYRSHIRES.				
L. H. Paten	"Jeyendel," Calvert, S. & W. Line	8	21	Ayrshire Herd Book of Queensland
J. H. Paten	Gwandalan, Yandina	6	21	Do.
Queensland Agricultural College	Gatton	4	40	Do.
State Farm	Warren	3	83	Do.
J. W. Paten	Ayrshire Park, Wanora, Ipswich	10	42	Do.
J. H. Fairfax	Marinya, Cambooya	9	55	Do.
J. Holmes	"Longlands," Pittsworth	6	20	Do.
H. M. Hart	Glen Heath, Yalangur	7	21	Do.
F. A. Stimpson ..	Ayrshire Stud, Fairfield, South Brisbane	7	77	Do.
M. L. Cochrane ..	Paringa Farm, near Cairns	5	21	Do.
John Anderson ..	"Fairview," Southbrook	7	34	Do.
JERSEYS.				
T. Mullen	"Norwood," Chelmer	3	20	Jersey Herd Book of Queensland
Queensland Agricultural College	Gatton	2	31	Do.
M. W. Doyle	"Oaklands," Moggill	4	12	Do.
G. A. Buss	Bundaberg	1	15	Do.
R. Conochie	Brooklands, Tingoorra	9	21	Do.
W. J. Barnes	Millstream Jersey Herd, Cedar Grove	10	37	Do.
W. J. Affleck	Grasmere, N. Pine ..	6	31	Do.
J. N. Waugh and Son	Prairie Lawn, Nobby	3	28	Do.
W. J. H. Austin ..	Hadleigh Jersey Herd, Boonah	2	11	Do.
State Farm, Kairi ..	Kairi, <i>via</i> Cairns ..	4	16	Do.
H. D. B. Cox	Sydney (entered in brother's name)	3	16	Commonwealth Standard Jersey Herd Book

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.

DAIRY BREEDS—*continued.*

GUERNSEYS.

Queensland Agricultural College	Gatton	2	2	Eligible, but no Guernsey Herd Book of Australia
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HOLSTEINS.

Queensland Agricultural College	Gatton	2	9	Holstein-Friesian Herd Book of Australia
George Newman	.. "St. Athan," Wyreema	12	47	Do.
F. G. C. Gratton	.. "Fowlerton," Kingsthorpe	1	15	Do.
R. S. Alexander	.. Glenlond Farm, Coolumboola	1	3	Do.
Ditto	.. Ditto	1	..	Holstein-Friesian Herd Book of New Zealand
S. H. Hoskings	.. St. Gwithian, Toogoolowah	..	..	Holstein-Friesian Herd Book of Australia
C. Behrendorff	.. Inavale Stud Farm, Bunjurgun, Q.	3	9	Do.
E. Swayne	.. West Plane Creek, Mackay	1	2	Do.

ILLAWARRA.

A. Pickels	.. Blacklands Stud, Wondai	4	62	Illawarra Herd Book of Queensland
J. T. Perrett and Son	.. Cornedale, Coolabunia	3	43	Do.
W. T. Savage	.. Ramsay	2	22	Do.
Hunt Bros.	.. Springdale, Maleny..	3	62	Do.

MILKING SHORTHORNS.

P. Young	.. Talgai West, Ellinthorp	2	42	Milking Shorthorn Herd Book of Queensland
W. Rudd	.. Christmas Creek, Beaudesert	2	10	Do.
A. Rodgers	.. Torran's Vale, Lane-field	1	9	Do.
W. Middleton	.. Devon Court, Crow's Nest	3	27	Do.
A. K. Yorksten	.. "Dunure," Miles ..	2	8	Do.

BEEF BREEDS.

SHORTHORNS.

T. B. Murray-Prior	.. Maroon, Boonah ..	2	37	Queensland Shorthorn and Australian Herd Books
C. E. McDougall	.. Lyndhurst Stud, Warwick (2)	25	100	Queensland Shorthorn Herd Book
Godfrey Morgan	.. "Arubial," Condamine	3	6	Do.
W. B. Slade	.. E. Glengallan, Warwick	2	20	Do.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
BEEF BREEDS—<i>continued.</i>				
HEREFORD.				
A. J. McConnell ..	Dugandan, Boonah	19	36	Australian Hereford Herd Book
E. M. Lumley Hill ..	Bellevue House, Bellevue	45	127	Do.
Tindal and Son ..	Gunyan, Inglewood	50	400	Do.
SUSSEX.				
James T. Turner ..	The Holmwood, Neurum	2	4	Sussex Herd Book of England

FARMERS' WOOL CLIPS.

By R. WILSON, Assistant Instructor in Sheep and Wool.

As advertised on another page of this Journal, the Department of Agriculture and Stock will receive and class all farmers' clips from flocks of 1,500 sheep and under.

No lot is too small for consideration, as one bag, or even one fleece, would be classed according to the various grades contained therein.

There has been specially fitted up a new store in William street, and experts are employed to superintend all work in connection with the treatment of farmers' wools consigned to the Department of Agriculture and Stock.

The fittings of the new store include all the necessary bins, tables, woolpress, with plenty of storage room; and the officers of the Department would be pleased to show and explain them to any visiting farmer who may be interested.

Farmers should notify the Under Secretary, Department Agriculture and Stock, the number of bales or bags consigned, and also state whether they will require the usual advance.

On arrival at the store all consignments are weighed on thoroughly tested scales; weights on railway waybills are not taken as correct.

After weighing, the wool is valued at an average value of all classes contained in the parcel, and if required by the farmer an advance of 60 per cent. of value for all qualities is paid by return of post. The balance will be paid after the wool is classed and sold in various grades.

All wool is classed into the various classes contained, rebaled into neat compact bales, and branded with the departmental brand , which is the only brand in use for farmers' wool by the Department. There are many different classes into which a farmer's wool may be put. The main features considered are:—Length, colour, soundness, condition, freeness from seed and burr, overgrown, charcoal or red soil stained, and the various qualities as in crossbreds or long-wools.

The results for the period of twenty months that the scheme has been in operation have been very satisfactory to growers, and netted them a lump sum of £4,000.

Three hundred and eighty-one bales were sold, the top price realising 21½d. per lb.; and this amount of wool consisted of original parcels ranging from one fleece to twenty-eight bales.

The only preparation of wool necessary is for the farmer to skirt all fleeces lightly by removing stained pieces, rough and bitty edges, folding the fleece over, showing skin side of the wool out, turning neck and breach, and rolling from breach to shoulder, showing the shoulder wool out, thereby exposing the best part of the fleece to view.

This treatment is not absolutely necessary, but it greatly assists the work done by the Department, as that class of work is much easier done when the fleece first comes off the sheep's back than if it were jumbled into a bale or bag and broken up.

Branding.—All bales and bags should be branded with a distinguishing mark, as $\frac{J\ T}{X}$, and all marks on bales to be on top cap, or on top side flap.

[TO BE CONTINUED.]

THE LANCASHIRE COTTON INDUSTRY.

According to the United States Bureau of Census (U.S.A.), the total area of cotton lands infested by the boll weevil now amounts to 480,940 square miles; yet the present season's crop of cotton in the United States is expected to reach 15,000,000 bales. Middling American cotton—which in 1915 was quoted in the Liverpool market at 5.08d., in 1916 at 8.04d., in 1917 at 19d.—was selling in 1918 at 22.27d. per lb. This, of course, refers to ginned cotton. The present position of the Lancashire cotton trade is that during the first six months of this year there has been more money made than in any similar period in the history of the industry. The majority of firms have made record profits. Mr. F. W. Tattersall, of Manchester, in an analysis of the stocktaking result of sixteen large spinning companies, shows that in share capital there has been a gain of over 45 per cent., whilst on share and loan capital combined there has been a profit of over 33 per cent. per annum, after allowing interest on loans. The share capital of these concerns amounts to £608,552, and loans to £220,820. In the mills there are over 1,500,000 spindles. Most companies have paid either increased dividends or a special bonus to shareholders. Sufficient details are not available for reliable figures to be published relating to the weaving section of the trade, but the past six months has been a very prosperous period, especially for firms who both spin and weave. Owing to the shortage of raw cotton, and the considerable amount of machinery stopped, demand in both yarn and cloth exceeds supply, and there is every probability of big profits being continued, at any rate until the end of the war.

If it were possible to ship over Queensland cotton to England there would be a revival of the times when our cotton sent to Liverpool in 1871 totalled 2,602,100 lb., valued at £79,317. Cotton, then, was universally grown by farmers, particularly in the East and West Moreton district; and at from 3d. to 4d. per lb. for seed cotton, the crop proved to be a very paying one. When, at the close of the Civil War in America, cotton once more was shipped to England, and prices fell to 5d. per lb., the industry in Queensland died out. Under present war conditions farmers have again taken advantage of the facilities afforded by the Department of Agriculture for handling the cotton crop; and for the past three years the quantity delivered at the State Ginnery has annually increased, and the prospects of cotton becoming one of our staple crops are bright. About 40,000 lb. of seed cotton were delivered, ginned, and marketed on farmers' account, during 1918; and the demand for seed for next season's planting has largely increased. As will be seen in our advertising pages, the conditions under which farmers are urged to grow cotton are most favourable, and have enabled growers to realise a good profit on the crop.

Poultry.

REPORT ON EGG-LAYING COMPETITION, QUEENSLAND AGRICULTURAL COLLEGE, SEPTEMBER, 1918.

The laying on the whole has been fairly good for the month. No rain has fallen, and some hot days have been experienced during the month. Considering the absence of green feed, some of the scores are very creditable. D. Fulton's "A" and "C" birds both broke their respective continuous runs at 70 eggs. Although "B" and "E" have gone broody in this pen, they have put up the highest score for a group, with the fine total of 162 eggs. In the light breeds E. Chester heads the list with 155 eggs. Broodiness is becoming more frequent, and there have been one or more cases in nearly all the heavy pens. Two cases of broodiness have occurred in the light section, viz.:—Mrs. Hunter's "B" bird and Mr. G. Prince's "C" bird. Two deaths occurred during the month, and new birds have been sent. J. Zahl's "F" hen has not yet been replaced. Several birds have been treated for minor ailments. All competing birds will be judged for "trueness to type" during October, and the results published at the end of the month. The following are the individual records:—

Competitors.	Breed.	Sept.	Total.
LIGHT BREEDS.			
*Dixie Egg Plant	White Leghorns ...	142	865
*E. Chester	Do.	155	786
*G. W. Hindes	Do.	137	770
*Geo. Howard	Do.	140	760
*C. Knoblauch	Do.	131	740
*C. P. Buchanan	Do.	129	739
*Geo. Prince	Do.	136	737
*T. Fanning	Do.	126	722
*G. H. Turner	Do.	141	721
*W. Becker	Do.	131	711
*Mrs. L. Henderson	Do.	129	705
*W. Lyell	Do.	135	701
*R. Holmes	Do.	131	698
*Oakland Poultry Farm	Do.	140	681
*L. G. Innes	Do.	134	680
*E. A. Smith	Do.	140	680
*O. K. Yards	Do.	118	664
B. Caswell	Do.	124	653
*Dr. E. C. Jennings	Do.	126	640
*Quinn's Post Poultry Farm	Do.	144	639
*Range Poultry Farm	Do.	120	621
J. J. Davies	Do.	122	620
*Chris. Porter	Do.	120	614
*Thos. Taylor	Do.	114	610
Harold Fraser	Do.	95	601
*Mrs. A. T. Coomber	Do.	122	593

EGG-LAYING COMPETITION—*continued.*

Competitors.	Breed.	Sept.	Total.
LIGHT BREEDS— <i>continued.</i>			
O. W. J. Whitman	White Leghorns ...	101	590
*J. Zahl	Do.	101	572
*J. M. Manson	Do.	129	569
*Homalayan Poultry Farm	Do.	134	564
R. T. G. Carey	Do.	90	552
Mrs. L. F. Anderson	Do.	121	534
*T. B. Hawkins	Do.	126	533
S. Wilkinson	Do.	101	509
*J. W. Newton	Do.	132	508
G. Williams	Do.	81	507
*Mrs. R. Hunter	Do.	130	507
Mrs. A. G. Kurth	Do.	124	504
H. B. Stevens	Do.	118	490
Geo. Trapp	Do.	110	488
Shaw and Stevenson	Black Leghorns ...	108	485
H. F. Britten	White Leghorns ...	107	475
Progressive Poultry Pens	Do.	111	458
B. Chester	Do.	102	439
P. O. Oldham	Do.	118	434
W. A. Wilson	Do.	112	407
A. W. Walker	Do.	120	394
HEAVY BREEDS.			
*Nobby Poultry Farm	Black Orpingtons ...	129	797
*A. E. Walters	Do.	144	691
*E. F. Dennis	Do.	133	683
*E. Morris	Do.	132	681
T. Hindley	Do.	121	665
*R. Burns	Do.	145	636
*D. Fulton	Do.	162	636
*Mars Poultry Farm	Do.	129	626
*W. Smith	Do.	123	620
*J. W. Macrae	Do.	120	604
*W. H. Reilly	Chinese Langshans ...	106	597
E. M. Larsen	Black Orpingtons ...	97	579
A. Shanks	Do.	137	557
T. W. Lutze	Do.	130	494
W. J. Mee	Do.	84	480
*F. A. Claussen	Rhode Island Reds ...	107	470
H. Puff	Do.	87	395
Jas. Fitzpatrick	Do.	103	369
Totals	...	7,947	39,050

* Indicates that the pen is being single tested.

