

QUEENSLAND AGRICULTURAL JOURNAL

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PART 6.

Agriculture.

THE ELECTRIFICATION OF SEEDS.

The following article from an English paper will doubtless be interesting to some of our readers. The electrifying of seeds of wheat has for some years engaged the attention of scientific agriculturists in Europe, and lately some remarkable results have been recorded, as here stated. The process has now reached a crucial stage.

Begun half a dozen years ago in a few pots, it was next extended to a plot of garden ground. In the following season a couple of farmers grudgingly gave up to it a few small plots of agricultural land. Surprised by the result, they and one or two more tried it the next season on a few acres. Again the result was encouraging, and more farmers sowed the seed upon larger acreages. The results were of such a character that the news spread far and wide, and at the present time more than 2,000 acres of corn grown from electrified seed are waiting to be harvested.

A number of representatives of foreign and colonial Governments and agricultural experts have visited many of the farms in Dorset on which electrified and unelectrified seeds of the same sample are growing side by side in the same fields, and this is what they saw. A square yard of electrified wheat was measured off by Captain Rawlence, a professional surveyor, in the presence of the visitors, and in their presence reaped and tied up in a sheaf. Another square yard of unelectrified wheat growing in the same field was then treated in the same way. The two sheaves were taken into Dorchester by the visitors and there weighed in their presence, and it was found that the unelectrified sheaf weighed $4\frac{1}{2}$ lb.; the electrified sheaf $7\frac{1}{2}$ lb.

In every case the straw growing from the electrified seed was longer by some inches than the straw growing from the untreated seed. In every case the ears of the electrified wheat and barley were longer, plumper, and appeared to contain more berries or seeds than the unelectrified, the heads of the oats were larger, and the florets more numerous. In some fields in which the untreated corn had been laid in patches by recent thunder showers, the whole of the electrified corn was standing upright, the straw being not only longer but stouter.

Experienced agriculturists estimated the increase of yield of the electrified crops at from two to three sacks per acre. An increase of two sacks per acre on an average crop of wheat would be 25 per cent. In 1915, rather more than two million tons of wheat were produced in the United Kingdom. If the electrifying process

should be universally adopted it seems that the quantity produced would be increased by half a million tons, that the food of the country and the wealth of the farmers would be increased by this amount, that half a million tons of freight and many more tons of shipping would be saved on wheat alone. The result of the thrashing should be interesting.

THE COTTON CROP OF 1918.

That cotton-growers in 1916 were satisfied with the returns from their crops, is evidenced by the fact that, whereas in that year only 75 acres were under cotton cultivation, the following year saw 133 acres planted. The area sown in 1918 does not appear in the report of the Government Statistician, which only supplies returns to December, 1917. In the two seasons mentioned the respective returns of seed cotton were given as 24,264 lb. and 76,656 lb. respectively. The quantity of seed cotton delivered by farmers at the departmental ginnery in 1918 amounted to 166,458 lb., which produced 54,280 lb. of lint, or, approximately, the proportion of lint was one-third the weight of the seed cotton. The whole of the ginned cotton was sold at 1s. 1d. per lb. except only a small portion of second grade. The farmers received, on delivery of their crop, an advance of 2d. per lb. The price obtained for the lint enabled the payment of a further 2d. per lb., making the total payment for raw cotton at the farm 4d. per lb. The Department had, however, since the previous year, installed a "Linter" machine, by which means the short lint remaining on the seed of Upland cotton was saved to the extent of between 2½ and 3½ per cent. This may enable the Department to pay a little more to the suppliers.

In the old days of cotton-growing in the State, the gin houses paid 3d. per lb. to the growers, and a glance at the records of the return of a cotton crop to farmers will show that, at that price, this crop paid far better than any other. Certainly wages in the old days were considerably lower than at present but, as of old, many farmers keep the picking (valued at ½d. per lb.) in their own families, thus equalising expenses, and increasing the value of the crop.

A fair crop of seed cotton is 1,000 lb. per acre, but in the Moreton districts, far larger yields have been obtained (up to 2,000 lb.), and the net return ranged from £5 16s. 10d. to £15 3s. 3d. per acre. The results of the 1918 crop go to show that a cotton field large or small will return to the farmer more than any other crop, and with less labour.

MARKET GARDENING.

WHEN TO PICK TOMATOES.

It is not generally known that tomatoes ripen and colour from within outward. The fruits will acquire a perfect colour if they are picked as soon as they have grown to full size. They should be spread out in the sunshine for a time. When the surface colour begins to change from a dark green to a distinctly lighter shade with a very little tinge of pink, the fruit may be picked. Such fruit, if wrapped carefully in paper, will carry long distances, and ripen during the journey, opening up almost perfect.

One who has only a few plants may secure beautiful fruits free from cracks and of splendid colour by enclosing the fruits in paper bags some weeks before they ripen.

Tomatoes only acquire their most perfect flavour when ripened on the vine in full sunlight. No fruit artificially ripened is equal to that ripened by the sun.

It requires a great deal of experience to know exactly when to pick tomatoes. Fruit that has to be sent on a long journey must be gathered before that which has only a short distance to travel. Generally speaking, the fruit should be left on the vine no longer than will permit of its becoming fully ripe by the time it reaches its destination, where it is exposed for sale. When the fruit is to be shipped any distance frequent pickings are necessary to secure the fruit in the right condition. When the markets are close it is always an advantage not to gather until the fruit

is well coloured and before it begins to soften. Great care must be taken not to mark or bruise the fruit. Care should be taken to grade the fruit and so make it more attractive for sale. It should be graded as to size, shape, and colour. It will always pay to grade the fruit carefully. Careful grading and packing have great influence on the price. In our State very little care is taken with tomatoes. We see the fruit exposed for sale in the barrows, hand carts, and elsewhere; no attempt being made to make the fruit attractive.

When ripe, tomatoes require most careful handling, as they are easily bruised when roughly treated. It is not uncommon to see boxes of fruit most roughly handled in the market, and emptied from case to case as if they were as hard as stones. No wonder they have lost their flavour before reaching the consumer. Australians have a lot to learn about marketing fruit.

Tomato Weevil.—These little creatures attack the tomato plants at night. The weevil belongs to the same family as the curculio. It does much damage both in the grub and beetle stages. It feeds on the leaves at night and hides in the soil during the day. It is an easy matter to catch the grub. Spread a sheet under the plants, then let the bright light of a lantern shine on the plant; the weevils immediately fall on the sheet and are easily killed. Some people get success by making a bait of arsenic and bran. This is spread near the base of the plants. Don't allow chickens to have the run of the garden while the baits are about.

Cut Worms.—These do considerable damage to young tomato plants. The best remedy is a poisoned bait made thus: 1 lb. of arsenic, 1 lb. sugar, 6 lb. of bran. Mix with enough water and make a mash. Spread this about the base of the plants.

A solution of arsenate of lead to 50 gallons of water, when sprayed on the foliage, will kill all leaf-eating beetles and grubs.

Cracking of the Fruit.—Cracks and fissures in the mature fruit are due to variations in water supply. Some varieties are very liable to this disease. The grower should cultivate thoroughly and so prevent sudden checks in growth. If the development of the fruit has been checked by dry weather conditions and abundant supply of water follows, the outer skin cannot keep pace with the expanding fruit, and so cracking ensues.—“Garden and Field.”

VARIOUS MANURES FOR ROSES.

Whatever other manures you choose to apply you must use cow manure, if possible, well decayed and lightly pointed into the soil after you have pruned them in spring. Plenty of this should, of course, have been worked into the ground before planting them. Cow manure is slower in its action and cooler than horse manure. Pig manure is a good substitute for cow manure, being similar in its action. At the same time it is well to note that manure from well fed dairy cows is better than that from cattle getting less rich food. If fresh it should be thrown up loosely in a heap to ferment for a week and turned at least twice during that time. Cow manure contains nitrogen, phosphoric acid, and potash. Mechanically it helps the soil to retain moisture in summer, and this is of great importance to roses. Bone manure, if good, supplies phosphoric acid and a small percentage of nitrogen. One-inch bones may be applied to the soil at planting time, but these are very slow and lasting. For more immediate use top-dress with bone meal. Superphosphate of lime may be applied in spring after pruning and lightly pointed into the ground. You may use it at the rate of two to three pounds per rod. It is quicker in its action than bone meal. The above artificial manures supply phosphoric acid, and basic slag is another of the same type. It may be applied in autumn. Potash may most profitably be applied to light soil. Some of this will be contained in farmyard manure, also in urine from cow houses and from manure heaps. Wood ashes also supply it, and this may be given in spring. Nitrogen is also a valuable manure and serves to encourage the growth of wood and foliage. It may be applied at the rate of $\frac{1}{4}$ oz. to the gallon of water at intervals of three weeks from the time the roses commence growing until the buds commence to open. Soot water supplies a little nitrogen in the form of ammonia and gives good colour to the foliage. Potash is valuable in the manufacture of starch in the foliage. Lime may be applied with advantage in heavy soils, but not at frequent intervals. Lime rubble would be less active and would answer the purpose. Marl is a slow-acting form of lime. For the purpose of food a sufficient amount of lime will usually be found in superphosphate and the various forms of bone manure. Most soils contain all of the elements of plant food in sufficient quantity, with the exception of phosphorus, potash, nitrogen, and occasionally lime. If you desire to get more growth of wood and leaves then apply some of those manures which contain nitrogen.

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.
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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.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

Name of Owner.	Address.	Number of Males.	Number of Females.	Herd Book.
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DAIRY BREEDS—*continued.*JERSEYS—*continued.*

W. J. Barnes	Millstream Jersey Herd, Cedar Grove	10	37	Jersey Herd Book of Queensland
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 Stand- ard Jersey Herd Book

GUERNSEYS.

Queensland Agricul- tural College	Gatton	2	2	Eligible, but no Guernsey Herd Book of Aus- tralia
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HOLSTEINS.

Queensland Agricul- tural College	Gatton	2	9	Holstein-Friesian Herd Book of Australia
George Newman ..	"St. Athan," Wy- reema	12	47	Do.
F. G. C. Gratton ..	"Fowlerton," Kings- thorpe	1	15	Do.
R. S. Alexander ..	Glenlmond Farm, Coolumboola	1	3	Do.
Ditto	Ditto	1	..	Holstein-Friesian Herd Book of New Zealand
S. H. Hoskings ..	St. Gwithian, Too- gooloowah	..	..	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	Corndale, Coolabunia	3	43	Do.
W. T. Savage	Ramsay	2	22	Do.
Hunt Bros.	Springdale, Maleny..	3	62	Do.

MILKING SHORTHORNS.

P. Young	Talgai West, Ellin- thorp	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.

BREEDERS OF PUREBRED STOCK IN QUEENSLAND—*continued.*

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

In future, the list of Breeders of Pure-bred Stock, hitherto published in the monthly issues of the Journal, will appear half-yearly only—namely, in June and December.

FARMERS' WOOL CLIP.

PREPARATION OF WOOL CLIPS FOR MARKET—No. 2.

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

(Continued from November issue.)

The reason for branding the bales in this way is that the packs may be used again, and if disfigured by a large brand on the side they have to be returned to owner as second-hand, when new packs would be charged for.

The advantages to the farmer are many:—

- (a) Minimum rate of commission, $1\frac{1}{2}$ per cent., which would not be obtained unless in lots whose value is £500 and over.
- (b) Classification charges are at the rate of 10s. per bale (average weight), being apportioned according to the size of parcels.
- (c) Handling and other charges are reduced to a minimum.

The clips that are now handled by the Department would previously be sold in unattractive parcels of bales, butts, and bags that were, before the appraisalment system, wholly bought by dealers and others, who reclassified and resold at a profit. I have a fair idea of that business as I was, at one time, employed as foreman to one of those firms. The farmer lost that profit. Hereunder is shown a typical submission sheet of six farmers' clips, showing the different classes and how the farmers receive their full values in the various grades.

The Department wishes to give the farmer every assistance in obtaining the best value for the product grown by him by putting the wool on the market in attractive and even lines, thereby encouraging the small owner and mixed farmer in sheep breeding, which has become a very profitable business.

PREPARATION OF WOOL CLIP FOR MARKET.—No. 3.

MERINO CLASSING—STATION AND FARMERS.

The system to follow in classing Merino wool is to class mainly to—(a) Length and soundness; (b) yield; (c) general characteristics, viz., colour, style, vegetable, earth or other foreign matter contained therein.

In the majority of cases, five to seven sorts will be found sufficient for a station of about 40,000 and upwards, and the sorts should be as follows:—First combing, second combing, first clothing, second clothing, AA fleece, A fleece, cast sort.

First Combing should contain the sound, light-conditioned wool of good length, full, bold, staple, and attractive looking wool of good colour.

Second Combing includes the sound, generous-conditioned, lean-stapled, duller fleeces of good length contained in the clip.

First Clothing contains the fine, soft, light-conditioned short wool of the clip.

Second Clothing, the rougher, heavier, duller, and less attractive-looking short wool.

In regard to the grading of clothing wools, fineness to a certain extent must come in.