DETAILS OF SINGLE HEN PENS.

Competitor.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
Dixie Egg Plant	138	137	155	135	147	153	865
E. Chester	132	136	123	152	121	122	786
G. W. Hindes	168	129	124	128	122	109	770
Geo. Howard	119	125	135	126	122	133	760
C. Knoblauch	123	113	138	117	124	125	740

EGG-LAYING COMPETITION—*continued.*DETAILS OF SINGLE HEN PENS—*continued.*

Competitors.	A.	B.	C.	D.	E.	F.	Total.
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LIGHT BREEDS—*continued.*

C. P. Buchanan	115	119	127	122	133	123	739
Geo. Prince	98	136	126	128	122	127	737
T. Fanning	131	110	132	92	131	126	722
G. H. Turner	73	101	133	134	153	127	721
W. Becker	120	121	100	133	108	129	711
Mrs. L. Henderson	123	106	119	86	134	137	705
W. Lyell	121	126	125	113	106	110	701
R. Holmes	130	127	111	111	101	118	698
Oakland Poultry Farm	101	111	126	129	110	104	681
L. G. Innes	119	137	146	76	79	123	680
E. A. Smith	92	133	118	126	118	93	680
O.K. Poultry Yards	104	121	124	98	121	96	664
Dr. Jennings	94	132	119	101	111	83	640
Quinn's Post Poultry Farm	137	90	102	92	129	89	639
Range Poultry Farm	33	139	85	113	120	131	621
C. Porter	70	108	120	93	101	122	614
Thos. Taylor	72	117	109	93	105	114	610
Mrs. Coomber	86	112	96	103	73	123	593
J. Zahl	124	95	113	106	84	50	572
J. M. Manson	126	116	129	67	57	74	569
Homalayan Poultry Farm	118	101	81	74	111	79	564
T. B. Hawkins	106	85	115	68	86	73	533
J. W. Newton	95	125	48	72	95	73	508
Mrs. R. Hunter	81	117	31	82	93	100	507

HEAVY BREEDS.

Nobby Poultry Farm	150	131	117	112	139	148	797
A. E. Walters	106	141	83	128	142	91	691
E. F. Dennis	141	106	105	64	150	117	683
E. Morris	101	109	135	134	117	85	681
R. Burns	96	108	86	95	133	118	636
D. Fulton	117	107	98	93	65	156	636
Mars Poultry Farm	110	120	99	106	95	96	626
W. Smith	150	118	43	102	93	114	620
J. W. Macrae	64	71	124	98	119	128	604
W. H. Reilly	104	124	107	58	92	112	597
F. A. Claussen	85	84	69	91	94	47	470

DOES POULTRY FARMING PAY?

Mr. I. W. Seymour (a returned soldier) contributes to the "Victorian Poultry Journal" some practical details regarding above. In August, 1917, he purchased 14 birds at a cost of £8 7s. His experience is given as follows:—

On 10th September last we hatched 40 chicks from incubator, and another 40 on 1st October. We had 26 cockerels from this lot; some died, principally owing to want of experience on our part. We have eaten 10 or 12 (saving butcher's meat), and now have 3 fine cockerels eight months old, worth, I am told, £2 2s. each, for sale. We now have the 13 old birds—still laying us a dozen eggs a week—just getting over the moult, and 26 fine pullets, just mostly coming into the "lay," the 10 laying at present returning us 54 eggs for the week ended 12th May, 1918. I

have erected (iron) single-testing sheds for eleven birds, 3 by 6 by 5 ft.; and in them are 11 of the young pullets being tested singly for next year mating knowledge. These sheds cost me, without labour, £10 12s. 6d.

From commencement I have purchased best feed, mostly as laid down by your paper, at full market rates. Cost of feed to date, £9 7s. 6d.; value of eggs laid to date, 223½ dozen at 1s. per dozen, £11 3s. 6d. (I have just sold 9 dozen at 2s. 4d. per dozen wholesale); excess value of eggs over cost of food, £1 16s.; and we are only just now on the threshold of getting any money back. By the end of next week (19th May, 1918) I hope to have 24 pullets laying; and if they do as well as the 10 already laying, you can easily figure out the result. As you know, feed is extortionately dear—wheat, 5s.; maize, 5s. 2d. &c.

The June issue of the "Victorian Poultry Journal" contains some interesting correspondence in connection with the above question. Mr. E. H. Gibbs, of South Camberwell, writes at some length, and from his letter we take the following:—

On 1st May, I had 17 pullets, 6 second-year hens, and 2 roosters, or 25 fowls in all. During May and June very few eggs were gathered, and things began to look gloomy, and I had one of the "cold" turns. Then the mating and breeding season came along, and the temperature went up to fever heat, busied myself buying incubators, brooders, &c., and altogether became thoroughly interested in the work, which culminated in hatching the little balls of fluff which delight the eye, and, perhaps for the first time, awaken the wife's interest in the venture, as she has hitherto been keenly criticising the expenditure. Then on with the anxious time of rearing the young brood; and I might here state that in my opinion the rearing of the chicks is where the utmost care is necessary, for 30 dead in two nights was one of my experiences by being too kind to them, and I ultimately succeeded in rearing about 170 strong chickens, and from them 87 pullets and 4 cockerels, having sold a few and eaten others.

Now for my balance-sheet and comparison of assets for the twelve months:—

BALANCE-SHEET.

<i>Receipts.</i>						£	s.	d.
From sale of eggs	..	..	..	..	..	23	14	6
From settings of eggs	..	..	..	..	..	1	1	9
From sale of chickens	..	..	..	..	..	0	9	0
From young cockerels	..	..	..	..	..	2	7	9
To debit	..	..	..	..	..	2	15	10
						£30	8	10
<i>Expenditure.</i>								
Feed, kerosene, &c.	..	..	..	..	..	28	5	10
5 per cent. interest on capital of £43	..	..	..	..	..	2	3	0
						£30	8	10

COMPARISON OF ASSETS.

1st May, 1917.						£	s.	d.
17 Pullets, at 5s.	..	..	..	..	..	4	5	0
2 Roosters, at 5s.	..	..	..	..	..	0	10	0
6 Second-year hens, at 3s.	..	..	..	..	..	0	18	0
To Cr. balance	..	..	..	..	..	23	10	0
						£29	3	0
30th April, 1918.								
87 Pullets, at 5s. each	..	..	..	..	..	21	15	0
20 Breeding hens, at 5s. each	..	..	..	..	..	5	0	0
6 Hens, at 3s. each	..	..	..	..	..	0	18	0
2 Roosters, at 5s. each	..	..	..	..	..	0	10	0
4 Cockerels, at 5s. each	..	..	..	..	..	1	0	0
						£29	3	0

or a credit balance on the whole of £20 14s. 2d. for the twelve months. I have assessed the value of the pullets at 5s. each, but they are worth much more.

The Horse.

OUR HORSE-BREEDING INDUSTRY.

Under this heading, with the sub-heading "Haphazard Methods," a contributor to the "Australian Farmer," Melbourne, 15th August, writes:—

Reports of the doings of Australian horses in Egypt and in France leave no doubt as to their superiority so far as toughness is concerned. The sizzling heat of Egypt and the freezing winters of France seem to be alike tolerable to them. American and Continental horses are easily outclassed by the Australian-breds. Official reports are laden with enthusiastic praise of the wonderful endurance of the mounts of our Light Horse Regiments in across-desert stunts.

Taken straight off fresh water on to the brackish—almost salt—desert well water, 900 horses carried our boys on a long journey over sand dunes for many days. Saddles were rarely removed; drinking-places were precariously distant from one another. For several days at a time the poor game brutes were without water; but these hardy Australian equines did not fail. They went and returned, the only casualties being one horse lame, and two developed colic.

The Arabian horse is outclassed in his own country by the military horses of Australia. There is ample evidence of the fact in the reports of trustworthy officers. It even has been asserted that the camel cannot "get away with" the Australian horse in desert travelling.

From France come glowing reports of the endurance of our horses—horses that have survived all manner of hardships in more than three years' transport work. They have survived—or, rather, 60 per cent. of them have worked incessantly throughout nerve-racking, muscle-straining service close to the firing line. It was not fair average toil, for the wheels often sunk until the wagon floors scraped the slushy surface. Horses which came from other sources to fill the occasional gaps in the Australian teams proved but poor substitutes.

From the veterinary hospitals we learn of the wonderful response to veterinary treatment made by wounded Australian horses.

In Egypt there seems to be no limit to their toughness. One official report concludes:—"If a reasonable quantity of water is kept up to these horses, they will go on practically indefinitely."

The popularity of our horses at the Front is undeniably great. A returned officer tells that the first question English "heads" ask, when applying at the depôts for equine reinforcements, is: "Have you any Australian horses?"

Little wonder that our khaki-clad boys abroad display so much affection for their four-footed comrades. Australia is the finest horse-breeding country in the world. Its indigenous grasses are not only extremely nourishing, but they retain high feeding value for months after they have become browned and shrivelled for lack of moisture. The climate is so genial in this land of sunshine as to make the winter stabling of stock unnecessary; but what contributes more than anything else to the creation of toughness in the Australian horses is, perhaps, the severe droughts that come so irregularly, yet so surely.

In the drought-stricken parts beyond the track of the plough, hundreds of horses perish from hunger and thirst. Ere rain comes, the survivors are merely moving shapes of bone and hide. Their toughness is amazing, for they seem to be able to retain a grip on life when there is apparently nothing edible and no moisture to sustain them.

When the rain comes, the rested and sweetened earth quickly gives forth abundant succour to its dumb dependents. The long-starved horses exhibit their powers of recuperation by making marvellously rapid return to robust condition. The climatic eccentricities of Australia have been an appreciable factor in creating the now-established toughness of our horse stock, since for generations succeeding droughts have left only the strongest equine individuals to sustain our horse-breeding industry. Nevertheless, we must remember that the horses shipped overseas from the Commonwealth represented the cream of our utility studs. The military buyers combed every State and searched every hole and pocket to get horses good enough for shipment.

LACK OF METHOD.

Our breeders, as a whole, must not plume themselves because Australian horses have gained such favourable notice at the Front. Rather, they should look at the thousands of horses that the military buyers declined to take. Soon they would realise that there is something wrong with our horse-breeding industry, something wrong with our methods of production—a fact which ought to arouse in our horse-

breeders early recognition of the haphazard means by which the industry they represent is kept in existence.

The sheep man carefully culls his studs and flocks, and is ever alert to employ the best stock procurable to improve his products. He will not put a price on his best ewes.

In ridiculous contrast is the attitude of the average breeder of utility horses, who will sell anything. When he discovers that a mare is an indifferent worker, he finds a way out of a difficulty as to what he shall do with her by "sending her to the horse." On the other hand, when asked why he does not breed from an extra good mare, the usual reply is: "Oh, I can't do without her."

Often it may be noticed that the small breeder sends to the stud only mares that he can easily do without.

It must be admitted that the oft-recurring depression of market values has been responsible for the evident indifference with which the landholder views his little horse-breeding side-show. During the past fifteen or sixteen years, military requirements have made our horse export trade an important one. At varying periods big orders have come for war horses. The rush with which big shipments were collected for this purpose enabled owners to get rid of a big percentage of undesirable horses as well as their best sorts.

SACRIFICING MARES.

One of the most regrettable influences towards the deterioration of our horse stock has been the indiscriminate sale of good mares for shipment overseas. During the Boer War thousands of mares were sent away. For the Boxer War, in China, the German Government purchased, at a high price, hundreds of very fine horses, which included a big percentage of the best mares in Australia. When Japan was at war with Russia, representatives of the Mikado bought thousands of serviceable horses. With them went at least hundreds of mares of superb conformation.

Amongst the hundred and thirty-odd thousand horses shipped since the present war began were many high-class mares, although it is comforting to know that the Defence Department issued an instruction that kept the exportation of females down to a reasonably small percentage.