Fineness plays a more important part than in the combing sorts, and in regard to this type of wool, a wool may be very thin-stapled, and yet show exceptional quality and fineness, which would constitute an ideal clothing wool; because quality, and fineness are two of the most strongly marked indications of a good felting wool.

AA Fleece would contain fleeces presenting similar features to the first combing, with the exception that it would be unsound; that is, having a tendency to break when tension is applied to a staple drawn from the fleece.

A Fleece to contain fleeces similar to the second combing, but unsound.

Cast Sort would comprise any rough, coarse, matted, very heavy-conditioned, dingy, or any badly bred fleeces.

If there were sufficient wool that carried a great amount of condition, another sort could then be made for wool-carrying condition only, as that class of wool would be too good to mix with a matted or dingy fleece. The difference between the two wools being that the heavy-conditioned wool will wash up a good, bright colour, while the dingy wool will never wash up bright in colour. Generally speaking, it is not necessary to make a condition sort for there is often not a sufficient quantity of that particular line in a clip.

Rams' wool should be packed by itself.

Black wool should be packed by itself.

FARMERS' LOTS.

In the classing of small clips, or farmers' lots, it is not necessary to go into very scientific classing, as the main idea for every small man to consider is to class his clip into even lines, and, at the same time, make as few sorts as possible.

Supposing he has 1,000 sheep, mostly Merino, the best method would be to make two (or, in isolated cases, three) sorts at most.

They would comprise the following:—

AAA—All long, sound, medium to light conditioned wool.

AA—Short, thin-stapled, fine wool of fair condition.

A—Heavy-conditioned wool of dull colour.

There would be very little of the latter quality, as the bulk of the clip would go into the two first lines.

In a clip you generally have a few badly-bred, matted, or very heavy-conditioned fleeces that will not match your bulk lines.

Rather than put low quality wool in your good, even lines, thereby making them irregular and lowering the value, it would pay to put it into a lower grade than it really is, such as pieces, &c., where it may help that line up instead of bringing the good lines down in quality.

In packing the wool for market, good, honest packing always pays. Thoroughly trained experts are employed to value wool, and they can detect "topping up" at once, when the farmer suffers, as he is allowed such a price that the buyer would not lose, should the bale turn out to be worse than it appears when valued. Cross-bred wool should always be packed separate from Merino, and if packing unskirted, it is always advisable to remove any stained wool, rough points, or fatty edges.

Poultry.

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

Very hot days, dust storms, and hot winds have been prevalent during the month. The scarcity of green feed is badly felt by the birds, and this, together with the removal of some of the pens, has caused a considerable drop in the number of eggs obtained. The heavy breeds that have been transferred have not taken to their new quarters at all well. The laying in these pens has not stopped altogether, but is very uneven. The opposite is the case with the light breeds removed. E. Chester's pen was moved at the commencement of September, attained the highest score for that month, and has repeated the performance during October. The following pens were moved last month:—Mrs. Hunter's Messrs. Becker, E. Chester, Taylor, Marson, Quinn's Post Poultry Farm, and Mrs. Coomber's. At the commencement of this month (October) the following were transferred:—Messrs. Macrae, W. Smith, Claussen, Lyell and Dr. Jennings. On the 20th October, Messrs. Burns, Morris, Fulton, and the Nobby Poultry Farm pens were removed. The following cases of broodiness were recorded in the heavy section:—Macrae (1), W. Smith (1), Reilly (5), Dennis (1), Mars Poultry Farm (1), Walters (5), Morris (2), Burns (1), Fulton (1), Larsen (2), Fitzpatrick (1), Hindley (1), Puff (3), Mee (4), Shanks (1), Lutze (2). In light breeds—Prince (2), Knoblauch (1), Howard (1), Porter (1), Zahl (1). The following have lost birds by death:—Puff, Trapp, and Fraser. Several birds have required treatment for sickness, mostly blood troubles and bowel cases.

TRUENESS TO TYPE.

The College True to Type prizes are given for the purpose of stimulating interest among breeders in maintaining a closer approximation to the standard type in the various breeds. On this account the pens of the various competitors have been judged fairly rigidly, with the results shown below. The standard adopted for entry into the general competition is not sufficiently rigid to render all birds entered eligible for the true to type prizes. The classification of the competing pens is as follows:—Class I. have passed, having answered all requirements in regard to trueness to type. Class II. have passed, but have faults which need rectifying in future breeding. These faults will be found in the full detailed report on the subject, to be published in November issue of the Queensland Agricultural Journal. Class III. possesses faults which will, in most cases, pass them out in the next competition (1919-20), and the breeders must take drastic measures to improve, otherwise such birds will not be accepted in future competitions. The current competition will admit the class. Class IV. altogether fail to comply with our requirements, and are consequently passed out.

The following are the individual records, with classification:—

Competitors.	Class.	Breed.	Oct.	Total.
LIGHT BREEDS.				
*Dixie Egg Plant	II.	White Leghorns ...	140	1,005
*E. Chester	III.	Do.	145	931
*G. W. Hindes	I.	Do.	144	914
*Geo. Howard	I.	Do.	125	885
*C. P. Buchanan	II.	Do.	131	870
*Geo. Prince	III.	Do.	130	867
G. H. Turner	III.	Do.	137	858
*T. Fanning	I.	Do.	133	855
*C. Knoblauch	III.	Do.	112	852
*W. Becker	III.	Do.	141	852
Mrs. L. Henderson	I.	Do.	136	841
*W. Lyell	II.	Do.	125	826
*E. A. Smith	II.	Do.	136	816
*Oakland Poultry Farm ...	III.	Do.	133	814
*R. Holmes	II.	Do.	115	813
*L. G. Innes	II.	Do.	129	809
*O.K. Poultry Yards	IV.	Do.	117	781
B. Caswell	I.	Do.	122	775
*Quinn's Post Poultry Farm ...	II.	Do.	135	774
*Dr. E. C. Jennings	IV.	Do.	126	766
*Range Poultry Farm	II.	Do.	126	747
J. J. Davies	I.	Do.	119	739
*Mrs. A. T. Coomber	II.	Do.	130	723
*Thos. Taylor	II.	Do.	112	722
*Chris. Porter	III.	Do.	94	708
Harold Fraser	III.	Do.	106	707
*Homalayan Poultry Farm ...	II.	White Leghorns ...	135	699
*J. M. Manson	II.	Do.	119	698
*J. Zahl	IV.	Do.	115	687
O. W. J. Whitman	III.	Do.	84	674
Mrs. L. F. Anderson	II.	Do.	127	661
*T. B. Hawkins	II.	Do.	110	643
*Mrs. R. Hunter	II.	Do.	133	640
R. T. G. Carey	IV.	Do.	88	640
*J. W. Newton	II.	Do.	128	636
Mrs. A. G. Kurth	II.	Do.	131	635
S. Wilkinson	IV.	Do.	115	624
H. B. Stephens	II.	Do.	124	614
G. Williams	II.	Do.	96	603
Shaw and Stevenson	I.	Black Leghorns ...	117	602
Geo. Trapp	I.	White Leghorns ...	104	592
H. F. Britten	I.	Do.	116	591
Progressive Poultry Pens ...	I.	Do.	121	579
B. Chester	II.	Do.	116	555
P. O. Oldham	I.	Do.	119	553
W. A. Wilson	II.	Do.	115	522
A. W. Walker	I.	Do.	123	517
HEAVY BREEDS.				
*Nobby Poultry Farm	II.	Black Orpingtons ...	105	902
*E. F. Dennis	IV.	Do.	126	809
*A. E. Walters	I.	Do.	110	801
*E. Morris	III.	Do.	105	786
T. Hindley	II.	Do.	113	778
*D. Fulton	II.	Do.	133	769
*Mars Poultry Farm	II.	Do.	131	757
*R. Burns	III.	Do.	120	756
*W. H. Reilly	II.	Chinese Langshans ...	110	707
*W. Smith	I.	Black Orpingtons ...	68	688
A. Shanks	I.	Do.	118	675