It would be a low estimate to conclude that within the past twenty years Australia has lost 50 per cent. of her best mares to oversea bidding. The Indian trade, since its inception forty-six years ago, has taken, perhaps, mares to the proportion of one-third of each shipment. Horses exported to the order of the Indian Government in time of peace are only of the highest military classes, so that the loss in mares in this direction alone has been so great that several of the shippers themselves have recently advocated schemes for the prohibition of the exportation of good mares.

THE GOVERNMENT MUST MOVE.

Not only is legislation urgently needed to prohibit the exportation of choice mares and to prevent the use of mongrel and unsound stallions, it is imperative that the Federal Government should move practically in the direction of guiding and assisting those engaged in the horse-breeding industry in every way possible.

We do not suggest that the Government should enter into competition with private enterprise, but that experimental breeding farms should be established, to discover to breeders the best methods of production, and to create for those needing instruction examples of the most marketable types.

The only recognition made of the recommendations which resulted from the important horse-breeding conference held in Melbourne a couple of years ago was the formation of a remount stud at Maribyrnong last year. Certainly this is a step in the right direction, because operations are being conducted by men experienced in the horse-breeding business. Something like 100 high-class mares, selected from the thousands purchased for the war at an average of £20 1s. 7d. per head, have been mated with high-class thoroughbred stallions for the production of military horses. The stallions now at Maribyrnong are:—Three Star (a good performer under heavy weights), Jolly Maltster (a proved sire of good stock), Piastre (winner of the Melbourne Cup, V.R.C. Champion Stakes, and other weight-for-age events), and Malt Flag (a half-brother to Red Signal, and himself a good performer and tried stock-getter). Piastre is one of Australia's greatest stayers. Three Star and Malt Flag—respectively winners of the big prizes for best remount sires at the Sydney Royal Show of 1917 and 1918—were presented to the Defence Department.

The mares so advantageously collected by the Remount Department for the formation of the stud at Maribyrnong have exacted the admiration of front-rank breeders and men engaged in the Indian trade. They are identical with the class being ear-marked in France by the Imperial Remount Department to mate with blood horses in England, after the war, to produce hunter-type cavalry horses.

Piastre, Three Star, and Jolly Maltster, together with half a dozen mares and a team of cavalry horses, were taken over to the last Sydney Show as a non-competitive exhibit, which aroused the enthusiastic approval of the Press and of the many

horse-breeders and others on the other side of the Murray. This one Government stud is but a small start of a necessarily larger scheme, which should embrace the raising of high-class stallions which could be made available to breeders at a low service fee.

THE REPATRIATION SCHEME.

The repatriation scheme, which is to provide for the placing of thousands of returned soldiers on the land, reminds us that fresh influence will be brought to bear upon the future of our horse-breeding industry. These soldier settlers may be depended upon to swell the ranks of small horse-breeders. Their numbers will make their combined operations in this direction an important factor in raising or lowering the standard of our equine stock.

The Remount Department, now well experienced in the buying and distributing of horseflesh, is fully equipped with the machinery to guide the soldier settlers in the matter of laying a good foundation for their horse-breeding operations.

So far, we understand, the Repatriation Department has not enlisted the services of the Remount Department in procuring horses for the returned boys; nor has it given any apparent consideration to the horse-breeding possibilities of the scheme.

Only mares, and mares calculated to produce first-class stock, should be issued to the soldier settlers. The establishment of the Remount Stud, which embraces four valuable stallions, suggests great possibilities in the direction of supplying to the returned soldiers mares that have been mated with one or other of these stallions.

The horse-breeder of the future will be the small farmer. The big horse-breeding stations practically have faded away before the march of closer settlement. Thousands of small holdings have succeeded them; and thousands of small farmers are doing the horse-breeding. This multiplication of controlling influences means an immense increase in the varieties of type. It means a deplorable lack of uniformity; and it also means that our horses will rapidly deteriorate if something is not done at once to put our horse-breeders on the right track.

The farmers of the Wangaratta district have decided, through the local organisation, to invite kindred bodies to combine with them to urge the Government to do something for the horse-breeding industry.

THE COMING DEMAND FOR HORSES.

From the same source we take the following article by B. Folliot Sandford:—

The effects of the present war are, of course, felt directly or indirectly by all members of the community and in all branches of industry. In commercial circles the prices of commodities have been so largely increased that the cost of living has become a very serious problem indeed. The enhanced price is not as yet observable in the case of horses—heavy or light—which are now obtainable at lower figures probably than have hitherto existed in this country. There would appear to be no dearth of supply for present purposes, but the quality of animal available is certainly inferior to those with which our saleyards are usually stocked in normal times.

There are, doubtless, other factors besides the war operating upon the prices of horse stock, but it is certain that when the times of peace return the public will have to pay—and pay well—for all classes of horses. During the currency of the war the best horses available the world over have been sought out for army use; during the first nine months no fewer than 60,000 horses were sent from Australia alone, and there has been a steady drain upon our reserves ever since. Very few, if any, will return into civil use, because those which survive the dangers and terrors of the battlefield will—at least as regards most of those sent from this Commonwealth—be absolutely debarred by the rigid laws of quarantine. They must be viewed, therefore, as non-existent, and consequently, with the return to peace conditions, our horse stock must of necessity fall far behind requirements.

Owners of mares will find it to their great advantage to prepare for the approaching demand by raising foals freely; but in doing so it is imperative that the question of quality must be studied. It is well to remember in this connection that the opinion accepted as that of the general public upon any subject is that formed by, and based upon, the utterances of certain persons whom the majority of the public itself, consciously or unconsciously, has invested with perfect knowledge of that particular subject. The natural result of this act of faith or folly is that upon most subjects, at one time or another, the public is carried away *volens volens*, and little by little an erroneous standard is established, to which the public—as a whole or in the main—not only consents, but blindly accords its hearty support.

This has for long been adversely affecting the quality of our Australian horses; and horse-breeders would act wisely by seeking advice of undoubted value upon the highly important subject of the selection of sires, because, since horse-breeding on sound lines has of late been to a great extent departed from, a very nondescript class of stallion will be rushed into service when better prices prevail.

Dairying.

THE DAIRY HERD, QUEENSLAND AGRICULTURAL COLLEGE, GATTON.

MILKING RECORDS OF COWS FROM 31ST AUGUST TO 30TH SEPTEMBER, 1918.

Name of Cow.	Breed.	Date of Calving.	Total Milk.	Test.	Commercial Butter.	Remarks.
			Lb.	%	Lb.	
Auntie's Lass ...	Ayrshire ...	1 Aug., 1918	1,237	4.2	58.26	
Gay Lassie ...	" ...	29 Aug. "	998	4.0	44.60	
Iron Plate ...	Jersey ...	1 Sept. "	761	5.0	42.95	
Netherhall Q. Kate	Ayrshire ...	29 Aug. "	771	4.2	36.27	
Miss Betty ...	Jersey ...	9 June "	387	7.2	30.96	
Nether-ton Belle ...	Ayrshire ...	30 Aug. "	661	3.8	27.99	
Yarraview Ida's	Guernsey ...	5 May "	455	5.2	26.81	
Hope						
La Hurette Hope	Jersey ...	10 July "	355	6.2	24.20	
Violet's Peer's	" ...	31 Aug. "	481	4.4	23.75	
Girl						
Barlesque ...	" ...	25 Aug. "	533	3.8	22.56	
Skylark ...	Ayrshire ...	25 July "	561	3.6	22.44	
Rosine ...	" ...	26 Aug. "	622	3.2	21.94	
Lady Melba ...	Holstein ...	31 Mar. "	618	3.2	21.80	
Sweet Meadows ...	Jersey ...	1 Sept. "	503	3.6	20.12	
Miss Security ...	Ayrshire ...	19 July "	500	3.6	20.0	

CALCULATING BUTTER FAT AND "OVER-RUN."

It is estimated that 100 lb. of fat in cream is equivalent to 103 lb. fat in milk. This is accounted for because the loss of fat in the skim milk falls upon the suppliers instead of the factory, and other minor losses in manufacture are avoided. In a general way it may be said that the over-run in milk, when samples are taken with great care and all the apparatus is correctly graduated, will average about 16 2.3 per cent.—that is, the pound of butter made will be one-sixth more than the pound of fat in the milk. With cream testing from 25 to 35 per cent. fat, the over-run will average not far from 20 per cent. That is to say, 100 lb. of fat in cream is expected to make not less than 120 lb. of butter. Stated in another way, the fat in cream will produce on the average about 3 per cent. more butter than the fat in milk. Hence, to adjust the returns in a factory where there are both milk and cream suppliers, it is suggested that the fat in the cream be reduced to its equivalent in milk by adding 3 per cent. to it. Thus, if Supplier A furnished 1,000 lb. of 4 per cent. milk, and Supplier B 100 lb. of 25 per cent. cream, the former should be credited with 40 lb. of fat, and the latter with 25 lb. plus 3 per cent., which would be 25.75 lb., and the total fat upon which to base the return would be 65.75 lb. It costs somewhat more to make butter from milk than from cream, for there is the expense of running the milk through the separator and the cost of the extra vats and pumps for storing and handling the milk and the skim milk. This extra expense would vary with the amount of milk. It would be scarcely appreciable as between 10,000 lb. and 11,000 lb.; but the extra expense might amount to about 2s. for milk; enough to make 100 lb. of butter.—“Australian Farmer.”

The Orchard.

SAFETY ATTACHMENT FOR A FRUITGROWERS' LADDER.

Many of our best citrus and other orchards are situated in hilly country, and where trees are planted on hillsides the gathering of the fruit requires that the ladder shall be firmly planted. Ordinarily a block of timber is placed in position at the foot of the ladder on the lower slope. This has occupied the attention of Mr. L. Stemp, a well-known fruitgrower at Palmwoods (N.C. Line); and he has devised a simple means of adapting an attachment to a ladder, by which, on reasonably sloping ground, the latter stands as it would on level ground, thus obviating all danger of a capsize down hill. The accompanying sketch gives a clear idea

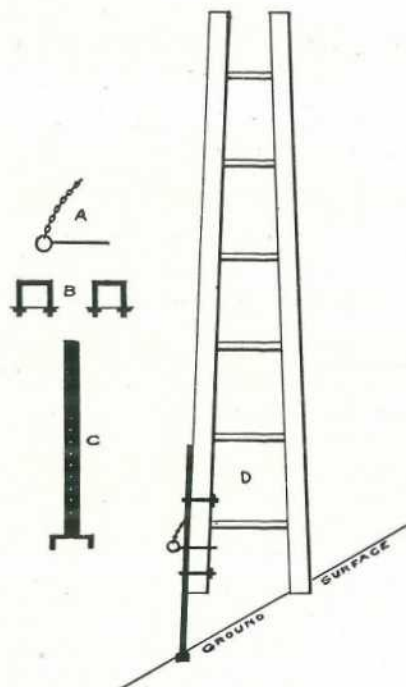


PLATE 29.

of the attachment in operation. Mr. Stemp has patented his invention, which, like many more important inventions, will doubtless come into general use. He names it "The Fruitgrowers' Ladder Attachment for Safety on Hillsides."

The whole attachment only adds $3\frac{1}{2}$ lb. to the weight of the ladder, and may be adjusted to any variable surface, as shown in the sketch, or it may be either removed, if not needed, or slid up. The bar has 5 holes, 2 inches apart. On the ladder foot there are 2 holes, 3 inches apart, 5 and 8 inches respectively from the bottom, to receive the pin.

Horticulture.

THE ROSE.

The great secret in successful horticulture is a perfect knowledge of the seasons, so as to adapt each variety of cultivated flowers to the needful temperature and rainfall. For roses to give complete satisfaction, they must be allowed ample room for the roots to spread and feed, with plenty of light and air to ripen the wood. Hence, seasonable planting, seasonable pruning, and seasonable working are the elements of success.

The proper season for planting roses is from March to August, and the main pruning should be done in June or July. The cuttings may be planted in beds for future setting out. The freest flowering roses are the Tea, Noisettes, Bourbons, and some of the hybrid Chinas and perpetuals. Some of the Teas and Noisettes will bear pruning whenever they are at rest and out of bloom, and this process will hasten their blooming again. Hybrid perpetuals must only be pruned during the main pruning season.

The best soil for roses is a deep, rich, strong loam free from stagnant moisture. Some like a sweet clay subsoil. Sandy, gravelly soils are not suitable. But, if such are the only soils available, they must be improved by a dressing of strong loam in conjunction with cowdung or nightsoil. The latter, if properly prepared, and not too fresh, is really the very best manure for roses in all soils except those which are naturally rich. If artificial manures are used, the trees will be much benefited by a manurial dressing once in three weeks of 1 lb. of nitrate of soda to from 50 to 75 gallons of water. After application, moisten the soil slightly. Old stocks require more dilution—say, 100 gallons of water to 1 lb. of nitrate. The soil may be soaked with this. Heavy soils are improved by adding burnt earth or gritty refuse with stable manure and leaf mould or cocoanut fibre refuse. Damp soils must necessarily be drained. Roses require a constant annual supply of manure, with liberal supplies of water, during the growing season, and especially must they be kept clear of aphides and other insect pests. This may be done by dusting them with tobacco dust when the branches and leaves are moist with dew and washing it off with a syringe next day, or spraying them with tobacco water or kerosene emulsion. A very effective spray pump is the Cyclone, which may be obtained from most seedsmen. It possesses the advantages of lightness, cleanliness, and effectiveness, and is especially adapted for ladies' use in the bush or hot house, or for garden spraying, being easily worked. It delivers a fine spray, which may be rendered heavier by working the plunger quickly. Used with a spraying fluid of extract of tobacco, whale-oil soap, or kerosene emulsion, it is effective in searching out green fly or mildew on delicate flowers and roses. For orchids and ferns the spray should consist of ammonia sulphate. It is also very handy for spraying the walls and roofs of poultry-houses.

Some growers prefer to grow roses on their own roots; others, on briar stocks. When growing on their own roots, should the tops die down from any cause, the roots will throw up fresh shoots true to their kind; whereas, if the grafted rose dies back, nothing will come in its place but the original briar. When dwarf beds of roses are required, a good plan is to peg down, to within about 6 in. from the ground, the strong one-year-old shoots from the root. In due time blooming shoots break out from nearly every eye, and masses of flowers are secured; while strong, young shoots are sent up from the centre, the plant being on its own roots. Before the winter, the old shoots which have then flowered and exhausted themselves may be cut away, and three or four more of the strongest and best-ripened young shoots are reserved for pegging down in the following season, say, in July or August. In the meantime, after the pruning has been effected, plenty of good manure should have been dug in around the roots. Thus treated, the plants never fail to produce plenty of strong wood for pegging down each season. To make kerosene emulsion, use 8 oz. of ordinary soap cut up and dissolved in 2 gallons of boiling water. When dissolved, add cold water to 4 gallons and 2 gallons of kerosene, well stirred during use. The emulsion must be warm when used. Tobacco spray is made with two fluid ounces of black leaf tobacco to one gallon of water.

Viticulture.

PRACTICAL HINTS ON ESTABLISHING A VINEYARD.—No. 7.

By P. MAHONEY.

IMPLEMENTS AND METHODS BEST ADAPTED TO CULTIVATION.

One of the most important factors in caring for a vineyard and bringing it into bearing early is cultivation. To conserve all the moisture possible for the plants' requirement, and to tide them over dry spells without any loss of growth or fruit, depends upon the cultivation, which cannot be too widely advocated, for it also has many other advantages, such as keeping down weeds and grass, which are moisture robbers, and also by disturbing the soil, thus affording the light and air more scope for action upon it, which action sweetens the soil and makes available plant food which otherwise would never be fit for assimilation by the plants.

Enormous quantities of moisture can be lost through leaving the cultivating until after the surface soil has become crusted and hard. When these conditions prevail, the moisture is drying out rapidly. If the ground has a tendency to set hard and become crusty before it is in a fit condition to be cultivated (as some soils will), that difficulty can be overcome by harrowing the land with a light harrow when it will just carry the horse without bogging; and such treatment will prevent the surface of the soil from caking, and results in a fine and thorough cultivation later, otherwise the soil will be in a cloddy condition after cultivation, thus affording greater scope for evaporation of moisture.

It is very important that the cultivation of the vineyard should continue until the vine has ceased growing. It is bad policy to discontinue cultivating after harvesting the fruit, for it is just as important for the plant to be supplied with abundance of moisture after harvest as before, to enable it to furnish rods with plenty of matured buds for the following crop. The plant needs to be supplied with plenty of moisture right up to the time when it becomes dormant. If this treatment of the vine is neglected after it has produced a crop or crops, its constitution is weakened, and consequently it becomes less productive every year (for, like human beings, it needs nourishment just as do the former as much after a heavy day's work as before it to store up energy for the following day's task). Good treatment to the vine after harvest plays just as an important part as manuring does.

To afford a thorough cultivation to a vineyard, a two-horse implement is essential, so as to admit of close working without damaging the vine, for with a one-horse implement it takes three times as long and greater risks are run, as it is difficult to cultivate close to the vine, and the work is not as thorough, as some ground is likely to be missed. A two-horse Planet Junior cultivator is generally the favoured implement, for it does good work at a minimum of cost. With this implement the ground under the vine can be disturbed right up to the butt of the vine without doing any damage to the vine or foliage, thus saving a lot of labour in weeding, &c., under the trellis. I find the small duck feet tines do the best work, for they leave the soil in a fine mulch, and they are more likely to destroy weeds, &c., than the other tines. A general weeding of the vineyard can be done by fixing the weed-cutting tines on to the cultivator and running them just deep enough to sever the weeds and undesirables below their crowns. This being done on a hot day has a beneficial effect in cleaning the vineyard.

The disc cultivator is a very useful implement when the vineyard is dirty and hard to keep clean, for it is an ideal implement for chopping up weeds, &c. It is more effective than the tine cultivator. But it has a few disadvantages, for it is of a heavy draught, and needs two strong horses to pull it when set to do good work. It also has a tendency to pack the subsoil tight through the discs, continually pressing the soil down. But it is a very useful implement in breaking up cloddy ground and where the soil is of a heavy nature. Both disc and tine cultivator can be made good use of in a vineyard.

[CONCLUDED.]

Botany.

BOTANICAL COLLECTION IN PAPUA.

The Government Botanist (Mr. C. T. White) has recently returned from a five-weeks' stay in Papua, which he visited as the guest of the Lieutenant-Governor—His Excellency Judge Murray—for the purpose of studying and collecting specimens of the vegetation, of which comparatively little is known. The shortness of the stay did not allow of a very detailed examination being made nor a number of places being visited.

The vegetation about Port Moresby (Mr. White says) reminds one of poor forest country in North Queensland, consisting for the most part of grass-covered hills with scattered white-barked Eucalypts of stunted growth dotted about. Other very common trees on the hills are *Alstonia scholaris* (Milky Pine) and *Albizia procera*. The Nut Fern (*Cycas*) is also very common. In the gullies and round the sea-beach are found patches of thin scrub supporting a more varied flora. Every here and there bright masses of scarlet can be seen—the flowers of *Bombax Malabaricum* (the Silk Cotton Tree)—a large tree ranging through North Australia, New Guinea, and Tropical Asia. Round about the rocky sea-coast near the town a species of *Cochlospermum* (a small tree) is also very noticeable on account of its abundance of large, bright, yellow flowers.

After a few days' stay in Port Moresby, Mr. White left—in company with the Papuan Government Geologist (Mr. E. R. Stanley, B.Sc., F.G.S.) and fifteen carriers—for the Sogeri Plateau and Javararie, via Sapphire Creek and Hombrom Bluff. On the Astrolabe Range (about 2,000 ft.)—Hombrom Bluff, Mt. Warirata, &c.—vegetation for the most part is of an open character, the principal forest trees being *Eucalyptus* spp. *Casuarina nodiflora* (a species of Sheo-oak not found in Australia), *Banksia dentata* (a Honeysuckle), *Melaleuca* sp. (Tea-tree), *Diplanthera tetraphylla* and *Timonius Rumphii*.

On the Sogeri Plateau itself the vegetation is very rich and tropical, being mostly evergreen jungle, reminding one very much of the "scrubs" of North Queensland, but perhaps of a more tropical nature.

Sogeri Plateau is a great centre of rubber cultivation, and several large and successful plantations have been established.

Further on, Javararie—nearly 50 miles by road from Port Moresby—is one of the oldest rubber plantations, and produces some of the finest rubber in the Territory; but the lack of decent road communication with the sea-port militates greatly against its financial success. Botanically, round Javararie the country is particularly rich and tropical in character, and a large number of plants was here gathered.

A few days after returning to Port Moresby, Mr. White left for Yule Island and the Mafulu district, again having the advantage of the company of Mr. Stanley. At Yule Island twenty-five native carriers were obtained for carrying the camping outfit, collecting gear, specimens, &c. The journey was made over to the mainland and up the Ethel River as far as Bioto by native canoes, a most comfortable method of travelling in favourable weather.

Time did not permit of much collecting along the banks of the Ethel River, though the mangrove swamps, Nipa palms, and rich tropical vegetation fringing the banks of the river and of Bioto Creek promised a rich field for the botanist.

On reaching Bioto, the canoes were drawn up on the bank and the five days' march to the mountains commenced, the following places being stopped at en route:—Kubunah, Fofofoto, Dilava, Deva Deva, Mafulu, and Bella Vista.

An excellent well-graded road has been surveyed and made under the direction of the Mission Fathers from Bioto as far inland as Ononge, which makes travelling in this country comparatively easy; and travellers in the Mekeo, Dilava, and Mafulu districts—the sphere of influence of the Roman Catholic Missions—are indebted to the missionaries for the facilities with which travelling can be accomplished in these parts of Papua.

The vegetation in the mountain country is extremely rich and varied—ferns, lycopods, orchids, begonias, palms, bamboos, and other tropical forms predominating.

In the Mafulu country, as in other mountain parts of Papua, the most appreciated article of trade with the natives is salt, with which carriers can be paid and provisions bought. Unlike the coastal people, the mountain folk do not press for tobacco in payment of services rendered, but always for salt, matches, beads, &c., tobacco of good quality being largely grown in all the mountain villages.

Mr. White has not, of course, had time as yet to go critically through his collections, but expresses himself as well pleased with the results, considering that, besides a number of species new to science, he has collected a number of Australian and other plants as yet unrecorded for New Guinea.

Entomology.

THE SUGAR INDUSTRY.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from the Entomologist to the Bureau, Dr. J. F. Illingworth:—

With reference to the editorial "Dealing with the Cane Grub" in the August "Sugar Journal," we certainly do appreciate suggestions from men of experience. Indeed, the success of our problem rests largely with the growers themselves. Experimentation, with us, is necessarily limited to the restricted area about Gordonvale; and it is only by free discussion and suggestions that we can hope for early conclusions. The problem is a tremendous one; and a man, single-handed, might spend many years upon it.

Through the splendid co-operation of a few growers we are beginning to see daylight, along the lines of cultivation and the supplying of humus, as indicated in our recent reports. Our experiments with poisons, which are numerous, are not yet concluded. I may state, however, that I am seeking a more satisfactory method of applying the poison than that outlined in Bulletin No. 4 of this station. I cannot advise the open furrow alongside the stools, because of the tendency to dry them out too much.

D1135 VS. GORU.

In a former report I called attention to the rooting systems of these two canes. I have been following the matter up, and have found every evidence of the superiority in the ratooning qualities of D1135. It is a cane that comes away with abundant shoots, and hence requires vigorous ratooning. It is well to slice right into the stool on each side, so that too many stalks will not develop and result in a grassy crop.

Mr. C. V. Hives, who is a man of recognised experience and ability, has called my attention to an interesting experiment which he has had with the two above varieties. He planted four rows of Goru down through the centre of a field of D1135. The first ratoons on this block were out last June; and after ratooning the second time he found that practically all the Goru died out entirely, while the D1135 is doing very well. Undoubtedly, this result is due to the character of the roots of the two canes.

In ratooning during dry weather Goru often succumbs, while under moist conditions it usually does well. I believe that this is due to the fact that the main roots, which are lateral, are broken off in ploughing and the stool dries out too much. This supposition is borne out by the fact that Goru which was not ploughed, on the same farm, is growing well.

Again, referring to the ratooning qualities of D1135, Mr. P. Wienert showed me one of his fields at Fishery Creek, which was planted with Badila in 1916; he supplied the misses, which were abundant, with D1135. At the time of my recent visit, practically all of the Badila had been killed out by the borer beetle, and the shoots of D1135 were very conspicuous because of their great vigour—none of them had suffered in the least from the pest.

PARASITES OF THE BORER BEETLE.

The tachinid parasites (*Ceromasia sphenophori*), referred to in my recent reports, have emerged splendidly in our cage at Gordonvale, where they have had our close attention; but those placed at Babinda and Moolaba have not fared so well; for on two occasions we found that ants (*Pheidole negacephala*) had got into the boxes of cane and were making their nests in the channels of the borers. We have no way of knowing, in these cases, whether the flies have escaped safely or not, and must wait for some months to see if they become established in those districts.

We feel rather confident of the result in our own district, because the flies were liberated from day to day, after they had mated in the large cage; and we sometimes saw them flying about in the borer-infested cane, which is alongside. They will have a good chance in this field, for it is not to be cut until the end of the season, and there is plenty of other cane near by.