EGG-LAYING COMPETITION—*continued.*

Competitors.	Class.	Breed.	Oct.	Total.
HEAVY BREEDS— <i>continued.</i>				
E. M. Larsen	II.	Black Orpingtons ...	94	673
*J. W. Macrae	II.	Do.	55	659
T. W. Lutze	II.	Do.	116	610
W. J. Mee	IV.	Do.	68	548
*F. A. Claussen	I.	Rhode Island Reds ...	71	541
H. Puff	I.	Do.	92	487
Jas. Fitzpatrick	I.	Do.	93	462
Totals			7,563	46,613

* Indicates that the pen is engaged in the single hen test.

RESULTS OF SINGLE HEN TESTS.

Competitors.	A.	B.	C.	D.	E.	F.	Total.
LIGHT BREEDS.							
Dixie Egg Plant	157	162	180	155	170	181	1,005
E. Chester	158	157	146	176	147	147	931
G. W. Hinde	185	153	142	154	146	134	914
Geo. Howard	139	148	146	153	147	152	885
C. P. Buchanan	133	145	148	148	155	141	870
Geo. Prince	124	160	146	151	138	148	867
G. H. Turner	91	123	157	156	181	149	858
T. Fanning	153	133	158	108	154	149	855
C. Knoblauch	144	132	158	136	135	147	852
W. Becker	144	146	123	157	129	153	852
Mrs. L. Henderson	149	126	141	109	158	158	841
W. Lyell	142	148	147	132	127	130	826
E. A. Smith	114	157	140	149	141	115	816
Oakland Poultry Farm	123	133	150	151	132	125	814
R. Holmes	148	150	129	132	118	136	813
L. G. Innes	144	159	172	89	99	146	809
O.K. Poultry Yards	124	141	145	115	139	117	781
Dr. E. C. Jennings	116	157	139	118	132	104	766
Quinn's Post Poultry Farm	162	112	122	110	155	113	774
Range Poultry Farm	47	161	107	138	142	152	747
C. Porter	92	122	136	117	109	132	708
Thos. Taylor	93	136	125	110	126	132	722
Mrs. A. T. Coomber	110	136	119	126	92	140	723
J. Zahl	146	113	136	130	98	64	687
J. M. Manson	148	132	148	87	75	98	688
Homalayan Poultry Farm	144	122	103	95	132	103	699
T. B. Hawkins	131	103	134	90	90	95	643
J. W. Newton	119	150	66	92	116	93	636
Mrs. R. Hunter	102	138	52	103	121	124	640
HEAVY BREEDS.							
Nobby Poultry Farm	171	151	136	113	160	171	902
A. E. Walters	118	160	98	157	160	108	801
E. F. Dennis	161	127	125	77	175	144	809
E. Morris	116	124	149	156	138	103	786
R. Burns	118	132	105	115	158	128	756
D. Fulton	148	122	122	119	80	178	769
Mars Poultry Farm	135	144	118	130	115	115	757
W. Smith	166	121	54	122	101	124	688
J. W. Macrae	75	33	134	100	127	140	659
W. H. Reilly	123	143	122	74	111	134	707
F. A. Claussen	99	96	82	101	105	58	541

GENERAL COMMENTS ON "TRUENESS TO TYPE," COMPETITION BIRDS.

Light Breeds.—The improvement in type of the birds competing in the current competition is small in comparison with the 1917-18 contest. In classifying the pens, the standard of the utility poultry breeders has not been strictly adhered to, and a good deal of leniency has been shown in connection with the English Poultry Club standards. There are a few pens of exceptional quality, and it is very gratifying to be able to say that these same pens have, in nearly every instance, given a satisfactory account of themselves. The type of the birds in the six-hen test, which are for the most part owned by beginners in competition work, is much better than the type of those owned by the majority of the old hands, and new men in the singles have in most cases forwarded good specimens. In our opinion, the pen owned by G. W. Hindes is almost ideal for utility work, and possesses every feature that marks them as Leghorns. They have size without coarseness, are very uniform, with typical Leghorn bodies, and perfect headpieces. They also possess stamina which no change in weather or conditions seems to shake. This, in our opinion, is half the battle in competition work. This same pen has passed the weight of egg test, and takes the third place for number of eggs produced. It is, therefore, plainly proved that close conformity to the English standard weight and number of eggs can be obtained by some breeders. It is therefore intended to adopt more stringent measures each year, allowing ample time for competitors to make the necessary improvements in their stock. The lack of uniformity in some of the pens spoils their whole appearance. Several pens are completely spoilt, and consequently graded lower, owing to one or two individuals being dwarfed. The Himalayan P. Farm's F bird in the single test is about the most typical bird in the competition, yet the pen is graded second class owing to the absence of uniformity. There are a goodly number of Leghorns with very diminutive combs. Taken for granted that the comb calls for a certain amount of upkeep, the larger it is the bigger the drain on the bird's system, a Leghorn without the neatly serrated, fine-textured comb hanging gracefully on one side has the appearance of anything other than a Leghorn, especially if the medium comb is in conjunction with small size or discoloured lobes. Tail-carriage in Leghorns has a tendency to alter the general outline of a bird. One possessing a "squirrel" tail usually carries its body more erect than one with the tail at an angle of 45 degrees to the back. These high-tailed, upright carriage birds always appear to be short backed, and always have an erect or semi-erect comb and rather long shanks. During the six months' duration of the present competition the weather has been most variable, and at times only birds possessing stamina could show a satisfactory advance in their totals. Owing to the judgment for trueness to type having been postponed till half the contest was finished, we are placed in a favourable position to observe the doings of the pens during trying weather conditions. There are, in our opinion, certain pens which their owners have had difficulties in rearing, and others that show every evidence of having been troubled with roup, catarrh, and other sickness in their early life. It is very often the case that a breeder has trouble with his young chickens, and at times has to treat them for various ailments; but as soon as these same birds redden up for laying and have that beautiful appearance that a pullet has when about to lay, in a large number of cases the owner forgets the bird's past life, thinks only of how she appears at the time for sending for competition work, and the way she was bred. These birds which have had early set-backs are soon picked out when the genuine hard work comes or the weather is trying. Some continue to lay moderately, but their drawn-in faces, anaemic combs, shrunken legs, overloaded tail appearance, poor appetites, and forlorn look give them away when the subject of stamina comes in. Stamina has had a great deal to do with the manner in which the birds are graded, for without it they cannot stand a year's heavy laying, and then be expected to produce birds even better than themselves. Competitors who think they have been hardly dealt with in the classification can rest assured that one of the reasons for their being graded lower than their expectations is that the birds owned by them are showing the strain in too marked a degree. Owing to the scarcity of green feed, closely bred birds feel its absence and show it in their returns. The