BORER BEETLES, RATS, AND OWLS.

Let me call attention to the close relation existing between borer beetles and cane rats; and, further on, the value of barn owls in destroying these rodents.

It is a recognised fact that the borer beetles work along the lines of least resistance in depositing their eggs. If they find a split or hole in the rind of the cane they take advantage of it, for they are able to deposit their eggs more abundantly. The stalks chewed by rats are ideal locations for finding the young grubs of the borer, and for this reason let me urge that they should be discarded when cutting cane plants.

Let us recognise then that the destruction of the cane rat is an important step in the control of the borer beetle, where soft varieties are grown; and, again, that rats are more abundant in badly cultivated fields, especially those with weedy headlands. I think this may be accounted for by the fact that owls are unable to catch the rodents thus protected. When the headlands are clean the birds are able to discover their prey as the rats cross from one field to another.

My experience with the American Barn Owl (*Strix pratincola*) will be of interest to those suffering from a pest of rats.

A pair of these birds had been nesting for some time on the top of a large, unused chimney of a school building. Upon examination I found that the chimney was almost filled with the cast-up pellets of the birds. Every bird student knows how the owl regurgitates the bones, hair, and so forth in a little pellet shortly after each meal. After raking these out of the chimney, they almost filled a two-bushel bag; and each one represented a rodent—identified by the skull, which was entire. I took the exhibit to a farmers' club, where it stirred up great enthusiasm for the protection of the owls.

I was pleased to learn from the literature here that Australia has four species of barn owls, and that one (*Strix delicatula*) was said to be common in North Queensland. Investigating the matter in the vicinity of the laboratory at night, I soon discovered a pair with several full-grown young. These birds have a call which is not unlike that of our American species. I can best imitate it by forcibly exhaling the breath between the tongue and teeth—a sort of rasping sound. They are very friendly, and come around the buildings at night, even perching on the water tank at the house when I gave their call.

This immediate region does not suffer from cane rats, and I do not doubt that these birds are doing their part to hold them in check.

MOTH PESTS.

Both the Army Worm (*Cirphis unipuncta*) and the Noctuid Moth Borer (*Phragmatiphila truncata*) are rather troublesome this season in places along the Mulgrave River. Fortunately, both species are attacked freely by parasites which keep them from becoming serious pests.

Every grower is familiar with the work of the army worm on young cane plants, the leaves being chipped out at the edges, and the caterpillar is usually to be found during the day hiding between the top leaves. The work of the noctuid moth borer, though less familiar, is easily recognised on young canes, for the central leaves are usually killed entirely, all the feeding being done inside the shoot. On old cane the caterpillars work behind the upper leaf-sheaths, boring into the stalks here and there; but their work may be easily recognised by the abundant frass that they throw out.

The caterpillars do not remain long inside the stalk, for a single individual may make a number of tunnels—evidently only going into them to feed and to hide during the day. The principal damage to mature cane is that they cause it to shoot freely at the eyes, due to the injury of the terminal bud.

I would suggest, as a possible control measure, the application of a green crop of beans or peas before planting cane again. This, however, would be of little avail if there were other infested fields of cane near by.

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report from the Field Assistant to the Bureau, Mr. J. C. Murray:—

During the month of August the districts of Nambour, Maryborough, Pialba, Childers, and Bundaberg have been visited, and as many farmers as possible called upon.

I find that in Nambour crushing has been proceeding since the 31st July. Prospects generally are fair, though the farmers seem to have suffered rather severely from the frost, although not so badly as at Bundaberg.

The principal varieties growing are D1135, N.G. 16, and H.Q. 285. Some farmers have small quantities of Purple Innis and Malagache, though the D1135 seems easily the best cane for this district. It has, however, a tendency to become thin and weak looking after the second ratoon crop.

Most of the land here has an acid reaction, as very little liming or green manuring has been done. Advice as to the best methods of getting results was eagerly sought after by the farmers, for, taking many things into consideration, they have had rather an uphill fight around Nambour.

The soil is rather hard to define. In some places it might be termed alluvial with a fair quantity of gravel, but a great deal of it is a heavy dark soil fairly rich in humus. The low-lying portions are not well drained.

No labour troubles have been experienced, most of the work being done by co-operation.

Cane farming around Maryborough appears to be declining. A good deal of 1900 Seedling is grown as well as D1135. Some of the farmers have a small quantity of Rappoe. The frost was fairly severe here; most of the cane is touched, though not severely, the tops only being damaged. Most of the farmers have a fair quantity of standover cane, principally D1135 for the Island. Plantation conditions are good. Soil conditions in Maryborough are very much the same as Nambour. Acidity in the soil is very pronounced. Conditions of labour are good as regards cane cutting.

Very few farmers volunteer ratoons, most of them burning the trash as the cane stands. The cane is peculiarly free from disease in this district.

At Pialba things are, from a farmer's point of view, discouraging. No frost has been experienced, but good results are not being obtained by the farmers. I consider this is due to lack of cultivation and neglecting to green manure and lime. Varieties of cane here are D1135, Black Java, 1900 Seedling. The same can be said here as regards acidity as of the other districts. The soil consists of a sandy loam with gravel and a heavy dark soil with a clayey subsoil. Some farmers are growing the Clark's Seedling, but of all the varieties the D1135 seems to do best. There are no local sources of lime around Pialba, most of the farmers dealing with the Degilbo Liming Company.

The Childers district, excepting that it is dry, looks very prosperous. The cane is untouched by the frost, and some of the 1900 Seedling is a picture. Nevertheless the land is becoming sour, and unless the farmers look to it they will very soon be getting poor crops.

There is a great deal of standover cane around Childers, due to the mills being idle during part of 1916. The soil here is a red volcanic, stony in places, and invariably, where cane is growing, has an acid reaction. The 1900 Seedling does better here than any other variety, although some of the Badila looks well. Clark's Seedling and D1135 show medium results. Rain is badly wanted in all the districts, and the cane planted in March will not make much of a showing, owing to the long spell of dry weather, unless rain falls soon.

Artificial drainage is hardly necessary around Childers, as most of the farms are on high land. Successful irrigation should be possible here.

Some trouble is being caused by the grubs, but if the land is kept clean and well cultivated the pest can be largely kept down.

Bundaberg is badly frosted, especially around Kalkie, Burnett Heads; Qunaba and Barolin have not suffered so severely as other places. Some growers have been using Mauritius Bean and cowpeas as a green manure, and the results are justifying the work done.

Badila and 1900 Seedling are making an excellent showing.

Animal Pathology.

IMPETIGO OF THE PIG.

By LIONEL B. BULL, B.V.Sc., South Australian Government Laboratory of Pathology and Bacteriology.

During the past two years a disease in young pigs has come under the notice of the staff of the Stock Department. Although the disease does not appear to have become very widespread there is some evidence to show that it is becoming more common. The disease appears to be more or less new to this State. It is characteristically a skin disease. It is found only in young animals, and usually appears at the age of two or three weeks, and rarely as late as ten weeks. It runs a more or less chronic course, but the mortality is usually very high, all the affected animals dying in most cases. Death occurs from one to three weeks after the first appearance of skin lesions. The disease is very contagious, and, depending upon the conditions, may affect every litter on a property.

At the request of the Chief Inspector of Stock the writer undertook an investigation into the nature and cause of the disease. The investigation was carried out in the field in collaboration with the Principal Veterinary Officer, Mr. C. V. Loxton, B.V.Sc., and in the laboratory. The following is a brief description of the results of the investigation:—

OCCURRENCE.

The disease has only been met with during the warmer months of the year.

AGE INCIDENCE.

Only young animals have been found affected. Although the whole of a litter may be severely affected, the mother has never been found to show any lesions whatsoever. The disease has been found most commonly in sucking pigs about two or three weeks old. Although the lesions may not appear until later than this, it is doubtful whether any case occurs after the tenth week.

SYMPTOMS.

The first sign of the disease is the appearance of small lesions in the skin. These are seen most commonly on the belly, behind the shoulder, on the thighs, and the under surface of the neck, although they may occur scattered irregularly over the body, head, and limbs. The lesion starts as a minute elevation in the skin, which rapidly enlarges, and takes a circular shape. The skin in the centre is roughened; the edges are usually sharply defined and rounded. The lesion is characteristically circular, raised, and discoid. The centre is at first denuded of the superficial layer of epithelium and covered by a crust. Later there is hypertrophy of the epithelium, with excessive keratinisation, a somewhat warty condition developing, which eventually covers the whole area except the edge, which is clean, raised, and rounded. The lesions vary in size from points just visible to the naked eye to areas of 15mm. ($\frac{3}{4}$ in.) in diameter, or even larger. Sometimes an area of congestion is seen surrounding the lesion.

There is rarely any discharge, but there is sometimes a slight oozing of a straw-coloured liquid, which rapidly dries on the surface. When the lesions are very numerous and crowded together a somewhat corrugated appearance is produced. Cracks may appear in or between the lesions in this case, and a purulent discharge (pus) develop.

At first the affected animals show little distress beyond a moderate pruritus or irritability of the skin. A little later they begin to lose condition, but this is not usually marked. They become less active, and show some shortness of breath. Usually a diarrhoea sets in, which lasts for a few days, when death occurs often quite suddenly, the tips of the ears and dependent parts becoming cyanosed (blue). Death occurs usually in from one to three weeks after the first appearance of the lesions.

In the more chronic cases the animals may become very emaciated before death. It is usual to find a mortality of 100 per cent. of affected animals, but some cases showing very few lesions may eventually recover. All of the cases observed have been found to harbor lice (*Haematopinus suis*), although not usually in great numbers.

POST-MORTEM APPEARANCES.

Apart from the typical skin lesions, there are usually well marked changes to be found in the internal organs. The same organs are not always attacked, and the appearances vary considerably in animals from the same litter, showing the same degree of infection—i.e., there is no typical *post-mortem* appearance to be found.

Thoracic Cavity.—The heart is usually found to be pale in colour and flabby. There are often areas of consolidation in the lungs (lobar pneumonia). Both lungs are usually affected, and the same lobes in either lung.

Abdominal Cavity.—The liver is large and usually mottled in appearance, and often showing on the surface numerous pin-point, whitish-coloured dots. The mottling is due to the occurrence of diffuse greyish-coloured areas. On section the greyish areas and small dots are seen to extend deeply into the substance of the organ, but are more frequent nearer the surface. The liver is usually paler than normal. The stomach is found to be normal; the small intestine is sometimes catarrhal. The kidneys usually show marked changes. On looking at the surface it is seen to be studded with petechial ("fleabite") hæmorrhages. On section these hæmorrhages are seen to extend throughout the cortex of the organ. At other times the kidney is seen to be intensely hæmorrhagic throughout. Sometimes the kidneys show no hæmorrhagic changes, but are much paler than normal. The spleen is usually large, but shows no marked changes. The mesenteric lymph glands are often very large and very hæmorrhagic. At other times they show the same change to a less degree. The superficial inguinal glands are often enlarged and hæmorrhagic.

BACTERIOLOGICAL EXAMINATION.

The majority of the animals examined have shown bacteria in the blood and tissues of the body. In most cases a bacillus giving the cultural and serological reactions of the *Bacillus enteritidis* (Gaertner) has been isolated from the blood and

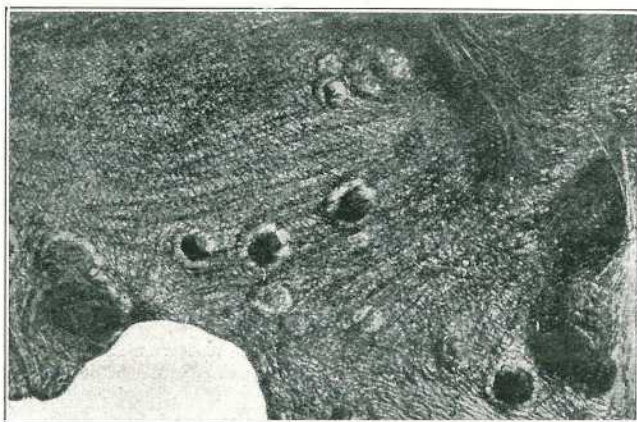


PLATE 39.

Photograph of the skin of an affected animal showing lesions in various stages of development. In the centre of the photograph are to be seen smaller lesions, typical in appearance, and showing distinctly the clean, raised edge. On the right side are to be seen two older lesions which have become fused. On the left hand side is to be seen one still older lesion. Note that the older and larger the lesion the less pronounced is the clean edge. (Photograph from a preserved specimen. Natural size.)

internal organs, and mixed with staphylococci and streptococci from the skin lesions. In other cases a streptococcus has been found associated with the *B. enteritidis* (Gaertner) in the blood and internal organs. In one mild case showing few skin lesions the blood and internal organs were found to be sterile.