very hot weather, together with the absence of greenstuff, picks out and hastens the death of a number of birds possessing hereditary weaknesses and disease. It would be far better for a breeder to sacrifice a dozen or two eggs than to put up with the trouble and disappointment of rearing the present day usual run of weak constitutioned specimens. The heavy mortality in rearing is often the cause of the disheartening of a beginner.

Heavy Breeds.—We have gone to the expense of leniency in classifying the heavy breeds, which for the most part consist of Black Orpingtons. Not only have breeders to make a big improvement in type, but the size of the eggs and tendency to broodiness have to be amended. There is a very great variety of type amongst the Orpingtons. There are birds with short backs, roach backs, finny backs, and those with cushions resembling those of a present-day Cochin. These backs finish off with an assorted variety of tails. There are true Orpington tails, long tails, and spread tails. Breeders of exhibition Orpingtons know too well the difficulty of producing blacks with that much desired green sheen, so too strict attention has not been given to this feature when passing verdict in this section. The required points of an Orpington are much harder to obtain than those of a Leghorn; hence, as previously remarked, more leniency has been shown in classifying in this breed. Side spikes on single combs are in evidence in too many cases for one's liking: it is a defect which is transmitted. Birds having this fault will be placed in the 4th class in future competitions, and the same may be said of birds having feathers on their shanks in the clean-legged breeds. The combs on some of the Black Orpingtons are too large and hang to one side, so that if they possessed white lobes they would easily pass for a light breed. The build of some, with their long backs, tails, and legs, together with their fineness of bone, more resembles a light breed than a heavy one. The sooner the better it will be for all utility poultrymen when a thorough understanding is arrived at as to what constitutes the type, and the number of points to be allotted for each feature in all breeds for utility purposes, instead of one common standard as issued by the Utility Poultry Club. The severe task of classifying 400 birds, the majority of which possess any number from three to a dozen failings on comparing them with the original standard, is a task not to be envied. Often the remark is heard—"That's So-and-so's type of birds." It may mean that So-and-so's stock compare with the standard so favourably that they stand out from all others; or, on the other hand, that he has been adopting close breeding and has stamped a number of failings into his flock which are easily detected. Shape is half the breed, and features the other half. The writer of these notes once showed a Jubilee Orpington, rather long in back, as a Speckled Sussex in one of the leading young stock shows of England, and won first prize. The same bird won first and cup at the Crystal Palace in the Jubilee Orpington class, thus showing that too much was allowed for colour and not sufficient for shape. The evolution of the Orpington has been remarkable. The late Wm. Cook originated the breed, for one reason, for lovers of the Cochin who objected to the feathering on the legs; but it must be borne in mind that the Cochin of that date was not the mass of balls of fluff it is at the present day. The first Black Orpington that was shown was very clean in face, possessed good eyes, but was not the full-fronted bird of the present day. It possessed width, fair length of back, a moderate tail, and showed more daylight underneath than the show bird of to-day, which has the appearance of being related to the old Scotch Dumble. In fact, the old time B.O. had the appearance of a robust, rather close feathered, better class utility Black of the present time.

The classification of the competing pens is as follows:—

Class I.—Have passed, having answered all requirements in trueness to type.

Class II.—Have passed, but have faults which need rectifying in future breeding. These faults will be found in the full detailed report given below.

Class III.—Possess faults which will pass them out in the next competition (1919-20), and the breeders must take drastic measures to improve same, otherwise they will not be accepted for future competition. This current competition will admit this class.

Class IV.—Altogether failing to comply with our requirements and consequently passed out.

Detailed Comments on Light Section.

G. W. Hindes (Class I.).—Nearest our ideal in the competition.

O.K.P. Farm (Class IV.).—B, D, and E too small. F side spikes.

Range P. Farm (Class II.).—Strong constitutions, variation in tail carriage.

L. G. Innes (Class II.).—Devoid of Leghorn headpieces, only just managed to get into this class.

Geo. Prince (Class III.).—B inclined to be wry-tailed.

C. Knoblauch (Class III.).—Lacking in stamina.

Oakland P. Farm (Class III.).—Tail carriage variable, assorted sizes and headpieces.

E. A. Smith (Class II.).—Lack uniformity, strong constitutions.

Geo. Howard (Class I.).—F a trifle small, good constitutions, D one of the most typical in competition.

T. Fanning (Class I.).—Robust, good doers, possessing size, and Leghorn characteristics, F a really fine specimen.

W. Lyell (Class II.).—An even, business-like pen, but could do with more size.

Dr. E. C. Jennings (Class IV.).—D and F very small, spoiling pen altogether, too high tail carriage and tails too erect, A, B, and C good bodies.

R. Holmes (Class II.).—Rather narrow, could do with more room behind in some cases, splendid open faces and fine textured combs.

T. B. Hawkins (Class II.).—C bird appears on the weak side.

G. H. Turner (Class III.).—C and E too small, E white in face, pen lacks uniformity.

Mrs. L. Henderson (Class I.).—Good bodies and tail carriage, neat heads.

Homalayan P. Farm (Class II.).—Very variable, B inclined to be weak, F bird an ideal specimen.

C. Porter (Class III.).—Splendid bodies, but all white in face.

C. P. Buchanan (Class II.).—Rather on fine side, but strong, good doers.

J. W. Newton (Class II.).—Largest in competition, too coarse in cases; headpieces away from requirements, being too large in some and rough textured in others.