In several cases the contents of the large bowel were examined for the presence of the *B. enteritidis* (Gaertner), but in no case was the micro-organism detected.

EXPERIMENTAL INVESTIGATION.

Four young pigs (Middle York) were taken from the mother and fed artificially. They were kept under observation for about a week, and as they remained healthy and developed normally, they were subjected to the following experiments:—

Experiment 1.—Lice (*Haematopinus suis*) were transferred from an affected animal to one of the experimental animals. About a week or ten days later characteristic lesions were found near the right shoulder, on the back, and on the belly. These lesions presented the characteristic appearances of lesions found in affected animals in the field. Bacteriological examination of the lesions revealed the presence of streptococci and staphylococci, but no bacilli. The animal was kept strictly isolated during the period of the experiment. Apart from the skin lesions the animal presented nothing abnormal. The lesions, which were few in number, gradually disappeared, no sign of them remaining six weeks after they were first observed.

Experiment 2.—An area of the skin along the belly of an experimental animal was lightly scarified and a skin lesion from an affected animal was rubbed into the spot. Nine days later small vesicles appeared on the area inoculated. These later took on the appearances characteristic of lesions found in naturally infected animals, although more crowded and not developing to the same size. The animal was kept strictly isolated during the period of the experiment. It showed no evidence of any ill-health, and gradually the skin lesions disappeared.

Experiment 3.—A young pig was inoculated subcutaneously with 3cc. of defibrinated blood collected from an animal showing very few skin lesions. This blood, on later examination, was found to be sterile. The animal was kept strictly isolated during the course of the experiment. It remained healthy and developed normally.

Experiment 4.—Two affected animals were kept in a pen for several days. The pen was purposely not cleaned during this time. The affected animals were removed and a healthy young pig placed in the pen. The animal was kept under observation for about two months. It remained healthy and developed normally.

DISCUSSION.

Although the investigation was necessarily somewhat limited in extent, and many points remain undetermined, it can reasonably be claimed that certain factors in relation to the disease have been elucidated. There seems to be no doubt that the disease is essentially a skin disease due to the inoculation of bacteria into the skin, where they grow and produce lesions with a very characteristic appearance. From the experimental observations and those carried out in the field it may reasonably be concluded that lice are responsible for this inoculation. Each lesion represents a separate inoculation of bacteria into the skin. When they are close together and numerous the lesions tend to fuse, but they always start as a minute elevation in the skin, which extends in a circular fashion.

There is no evidence to show that the skin becomes inoculated by any other means, although there is no reason to believe that this is not possible. Only the soft and tender skin of the young animal appears to be susceptible. The thicker and harder skin of the old animals appears to offer complete protection. That skin lesions are not the external manifestation of a systematic disease has been shown by the results of the experimental inoculations and the bacteriological examinations of affected animals.

Although a general infection results in the majority of cases, this appears to be due to the lowering of the resistance of the animal following the inflammatory trouble of the skin. Although the *Bacillus enteritidis* (Gaertner) is the micro-organism which is directly responsible for the serious condition and death of the animal, its presence is not essential for the production of the skin lesions. This is shown by the fact that the bacillus was not isolated from lesions produced experimentally. The skin lesions appear to be due to the inoculation into the skin of staphylococci and streptococci. Usually other micro-organisms are associated with these cocci, and may produce serious complications.

The *B. enteritidis* (Gaertner) and the streptococcus appear to be capable of invading the blood stream and internal organs after the resistance of the animal becomes lowered. This invasion probably takes place from the foci of infection in the skin. It has not been possible to determine whether the fatal termination of the disease depends directly upon the presence of *B. enteritidis*. The determination of this point is only possible after the investigation of many separate outbreaks. The opinion is held, however, that, given the absence of this bacillus, a milder type of disease would result, with few or no deaths.

PREVENTION.

Prevention of the disease should prove easy if sufficient care and attention are given to the management of young animals. They should always be kept in clean surroundings, where they can obtain a sufficiency of exercise in the fresh air and sunlight. A strict watch should be kept on adult and young animals for the appearance of any lice. Should any lice be detected, efficient methods for their eradication should be adopted.

Whenever lice are found on the animals their quarters should be thoroughly cleaned and disinfected. The animals themselves should be dipped, sprayed, or hand-dressed. A 2 to 4 per cent. creolin solution is useful for this purpose. A 10 per cent. kerosene solution is very efficient, but should not be used in the very hot weather, when it is liable to seriously injure the skin.

All treatments must be repeated at least three times at intervals of a week to ten days. The addition of creolin to hog wallows from time to time will be found to keep the animals comparatively free from lice. It is probable that, in the absence of lice, the disease will be absolutely unknown.—“Journal of Agriculture of South Australia.”

The Markets.

PRICES OF FARM PRODUCE IN THE BRISBANE MARKETS FOR OCTOBER, 1918.

Article.		OCTOBER.	
		Prices.	
Bacon	lb.	9d. to 10d.	
Barley	bush.	4s. 9d.	
Bran	ton	£7 5s. to £7 10s.	
Broom Millet	"	£30 to £50	
Broom Millet (Sydney)	"	£40 to £50	
Butter (First Grade)	cwt.	149s. 4d.	
Chaff, Mixed	ton	£6 to £7 10s.	
Chaff, Oaten	"	£7 to £8 15s.	
Chaff, Lucerne	"	£12 to £14	
Chaff, Wheaten	"	£6 10s. to £7 10s.	
Cheese	lb.	11½d.	
Flour	ton	£12	
Hams	lb.	1s. 6d. to 2s.	
Hay, Lucerne	ton	£8 to £11 10s.	
Hay, Oaten	"	...	
Hay, Wheaten	"	...	
Honey	lb.	8d. to 9d.	
Maize	bush.	5s. 8d. to 5s. 9d.	
Oats	"	3s. 3d. to 4s.	
Onions	ton	£26 to £28	
Peanuts	lb.	8d. to 10d.	
Pollard	ton	£5	
Potatoes	"	£8 7s. 6d. to £12 10s.	
Potatoes (Sweet)	cwt.	4s. to 4s. 6d.	
Pumpkins (Table)	"	10s. to 12s.	
Pumpkins (Cattle)	ton	£12 10s. to £13 10s.	
Sugar-cane Fodder	"	55s.	
Eggs	doz.	8d. to 10½d.	
Fowls	per pair	4s. to 6s. 6d.	
Ducks, English	"	3s. 9d. to 4s.	
Ducks, Muscovy	"	3s. 6d. to 6s. 6d.	
Geese	"	8s. to 10s.	
Turkeys (Hens)	"	10s. to 13s.	
Turkeys (Gobblers)	"	18s. to 25s.	
Wheat (Milling)	bush.	4s. 6d. to 4s. 9d.	

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per dozen boles	6s. to 10s.
Beans, per sugar-bag	10s. to 13s. 9d.
Beetroot, per dozen bunches	1s. to 2s.
Cabbages, per dozen	3s. to 15s.
Carrots, per dozen bunches	1s. to 2s.
Cauliflowers, per dozen	5s. to 10s.
Chokos, per quarter-case	...
Cucumbers, per dozen	1s. 6d. to 2s.
Lettuce, per dozen	9d. to 1s.
Marrows, per dozen	7s. 5d. to 10s.
Parsnips, per dozen bunches	1s. to 2s.
Peas, per sugar-bag	8s. to 13s.
Sweet Potatoes, per cwt.	1s. 6d. to 4s.
Table Pumpkins, per cwt.	10s. to 12s.
Tomatoes, per quarter-case	5s. to 8s.

SOUTHERN FRUIT MARKETS.

Article.	OCTOBER.	
	Prices.	
Bananas (Queensland), per case ...	...	10s. to 23s.
Bananas (Tweed River), per case ...	...	15s. to 19s.
Bananas (Fiji), per bunch...	...	6s. to 8s. 6d.
Bananas (G.M.), per bunch ...	...	6s. to 8s.
Bananas (G.M.), per case ...	...	20s. to 22s.
Lemons, per bushel-case ...	...	4s. to 7s.
Mandarins, per bushel-case ...	...	18s.
Oranges (Navel), per bushel-case...	...	14s. to 18s.
Oranges (Other), per case...	...	8s.
Oranges (Queensland), per case ...	...	8s. to 10s.
Papaw Apples, (Queensland), per double-case ...	...	12s.
Passion Fruit, per half-case ...	...	10s. to 20s.
Pears, per bushel case ...	...	...
Pineapples (Queens), per double-case ...	...	8s. to 11s.
Pineapples (Ripleys), per double-case ...	...	6s. to 9s.
Pineapples (Common), per double-case ...	...	5s. to 8s.
Tomatoes, per half-case ...	...	2s. to 6s.

PRICES OF FRUIT—TURBOT STREET MARKETS.

Apples, Eating, per case ...	...	10s. to 13s. 6d.
Apples, Cooking, per case ...	...	10s. to 12s. 6d.
Bananas (Cavendish), per dozen ...	...	2d. to 7d.
Bananas (Sugar), per dozen ...	...	2d. to 5d.
Cape Gooseberries, per quart ...	...	9d.
Citrons, per hundredweight ...	...	16s.
Cocoanuts, per sack ...	...	15s. to 25s.
Cumquats, per quarter-case ...	...	...
Custard Apples, per quarter-case ...	...	...
Lemons (Lisbon), per case ...	...	8s. to 12s.
Mandarins, per case ...	...	10s. to 15s.
Oranges (Navel), per case ...	...	...
Oranges (Seville), per hundredweight ...	...	12s.
Oranges (Other), per case ...	...	6s. to 10s.
Papaw Apples, per quarter-case ...	...	1s. to 2s. 6d.
Passion Fruit, per half-case ...	...	8s. to 10s.
Peanuts, per lb. ...	...	8d. to 10d.
Pineapples (Ripley), per dozen ...	...	1s. 6d. to 5s.
Pineapples (Rough), per dozen ...	...	1s. to 5s.
Pineapples (Smooth), per dozen ...	...	2s. to 3s. 6d.
Strawberries, per tray ...	...	1s. to 2s.
Strawberries, per dozen boxes ...	...	3s. 6d. to 9s.
Tomatoes, per quarter-case ...	...	5s. to 8s.

TOP PRICES, ENOGGERA YARDS, SEPTEMBER, 1918.

Animal.	SEPTEMBER.	
	Prices.	
Bullocks ...	...	£24 5s. to £29 2s. 6d.
Cows ...	...	£17 to £20 15s.
Merino Wethers ...	...	49s.
Crossbred Wethers ...	...	43s. 6d.
Merino Ewes ...	...	34s. 3d.
Crossbred Ewes ...	...	32s. 3d.
Lambs ...	...	31s. 3d.
Pigs (Bacon) ...	...	81s.
Pigs (Porkers) ...	...	41s.

RAINFALL IN THE AGRICULTURAL DISTRICTS.

TABLE SHOWING THE AVERAGE RAINFALL FOR THE MONTH OF SEPTEMBER, 1918, IN THE AGRICULTURAL DISTRICTS, TOGETHER WITH TOTAL RAINFALLS DURING SEPTEMBER, 1918 AND 1917, FOR COMPARISON.

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Sept.	No. of Years' Records.	Sept., 1918.	Sept., 1917.		Sept.	No. of Years' Records.	Sept., 1918.	Sept., 1917.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
	In.		In.	In.		In.		In.	In.
Atherton ...	0·62	17	Nil	0·48	Nambour ...	2·54	22	3·46	5·30
Cairns ...	1·71	36	0·89	1·00	Nanango ...	2·01	35	1·30	7·11
Cardwell ...	1·45	46	0·81	1·12	Rockhampton ...	1·41	31	0·38	3·68
Cooktown ...	0·57	42	0·62	0·12	Woodford ...	2·24	31	0·98	4·14
Herberton ...	0·48	31	0·08	0·02					
Ingham ...	1·08	26	0·52	1·25	<i>Darling Downs.</i>				
Innisfail ...	3·63	37	2·65	2·51	Dalby ...	1·85	48	0·60	5·82
Mossman ...	1·08	10	...	1·18	Emu Vale ...	2·06	...	Nil	7·02
Townsville ...	0·79	47	0·19	0·23	Jimbour ...	1·75	...	0·38	6·58
<i>Central Coast.</i>					Miles ...	1·53	33	0·38	5·92
Ayr ...	1·69	31	0·19	0·22	Stanthorpe ...	2·56	45	0·33	7·28
Bowen ...	0·85	47	0·69	0·18	Toowoomba ...	2·31	46	0·50	6·62
Charters Towers ...	0·83	36	0·50	0·71	Warwick ...	2·02	31	0·05	6·90
Mackay ...	1·54	47	0·53	0·70					
Proserpine ...	2·18	15	0·37	1·45	<i>Maranoa.</i>				
St. Lawrence ...	1·38	47	0·61	2·59	Roma ...	1·65	44	0·24	7·25
<i>South Coast.</i>					<i>State Farms, &c.</i>				
Biggenden ...	1·84	...	0·29	4·51	Bungeworgorai ...	2·33	4	Nil	7·07
Bundaberg ...	1·93	35	0·47	3·54	Gatton College ...	1·87	...	0·52	7·50
Brisbane ...	2·09	67	1·98	5·21	Gindie ...	0·95	...	0·51	3·57
Childers ...	2·12	23	0·82	3·98	Hermitage ...	1·88	...	Nil	6·56
Crohamhurst ...	2·53	25	3·45	5·81	Kairi ...	1·07	4	0·08	0·66
Esk ...	2·44	31	0·73	7·16	Kamerunga ...	1·23	...	...	0·70
Gayndah ...	1·64	47	0·26	5·28	Sugar Experiment Station, Mackay	1·40	...	0·46	0·60
Gympie ...	2·18	48	2·95	3·57	Warren ...	1·08	4	0·55	3·70
Glasshouse M'tains	2·24	10	1·55	5·60					
Kilkivan ...	1·82	39	0·07	4·17					
Maryborough ...	2·01	47	1·75	3·63					

NOTE.—The averages have been compiled from official data during the periods indicated; but the totals for September this year, and for the same period of 1917, having been compiled from telegraphic reports, are subject to revision.