Dixie Egg Plant (Class II.).—Not of the largest, D and E possess neat heads, the others having very small combs, rather fine in type, faults largely counteracted by stamina.

J. Zahl (Class IV.).—Lacking in stamina.

Mrs. R. Hunter (Class II.).—Heads trifle coarse; good size, shape, and bone; A and E have side spikes on comb.

W. Becker (Class III.).—Squirrel-tailed, C wry-tailed, combs too erect, only just managed this class.

E. Chester (Class III.).—Side spikes in evidence, lack size and substance, splendid constitutions.

Quinn's Post P. Farm (Class II.).—B bird too fine in bone, good bodies; F erect comb.

Mrs. A. T. Coomber (Class II.).—Size varies, C spoils pen; F very typical.

Thos. Taylor (Class II.).—B bird too fine, otherwise first-class pen.

J. M. Manson (Class II.).—Could be more uniform.

H. F. Britten (Class I.).—A very nice light-feathered pen, showing no weediness whatever.

G. Williams (Class II.).—On the narrow side and not too uniform.

A. W. Walker (Class I.).—A pen we like very much, being very typical and good doers, evidently were used to intensive housing before arrival at competition.

H. Fraser (Class III.).—Very mixed.

W. A. Wilson (Class II.).—One small bird spoils pen.

S. Wilkinson (Class IV.).—Too small and type very variable.

Mrs. L. F. Anderson (Class II.).—Lack uniformity.

B. Chester (Class II.).—Spoilt by variation in size.

Geo. Trapp (Class I.).—Splendid bodies and carriage.

R. T. G. Carey (Class IV.).—Type and size very uneven.

O. W. J. Whitman (Class III.).—Lacking in stamina.

B. Caswell (Class I.).—Very even and good stamina, want just a little more size.

P. Oldham (Class I.).—Nice headpieces, slight variation in size, good bodies.

J. J. Davies (Class I.).—Good doers, a pleasing pen all through.

Shaw and Stevenson (Class I.).—A first-class pen for type, size, and colour. Constitutions good.

Mrs. A. G. Kurth (Class II.).—Rather coarse in heads, good bodies and stamina.

Progressive P. Pens (Class I.).—A front rank pen for size and shape. Another pen that has evidently been used to intensive work before entering competition.

Heavy Breeds.

J. W. Macrae (Class II.).—Good size, plenty of room, too much tail.

W. Smith (Class I.).—Nice and blocky, type of the best if compared with average utility Blacks of the present day.

F. A. Claussen (Class I.).—Good size and shape, colour passable on arrival in April, 1918.

D. Fulton (Class II.).—Type not consistent throughout, splendid eyes.

Nobby P. Farm (Class II.).—Very strong constitutions, roach backs and too tall on legs.

R. Burns (Class III.).—A big variation throughout in type and size.

E. Morris (Class III.).—Type not regular enough, those possessing shape are too small.

A. E. Walters (Class I.).—A very nice pen, taken all round, not so tall as the majority, headpieces very neat.

Mars P. Farm (Class II.).—Very neat heads, inclined to too much tail.

E. F. Dennis (Class IV.).—Type very variable, poor colour.

W. H. Reilly (Class II.).—Type and size not consistent, type of D bird approaching that of a modern Langshan.

E. M. Larsen (Class II.).—Good constitutions, and not so tall as a good many; could be more uniform.

J. Fitzpatrick (Class I.).—Good size and stamina, not the best of colour.

T. Hindley (Class II.).—First-class headpieces, too much tail, colour in some cases dull and devoid of sheen.

H. Puff (Class I.).—The pick of the R. I. Red pens; two birds in this pen are fit for show bench.

W. J. Mee (Class IV.).—Too small, and altogether away from standard.

A. Shanks (Class I.).—One of the best pens in the heavy section for colour and Orpington characteristics.

T. W. Lutze (Class II.).—Strong big-framed birds on the big side.

CUTHBERT POTTS, Principal.

The Orchard.

A FEW NOTES ON CITRUS CULTURE.

Read at the Fruit Growers' Conference held at Palmwoods, 2nd November, 1918.

By ALBERT H. BENSON, Director of Fruit Culture.

At your last conference, which was held in October, 1917, a long, interesting, and instructive paper on Citrus Culture was read by the late Mr. S. C. Voller, and was evidently much appreciated, as your secretary has asked me to prepare a paper on the same subject for submission to you to-day.

As I have already dealt very fully with this matter in my writings, I do not consider it necessary to go into details now, but will confine my remarks to those points that are of especial interest to growers at the present time. Should any grower require fuller information than that contained in these notes, I would refer him to the last edition of my work on Citrus Culture, issued in 1916, and which can be obtained on application from the Department of Agriculture and Stock.

There are, however, certain well-established facts connected with the industry on which the success or failure of the orchard is very largely dependent, and although these facts are well known to the majority of growers, they will bear repeating as they are of the greatest importance to beginners.

In the first place, the selection of suitable soil and a suitable situation for the citrus orchard is imperative, as without these essential factors the commercial success of the undertaking is very doubtful under existing conditions. Intending growers cannot afford to make any mistakes at the start, but must be certain that the land they select is suitable in every way, which means that, not only must it possess perfect natural drainage, but it must be capable of being worked economically.

This narrows the choice of sites, as the only soils that will fulfil these conditions are deep, free loams or sandy loams that will not retain stagnant water even during periods of heavy and prolonged rainfall, and the choice of such soils is further limited when the cost of working is taken into consideration.

Level or nearly level land is much cheaper to work than hillside land, as practically the whole of the cultivation that is so necessary to keep down weed growth, and to conserve water in the soil during a dry time, can be carried out by horse labour and the use of up-to-date implements of cultivation.

Level land possessing a suitable soil does not wash during periods of heavy rainfall, and thus there is no danger in keeping it in a state of perfect tilth; further, the cost of spraying or cyaniding and the gathering and handling of the fruit is materially reduced, and manures are not washed out.

Other conditions being favourable, it will thus be seen that the more level the land the better, as the cost of producing and handling the fruit is considerably reduced.

Having selected suitable land, the next step is its preparation. This should always be thorough, as once the trees are planted you never get as good a chance again, and, though the initial expense is greater, it always pays in the long run. The same remark applies to the selection of the trees and planting. Only well-grown, perfectly healthy trees should be planted, and they should be planted properly. This necessitates, first, a careful examination of the roots and cutting away all badly-bruised or broken roots, and secondly, the planting of the tree at the right depth and placing the roots so that they will have a downward and not an upward tendency.