GEORGE G. BOND, Divisional Officer.

CLOSE SEASON FOR OPOSSUMS AND BEARS.

Trappers and shooters of bears and opossums should note that the season for their operations as far as opossums are concerned closed on 31st October. Persons, however, who killed up to that date will be permitted to remove the skins by rail up to and including 14th November. The close season for native bears remains in force until 30th April, 1919, and, therefore, the carriage of the skins of these animals is prohibited until that date.

ASTRONOMICAL DATA FOR QUEENSLAND.

TIMES COMPUTED BY D. EGLINTON, F.R.A.S.

TIMES OF SUNRISE AND SUNSET AT BRISBANE.

1918.	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
Date.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.	Rises.	Sets.
1	6:3	5:34	5:29	5:47	4:59	6:5	4:46	6:28
2	6:2	5:34	5:27	5:47	4:58	6:5	4:46	6:28
3	6:1	5:35	5:26	5:48	4:57	6:6	4:46	6:29
4	6:0	5:35	5:25	5:48	4:56	6:7	4:46	6:30
5	5:59	5:36	5:24	5:49	4:55	6:8	4:46	6:31
6	5:58	5:36	5:22	5:50	4:54	6:9	4:46	6:32
7	5:57	5:36	5:21	5:50	4:54	6:9	4:46	6:32
8	5:56	5:37	5:20	5:51	4:53	6:10	4:46	6:33
9	5:54	5:37	5:19	5:51	4:53	6:10	4:46	6:34
10	5:53	5:38	5:18	5:52	4:52	6:11	4:47	6:35
11	5:52	5:38	5:17	5:52	4:52	6:12	4:47	6:35
12	5:51	5:39	5:16	5:52	4:51	6:13	4:47	6:36
13	5:50	5:39	5:16	5:53	4:51	6:13	4:48	6:36
14	5:49	5:40	5:15	5:53	4:50	6:14	4:48	6:37
15	5:47	5:40	5:15	5:53	4:50	6:15	4:49	6:37
16	5:46	5:41	5:14	5:54	4:49	6:16	4:49	6:38
17	5:45	5:41	5:13	5:54	4:49	6:17	4:50	6:38
18	5:44	5:41	5:12	5:55	4:48	6:17	4:50	6:39
19	5:43	5:42	5:11	5:55	4:48	6:18	4:50	6:39
20	5:42	5:42	5:10	5:56	4:48	6:19	4:51	6:40
21	5:41	5:43	5:9	5:56	4:48	6:20	4:51	6:40
22	5:40	5:43	5:8	5:57	4:47	6:21	4:52	6:41
23	5:39	5:44	5:7	5:58	4:47	6:21	4:52	6:41
24	5:37	5:44	5:7	5:58	4:47	6:22	4:53	6:42
25	5:36	5:44	5:6	5:59	4:47	6:23	4:54	6:42
26	5:35	5:45	5:5	5:59	4:46	6:24	4:54	6:43
27	5:33	5:45	5:4	6:0	4:46	6:25	4:55	6:43
28	5:32	5:46	5:3	6:1	4:46	6:25	4:55	6:44
29	5:31	5:46	5:2	6:2	4:46	6:26	4:56	6:44
30	5:30	5:46	5:1	6:3	4:46	6:27	4:56	6:45
31	...	...	5:0	6:4	...	...	4:57	6:45

PHASES OF THE MOON.

The Phases of the Moon commence at the times stated in Queensland, New South Wales, Victoria, and Tasmania.

H. M.
 5 Sept. ● New Moon 8 44 p.m.
 14 „ ☾ First Quarter 1 3 a.m.
 20 „ ○ Full Moon 11 1 p.m.
 27 „ ☾ Last Quarter 2 39 p.m.

The Moon will be farthest from the earth on the 8th, and nearest to it on the 21st.

5 Oct. ● New Moon 1 5 p.m.
 13 „ ☾ First Quarter 3 0 p.m.
 20 „ ○ Full Moon 7 35 a.m.
 27 „ ☾ Last Quarter 3 35 a.m.

The Moon will be farthest from the earth on the 6th, and nearest to it on the 20th.

4 Nov. ● New Moon 7 2 a.m.
 12 „ ☾ First Quarter 2 46 a.m.
 18 „ ○ Full Moon 5 33 p.m.
 25 „ ☾ Last Quarter 8 25 p.m.

The Moon will be farthest from the earth on the 2nd and 29th, and nearest on the 17th.

4 Dec. ● New Moon 1 19 a.m.
 11 „ ☾ First Quarter 12 31 p.m.
 18 „ ○ Full Moon 5 18 a.m.
 25 „ ☾ Last Quarter 4 31 p.m.

The Moon will be nearest to the earth on the 15th, and farthest from it on the 27th.

There will be an annular or ring-shaped Eclipse of the Sun on 3rd December, but it will not be visible in Australia.

For places west of Brisbane, but nearly on the same parallel of latitude— $27\frac{1}{2}$ degrees S.—add 4 minutes for each degree of longitude. For example, at Toowoomba the sun would rise and set about 4 minutes later than at Brisbane if its elevation (1,900 feet) did not counteract the difference in longitude. In this case the times of sunrise and sunset are nearly the same as those for Brisbane.

At St. George, Cunnamulla, Thargomindah, and Oontoo the times of sunrise and sunset will be about 18 m., 30 m., 38 m., and 49 minutes, respectively, later than at Brisbane at this time of the year.

At Roma the times of sunrise and sunset during September, October, and November may be roughly arrived at by adding 16 minutes to those given above for Brisbane.

The moonlight nights for each month can best be ascertained by noticing the dates when the moon will be in the first quarter and when full. In the latter case the moon will rise somewhat about the time the sun sets, and the moonlight then extends all through the night, when at the first quarter the moon rises somewhere about six hours before the sun sets, and it is moonlight only till about midnight. After full moon it will be later each evening before it rises, and when in the last quarter it will not generally rise till after midnight.

It must be remembered that the times referred to are only roughly approximate, as the relative positions of the sun and moon vary considerably.

[All the particulars on this page were computed for this Journal, and should not be reproduced without acknowledgment.]

Orchard Notes for December.

THE SOUTHERN COAST DISTRICTS.

December is somewhat an off month for pines, though bananas should be improving both in quality and quantity. The purely tropical summer ripening fruits are not yet ready, and, consequently, there is only a limited supply of fruit in this part of Queensland during the month.

Early ripening varieties of grapes will mature, and care should be taken to market them in good order. The first fruit to ripen should be put up in small packages, as, if marketed in this manner, it will fetch a better price, but as it becomes more plentiful it can be packed in larger cases.

Pay particular attention during the month to all peaches, apples, pears, Japanese plums, or other fruits that are liable to be attacked by fruit fly, and see that no fly-infested fruits are allowed to lie about under the trees, and thus breed out a great crop of flies that will be ready to destroy the grape and mango crops as they mature.

If the month is dry, see that the orchard is kept well worked so as to retain moisture in the soil, and, in any case, even should there be a good rainfall, it is necessary to cultivate in order to keep down weed growth, as if weeds are not kept in check now there is little chance of their being kept in hand once the January and February rains set in.

The planting out of pineapples, bananas, and most kinds of tropical fruits can be carried out during the month, especially if there is any rainy weather; but, if the weather is dry, it is better to defer the planting out of tropical fruits till January or February.

The cyaniding of citrus trees can be continued when necessary, and where Maori or orange mite is showing it should be checked at once, as Maori fruit is of no use for the Southern markets, and is unsuitable for export to the old country.

THE TROPICAL COAST DISTRICTS.

Clean up all orchards and pineapple and banana plantations as long as you have the chance of fine weather, so as to have your land in good order when the wet season commences, as once the rain sets in there is little chance of fighting weeds. Watch bananas carefully for fly, and market the fruit in good order. Handle the crop of pines carefully; don't let the fruit get too ripe, as an over-ripe Northern pine is tasteless. The fruit should be cut as soon as it is fully grown, as even when quite green the rough-leaf varieties have usually developed sufficient sugar to suit most persons' taste. Pack carefully to prevent bruising, and they will carry South in good order.

Only send high-class mangoes South—bad-flavoured sorts, and stringy, carroty, or turpentine flavoured varieties are not worth shipping. High-class fruit will pay to handle carefully, but there is no demand for rubbish, and I am sorry to say that fully 90 per cent. of the mangoes grown in the State must be classed under the latter heading.

Tropical fruits of all kinds can be set out during suitable weather. Fruit pests of all sorts must be systematically fought.

THE SOUTHERN AND CENTRAL TABLELANDS.

December is a busy month for the growers in the Stanthorpe district. Early apples, plums, peaches, nectarines, &c., will ripen during the month, and must be marketed as soon as ripe, as they do not keep long once they are gathered. Handle carefully, and grade better; there is far too much early rubbish dumped on to the local markets, which tends to spoil the demand as well as the price. Watch the orchards very carefully for codling moth and fruit fly, and take every possible precaution to keep these pests in check should they make their appearance, as the future cleanliness of the orchard depends very largely on the care that is taken now to keep these pests in check.

If the month is dry, keep the orchard and vineyard well cultivated. Watch the vines carefully so as to detect the first signs of Oidium or Anthracnose, and systematically fight these pests, remembering always that in their case prevention is better than cure, and that only prompt action is of the slightest value.

On the Darling Downs every care must be taken to keep the fruit-fly in check, and on no account must infested fruit be allowed to lie about under the trees, as this is far and away the best method of propagating the pest wholesale.

In the Central District the grape crop will ripen during the month. Handle the fruit carefully. Cut it when dry, and where it has to be sent long distances to market pack in 6-lb. baskets rather than in larger cases. Where dry keep the orchard and vineyard well cultivated, and where the citrus and other fruit trees require it give them an irrigation. Don't irrigate grapes once the seeds have been formed, as it tends to deteriorate the quality, and to make the fruit tender and consequently to carry badly.

Farm and Garden Notes for December.

Too much care can scarcely be bestowed upon potatoes dug up this month to protect them from the sun. They should be dug or ploughed out as soon as the skin is firm, as they are liable to rot in the ground owing to the great heat.

FIELD.—The wheat harvest will be now nearing completion. The estimates of the probable yield have varied so considerably that it will be well to wait until the entire harvest is over before speculating on the result. This State is a long way from becoming a wheat-exporting country. The principal factor operating against a still greater extension of the wheatgrowing industry is that many farmers who formerly grew wheat and barley have turned their attention to dairying, which offers larger and quicker returns.

Given favourable weather, maize, panicum, imphee, kafir corn, and the various millets may be sown.

Cotton sown in October and November will be making headway but slowly, owing to the lack of September and October rains. Keep down all weed growth by scarifying as long as the growth will admit of horse work. Tree cottons, such as Sea Island and Caravonica, should be topped and pruned.

KITCHEN GARDEN.—Gather cucumbers, melons, vegetable marrows, and French beans as soon as they are fit for use. Even if they are not required, still they should be gathered, otherwise the plants will leave off bearing. Seeds of all these may be sown for a succession. Sow cabbage and cauliflower seed. Great difficulty will be experienced in getting these to grow at this season, and the plants will consequently be more valuable in proportion. Tomatoes should be in full bearing, and the plants should be securely trained on trellises or stakes. Take up onions, and spread them out thinly on the barn floor until the tops wither sufficiently to pull off easily. They should then be graded into sizes, and sent to market or stored in a cool place. Where there is an unlimited supply of water, and where shade can be provided, lettuce and other salad plants may still be sown. All vacant ground should be well manured and dug two spits deep. Manure and dig as the crops come off, and the land will be ready for use after the first shower.

FLOWER GARDEN.—Keep the surface of the land well stirred. Do not always stir to the same depth, otherwise you are liable to form a "hard pan," or caked surface, beneath the loose soil. Alternate light with deep hoeings. A few annuals may still be planted, such as balsams, calendulas, cosmos, coreopsis, marigold, nasturtium, portulaca, zinnia, and cockscomb. Plant out whatever amaranthus may be ready. These may still be sown in boxes. Clear away all annuals which have done flowering. Bulbs should have all the dead leaves cut away, but the green leaves should not be touched. Stake chrysanthemums, and, as the flower buds develop, give them weak liquid manure. Coleus may now be planted and propagated from cuttings. Dahlias are in various stages, but the greater part will have been planted by this time. Give them liquid manure, and never let them dry up. Lift narcissus about the end of the year, but do not store them. Plant them out at once in their new positions. Top-dress all lawns.

GOVERNMENT AGRICULTURAL LABORATORY.

INSTRUCTIONS FOR THE COLLECTION OF SAMPLES, AND
SCALE OF FEES.

GENERAL INSTRUCTIONS.

1. All analyses will be carried out in the order in which the samples are received at the Laboratory, with the exception of perishable substances, which will be analysed immediately after arrival.

2. Should any person wish for an immediate analysis, the fee, charged in accordance with the scale of fees below, will be increased by 50 per cent.

3. The samples may be forwarded by parcel post or by rail, carriage paid, to the

Under Secretary for Agriculture and Stock, Brisbane.

In all cases a letter, giving full instructions as to the information required, and enclosing the prescribed fee, must be sent at the same time.

4. Analyses will only be carried out if these instructions are adhered to, and if the samples are taken in accordance with further instructions issued below.

5. The Under Secretary may, under special circumstances, modify the fees charged for analytical work.

	SCALE OF FEES.			For Farmers, &c.*		
	£	s.	d.	£	s.	d.
Butter, Cheese, Condensed Milk—commercial analysis ..	1	1	0			
Butter, Cheese, Condensed Milk—complete analysis ..	2	2	0			
Butter, Cheese—Estimation of boric acid, or moisture ..	0	5	0			
Cream and Milk—Estimation of fat only ..	0	5	0	0	2	6
Cream and Milk—Estimation of fat, total solids, and test for preservatives	1	1	0			
Dipping Solutions, prickly-pear destroyers—test for arsenic only	0	10	6	free†		
Fertilisers—Determination only of—						
Lime	0	10	0	0	3	0
Nitrogen, total nitrogen, nitrate nitrogen, ammonia salts, or otherwise (each)	0	12	6	0	3	0
Phosphoric acid—water soluble, citric acid soluble, or total phosphoric acid (each)	0	15	0	0	3	0
Potash	0	15	0	0	3	0
Fat	0	10	0	0	3	0
Degree of fineness	0	10	0	0	3	0
Analysis of—						
Blood manure, or dried blood	0	15	0	0	3	0
Bone dust, or bone meal	1	10	0	0	6	0
Guano, rock phosphates	2	0	0	0	10	6

* Reduced fees apply only to such residents in Queensland whose main source of income is from agricultural, pastoral, and horticultural pursuits.

† Dipping fluids are analysed free of charge for the owners of all registered dips.

For Farmers,
&c.*SCALE OF FEES—*continued*.

Analysis of—	£	s.	d.	£	s.	d.
Meatworks manure, bone and blood manure ..	1	10	0	0	6	0
Meatworks manure, including estimation of fat ..	2	0	0	0	9	0
Mixed fertilisers	2	10	0	0	10	6
Superphosphates	1	10	0	0	6	0
Thomas phosphate, and basic superphosphate ..	1	10	0	0	6	0
Charge for sampling of fertilisers	0	15	0			
Foodstuffs—Grains, Grasses, Ensilages, Oil Cakes, &c., estimation only of—						
Moisture	0	5	0			
Albuminoids or proteins	0	12	6			
Ash	0	5	0			
Digestible fibre	0	7	6			
Oil or fat	0	10	0			
Raw fibre	0	7	6			
Complete analysis	2	2	0	0	10	6
Insecticides and Fungicides	1	1	0	0	10	6
Limestone, Lime, and Marls	1	1	0	0	10	6
Meat Extract—						
Commercial analysis	1	10	0			
Full analysis	3	3	0			
Parchment Paper, Butter Packing Paper	0	10	6			
Salt	1	1	0			
Soap, commercial analysis	1	10	0			
Soil—						
Partial analysis—estimation of lime, potash, phosphoric acid, and nitrogen	1	1	0	0	10	6
Complete analysis—including available plant foods soluble in citric acid	3	3	0			
Mechanical analysis—capacity for water, capillarity, elutriation, &c.	1	1	0			
Sugar-cane	0	10	6			free
Sugars, Syrup, Molasses	1	1	0			
Tallow—Titre Test	1	1	0			
Tanning Materials—assay of tannin	1	1	0			
Water—						
Partial analysis—total solids, loss on ignition, and chlorine	1	1	0	0	10	6
Complete analysis	3	3	0			
Wheat—Milling test, analysis of flour	1	1	0	0	10	6

INSTRUCTIONS FOR TAKING AND COLLECTING OF SAMPLES.
SOILS.

A rough sketch of the field, paddock, or block of land from which the samples are to be taken should be prepared to accompany the samples. The spots where the samples are taken are marked on this plan, and are numbered. This sketch plan should also indicate position of roads, creeks, gullies, ridges, general fall, and aspect of land, &c.

Should the soil in various parts of the block show a very marked difference, it will be necessary to divide the block into two or more parts. Should the different soil occur only in a small patch, this sample may be left out.

Not less than three samples should be taken in each section. A greater number is to be preferred, as a better average will be obtained. In order to obtain a fair average sample of the soil from a block of land, as nearly as possible equal quantities of soil are collected from various parts of the field.

At the places chosen for the taking of the samples the surface is slightly scraped with a sharp tool, to remove any surface vegetation which has not as yet become part of the soil.

Vertical holes from 10 to 18 inches square are dug in the ground to a depth of 3 feet. The holes are dug out like post-holes; an earth-auger facilitates the operation considerably, and the holes may be trimmed with the spade afterwards, and the holes cleaned out.

Careful note of the appearance of the freshly cut soil of any intermediate layer and of the subsoil should be taken. The depth of the real soil, which in most cases is easily distinguished, is also measured and noted for each hole. Note how deep the roots of the surface vegetation reach into the soil. If the soil changes gradually into the subsoil, as is the case in some places where the soil is of very great depth, this line of division can only be guessed approximately, and it is best to take the soil uniformly to a depth of 12 inches.

With a spade a slice of soil, from 3 to 4 inches thick, down to the beginning of the subsoil or to a depth of 12 inches, is now cut off and put on to a clean bag. The same is done with the subsoil, and the slice is taken from where the soil ends (or 12 inches) to the bottom of the hole, and this subsoil placed on another bag. Stones over the size of a pea may be picked out, the rough quantity of such stones estimated, and a few enclosed with the samples. Fine roots must not be taken out from the soil samples. The same operation is repeated at the other places chosen. Take careful note and give description of soils in each hole, as numbered and marked on plan. The samples of soil collected on the one bag are thoroughly mixed by breaking up any large clods, and about 10 lb. of the mixed soil are put into a clean canvas bag, which is securely tied up and labelled. The same is done with the samples of subsoil collected separately on the other bag.

All the samples collected are afterwards placed in a wooden box.

It is important to use clean bags and clean boxes, and also that the samples should not be left in the neighbourhood of stables or manure heaps.

A short description of the land must accompany the samples and the sketch plan. In the case of cultivated land, state how long the land has been under cultivation, what crops were chiefly grown, results of such crops, was any manure applied, when, and what sort, and in what quantities per acre. In the case of virgin soil, state if the land was heavily timbered or not, ringbarked, if scrub or forest land, what sort of timber was chiefly growing on the land. In all cases a description of the neighbouring land, outcropping rocks, &c., is of great value. Also state if the land is naturally or artificially drained or not; describe the land as regards its position to hills, roads, creeks, ridges, &c.

Only by adhering strictly to these instructions, and by giving minute details can benefit be derived from the soil analyses.

Special forms of application for "*Advice as to Manurial Treatment of Soil*" have been prepared, and may be obtained from the Under Secretary, Department of Agriculture and Stock.

It is strongly advised to fill up one of these forms in each case when a sample of soil is submitted for analysis.

WATER.

It is best to collect and forward samples of water for analysis in stoppered glass bottles, generally known as Winchester quarts.

The bottles have to be perfectly clean, and stoppers must fit well. Corks should be avoided, but if used must be new and well washed with the water before being used for closing the bottle.

When taking waters from taps, pumps, or bores, the water must be allowed to run for a while before taking the sample. When taking the water out of a well, pond, or river, the bottle is completely immersed, but care must be taken not to disturb the mud or sediment at the bottom of the water. Before the sample is actually collected, the bottle is rinsed three times with the water, filling each time about one-third full. The bottle is then filled within about 1 inch from the top; the stopper is inserted and securely tied down with a clean piece of linen or calico.

The stopper must not be fastened or luted with sealing-wax, paste, plaster of paris, &c.

State for what purpose the water is to be used, as for irrigation, household purposes, factory use, steam boilers, stock, &c.

Forms of application for "*Analysis of Water*" have been prepared, and may be obtained from the Under Secretary, Department of Agriculture and Stock. Suitable bottles for taking samples of water, both for chemical analysis and for bacteriological examination, may also be obtained on application.

FERTILISERS.

When taking samples of artificial manures from bags, the samples must be taken from different bags and at different places of the bag and not only from the top; or the contents are emptied on a heap and mixed up well, and the samples then taken.

The samples sent for analysis should not weigh less than $\frac{1}{2}$ lb., and not more than 2 lb., and should be contained in a clean, dry bottle (lightning jars are very suitable), or stone jar, or in tins with tightly-fitting lids. To each sample must be securely attached a label, giving all the particulars required by the regulations in connection with "*The Fertiliser Act of 1914*" and "*The Fertilisers Act Amendment Act of 1916*."

It is extremely difficult to obtain a fair average sample from a large quantity of a mixed fertiliser; special precautions have to be taken, and a special sampling tool must be used. Minute instructions to take such samples are being prepared, and the inspectors under the Fertilisers Acts will be instructed in the proper method of procedure.

FOODSTUFFS.

It is always important to obtain good average samples, and this can only be done by carefully taking the samples from different places, mixing well, and taking a portion of the mixture. This method would apply to any dry foodstuffs—as grains of any kind, peas, beans, chaff, pollard, meal, &c. For the analysis of green foods—as green hay, sorghum, silage—it is best to make a mixture of the sample by passing it through a chaffcutter, and by taking an accurately weighed quantity—say, 3 lb. This quantity is then dried in the sun, taking care that nothing is lost, and when dry put in a bag and forward for analysis, stating how much of the original green stuff the total amount of the dried material sent represents.

To collect information about value of *green manures*, it is best to plot out exactly 1 square yard in the field covered with the plant, not picking out a position where the growth is very heavy or poor, but about a fair average. Four pegs are driven into the ground at the four corners, and string stretched between them; with a sharp spade all the plants are cut along the strings, so as to get really the growth of 1 square yard. The plants are all collected and accurately weighed, passed through a chaffcutter, and the sample for analysis taken as above described. In many cases the roots may be also pulled out, weighed separately, and a sample forwarded.

The samples must be accompanied by a description of the crop—when planted, how old when cut, if the land was manured or not, weight of crop per acre or per square yard, and weight of the sample forwarded when in its green state. In the case of green manures it is generally best to take the samples just after flowering, and immediately before ploughing in.

Wheat.—Samples of wheat sent to be tested for their milling qualities, and analyses of flours obtained therefrom, should not weigh less than 2 lb. each, and should be well cleaned and free from weevils. Give full particulars about the locality in which the wheats were grown, and also the weight of the crop in bushels per acre.

Milk and Cream are best preserved for analysis by adding to every 8 oz. of liquid about 5 grains of powdered bichromate of potash, and mixing the sample with the preservative by shaking the bottle.

Should it be desired to have a sample of milk or cream tested for preservatives, a second sample should be sent in its natural state.

The sample bottles should be closed with a well-fitting cork, and placed with the cork downwards in the boxes, so that the cream will not collect on the cork but on the bottom of the bottle.

DIPPING FLUIDS.

Special forms for taking and forwarding dipping fluids for analysis may be obtained on application.