To do this, the digging of large or deep holes is not necessary, as, if the land has been properly prepared, all that is required is to make the hole large enough to take the spread of the roots, and for the tree, when planted, to stand in the soil at the same depth it stood when growing in the nursery. The centre of the

hole should be a little higher than the sides, so as to give the roots a downward trend.

If dry at the time of planting, place a little fine top soil round the roots when they are placed in position, and then give the tree a good watering and fill in the hole with soil. This will give the tree a start, as the water will not dry out quickly on account of the soil mulch above the wet ground, whereas, if a surface watering is given, the effect is soon lost.

We now come to one of the most important parts, and that is the pruning of the young tree as soon as it is planted. In removing the young tree from the nursery, it has been deprived of most of its root system, especially the fine, feeding roots, so that it is necessary to reduce the top in order to give the root system a chance to recuperate, and it is also necessary to cut back so as to provide a strong framework for the future tree. This means that only a limited number of branches are left, not less than three nor more than five, as these first branches eventually become the main limbs of the tree. Many growers make the mistake of leaving far too many branches, with the result that the branches are too crowded and very weak, so that when they are laden with fruit they are unable to bear the weight and frequently break down. This is often seen in the case of mandarins, and particularly with the Beauty of Glen Retreat, which requires very careful attention when young, as it is apt to produce a dense growth of weak wood unless its main limbs are properly established and all subsequent growths are kept severely thinned. If the tree is not pruned out properly it will overbear, the result being a great crop of undersized fruit one year, that is hard to dispose of, and a sickly looking tree and very little fruit the next.

No citrus tree should be allowed to grow into a dense bush, as it is impossible to spray such properly, and consequently they become a breeding ground for all kinds of pests. A typical citrus tree should have one main trunk from 18 inches to 2 feet high, with not more than three to five main branches, and these main branches should only be allowed to carry sufficient subsidiary branches to form the framework of the tree. All others are unnecessary and should be removed.

The inside of the tree should never be crowded, the limbs should be properly spaced, and the outer branches on which the fruit is produced should not only shade the inside of the tree, but the ground under the tree, so that as long as the lower branches are clear of the ground, when in fruit, they can be left on.

High heading is not, in my opinion, desirable in this climate, as the ground requires shading from the summer heat, and, further, the more of the crop that can be gathered from the ground the better.

The great fault of beginners is that they are afraid to prune hard enough, and there is frequently much more harm done to the trees by under-pruning than by over-pruning.

Properly pruned trees produce regular crops, as they make a good growth annually, but under-pruned trees are very apt to over-bear one year and consequently to make little new growth, so that the following year they have a small crop and have to make wood for the next season's crop.

The pruning of the lemon is quite different from that of the orange or mandarin, once the tree is given its permanent shape, as, unless the long straggling growths it is prone to throw out are kept well shortened back, so as to encourage the production of fruit-producing laterals, you get a very untidy tree that bears the majority of its fruit at the ends of long branches that sway about in the wind and rub or bruise much of the fruit. In pruning the lemon the main object is to encourage lateral growths on which to grow the fruit, and to discourage the production of long straggling branches. A well-pruned lemon-tree in full bearing should not be more than ten feet high, and should have its laterals so spaced that there is no overcrowding. Such a tree will bear even crops of well-grown fruit, whereas a tree allowed to run wild will produce a lot of coarse fruit which is hard to dispose of.

So far I have only dealt with the pruning of young trees and healthy trees, but it frequently happens in old or neglected orchards that quite another class of pruning is necessary—namely, pruning for renovation. This is a very important matter, as, if it is carried out in time, many an apparently worthless tree can be brought round and made to produce profitable crops. The bearing wood of many old trees frequently becomes useless as the result of drought, neglect, starvation, want of pruning, insect or fungus pests, &c. The wood is hidebound and there is no free flow of sap. Such trees frequently show signs of gum on the main branches and they throw out many water sprouts. Trees showing these symptoms should have

their roots carefully examined, and if the roots are found to be healthy, they can be brought round by giving them proper treatment. This consists of removing the top of the trees, cutting back all limbs till sound, healthy bark and wood are met with, and removing all dead or superfluous main branches. The tree is then painted or sprayed with a strong solution of lime-sulphur, not less than one part of the standard solution of 32 deg. Beaumé in 10 of the mixture when used as a spray, or even much stronger when used as a paint. The ground round the tree should then be worked up well and a good dressing of a complete fertiliser given. This work should be done when the tree is more or less dormant, and as soon as rain comes young shoots will make their appearance all over the tree, and these should be carefully thinned out, only leaving enough to form the new top of the tree. If these young shoots make a strong growth they should be checked, so as to encourage lateral growth, and this in turn must be thinned out. If this work is carefully carried out a tree that was practically useless on account of its worn-out top will have a new head of vigorous growing wood which will produce good fruit. If the tree is then properly looked after—that is to say, kept pruned, manured, sprayed, and cultivated—it will continue to yield a profitable return for many years.

The next point to be considered is how to keep the orchard clean—that is to say, free from insect and fungus pests. The first consideration is to keep the trees in a healthy and vigorous condition by proper pruning combined with thorough cultivation and systematic manuring, as healthy vigorous trees are able to throw off many pests that a weakly, neglected tree would succumb to. The second consideration is to systematically inspect the whole of the trees in the orchard at regular intervals, so that the presence of any disease can be detected before it has become firmly established, as it can then be stamped out before it has had time to do serious damage.

The trouble is that many orchardists fail to recognise the importance of taking steps to fight diseases as soon as they make their appearance, and frequently allow their trees to become so badly infested that their vitality is seriously injured; the crop suffers in consequence, and the cost of cleansing the orchard and bringing the trees back into a healthy condition is a heavy tax on the grower. Diseases such as borers of all kinds, gumming, both of the branches and around the collar of the tree, bark-destroying fungi of several kinds, and red scale, require attention as soon as ever they make their appearance, and if they are taken in hand promptly they cause little damage, but if they are neglected the tree soon shows signs of distress.

In fighting fruit pests the old saw “A stitch in time saves nine” is very sound advice and should be kept in mind by all growers, as by acting up to it they will be saved a lot of trouble and expense.

I will not go into further details to-day, as I have just revised an edition of my pamphlet on Fruit Pests, which I have tried to bring up to date, and which is now in the hands of the Government Printer, so that, when issued, I trust it will be found useful to growers.

I will now conclude my remarks with a little general advice on marketing the fruit, as no matter how well you keep your orchards, and no matter how good fruit you grow, you will not get the best returns unless it is properly marketed.

Now, what I mean by being properly marketed is, that the fruit must be placed on the market in the best possible condition, so that when opened up for sale it will show off to the best possible advantage.

To do this the grower must spare no trouble—he must gather the fruit carefully so as to prevent bruising, he must grade it, both for size, quality, and colour, and he must only pack one grade of even size, quality, and colour in a case, so that when the case is opened up for sale the fruit will not only show to the best advantage, but the shown surface will indicate the quality of the whole of the contents, and buyers will know exactly what they are purchasing.

Fruit will have to be packed in this manner in order to comply with the Victorian regulations, and, therefore, it is advisable to pack all fruit properly, so that there will be no difficulty in their being admitted into any State.

In the case of our local Queensland markets, our regulations demand honest packing and the correct marking of the case, and growers who fail to comply with the law are being proceeded against.

The honest packer has nothing to fear, and it is only fair that he should be protected from the man who tops his fruit or puts it on the market under another man's brand.

Horticulture.

THE ROSE GARDEN.

Roses Pegged Down.—The object of bending over the long growths of roses is to induce the eyes all along the shoot to start into new growth and to produce blooms. If the long growths are not so bent, the sap flows to the extreme ends, and only those buds at the ends will move. If you observe a wild rose in the hedges you will usually find some long growths have arched over naturally and they are studded with shoots and blooms. It is not at all necessary to peg the ends into the soil. The best plan is to drive a few stout pegs into the ground, then attach tarred twine to them by making a notch so that the string cannot come off. The end of the growth is then secured to the string and bent at any angle preferred. The ends may touch the ground or be a foot or so away; it is immaterial. We like to peg one or two growths and allow the others to grow naturally on such plants as are suitable to treat in this way. If such as W. A. Richardson are pegged, all the growths may be bent, and towards autumn a number of new shoots will spring up from the base, and after attaining a height of about 3 feet will flower at their extreme ends, and most lovely sprays they will produce. Any rose at all shy in blooming should have its growths trained horizontally or arched over. This will induce it to bloom quicker than anything, only the growths must be hard and well ripened. We cannot expect much bloom from pithy wood. We have seen standards of such shy bloomers as Reve d'Or with their growths tied out horizontally to a framework of bamboo, and in a year or two they bloomed marvellously. Some of the old growths are removed after flowering, and new growths take their place another year.—'The Garden.'

GARDEN WORK AND HEALTH.

No one who pays the least attention to the ebb and flow of public taste can fail to note the ever-rising tide of the gardening instinct. In striking contrast to many other pursuits the interest in matters horticultural flows on and on, but never does it ebb. There are few outdoor amusements of which the same remark can be made. The last thirty years have seen the wax and wane of many open-air games and occupations. Tennis and croquet, so absorbing in their day, have had their ups and downs. Cycling—useful as it is—does not hold the position in public favour which it did a few years ago. Motoring, though just now in the ascending scale, may have given place in another decade—who knows?—to airships. The young and the strong may indulge in these and many more pastimes while health and strength last; then the wear and tear of the nervous system begins to tell upon them, and they drop behind in the race for distinction, while the weakly are left out of the running altogether. Doubtless all these in moderation tend to healthfulness; when all of them fail in their turn then gardening comes in and fills the gap, and happy is he or she who has a good foundation of experience to begin upon.

The reason why gardening will always hold its own is not far to seek. Nature—the mother of gardens—holds in her beautiful hands the inexhaustible gift of life, and horticulture is one of her chosen handmaidens to distribute the blessings which she is able and willing to bestow upon all who will work for them.

In many branches of natural history destruction is bound to precede exact knowledge. The entomologist pins his beetles to the board. The ornithologist shoots his bird to make sure of its species. The gardener, on the contrary, cherishes the germ; his aim is not destruction, but growth and progress in the pursuit of practical knowledge, and the result of his work is living beauty. And while he toils to wrest her secrets from nature, she rewards him, all unwittingly, with the health of mind and body which comes of congenial occupation in the open air. It is true, in a measure, that the gardener must be born, not made, and that, just as we have met with isolated cases in which the song of birds gives pain rather than pleasure, so here and there we find those so closely wedded to the life of towns that a garden to them would be as a waste howling wilderness. But even such as these depend upon the products of the soil so long as they come to them without pains or trouble. The health and enjoyment, however, that follow on genuine work in a garden never come to such as these.

We may be sure that no pursuit will give quicker or better returns in health and wellbeing for thought and work and money expended than horticulture in any of its varied aspects. For in a well-ordered garden work goes hand in hand with good play, and many another bright and pleasant thing, and we feel that there is no exaggeration in calling it, after John Parkinson's old-world phrase, "In very deed an earthly paradise."

Botany.

TWO NATIVE LEGUMINOUS FODDER PLANTS.

By C. T. WHITE, Government Botanist.

PSORALEA CINEREA.

Mr. A. J. Cotton, in a letter from Brunette Downs, Northern Territory, some little time back wrote: "I am forwarding a sample of herb which grows most plentifully here on our lake country, and on which the cattle do remarkably well, it being the only fodder they get to eat on that part of the country, which will always produce fat cattle when the herd on the rest of the country are half poor. It seems to have some wonderful fattening properties. It is not known in the other parts of the territory (by other parts, I mean the country that is not flooded). Looking at it as it grows in the wild state, it has the appearance of lucerne, and is called hereabouts "urvine" or "herb-vine."

Psoralea cinerea is a very common plant in some parts of Western Queensland and is also found in north-western New South Wales.

The genus *Psoralea* is a large one, comprising about 100 species found in different parts of the world; sixteen species occur in Australia, and of these eleven are found in Queensland.

They are strong growing lucerne-like plants in appearance and hence are often known as "wild lucerne," a sobriquet applied, however, to a great number of wild leguminous plants. The older stems are very tough and fibrous, and two species are recorded as having been used for fibre-making by the aborigines.

Psoralea tenax is a very common species in Southern Queensland and is looked upon as a useful fodder herb. Of species found outside of Australia, J. G. Smith, in Bulletin No. 2 of the Division of Agrostology, United States Department of Agriculture, records the genus as containing several excellent fodder plants. According to Ewart and Davies, in the "Flora of the Northern Territory," some species outside of Australia are considered poisonous to stock, and it may here be recorded that specimens of the species under notice have been received from the Flinders River country, where it is very common, as suspected of poisoning cattle. It is not likely, however, that any of the Australian species are poisonous to stock.

ALYSICARPUS RUGOSUS.

In forwarding specimens of this plant for identification from Corfield, Mr. F. M. Boyd writes: "The plant sent is new to this part of the country, stock devour it in preference to any other kind of grasses or herbage, and it is very abundant this year (March, 1918); horses that get plenty of it are like cornfed animals."

Alysicarpus is a small genus of plants scattered over the world. Two species—*Alysicarpus vaginalis* and *Alysicarpus rugosus*—occur in Queensland, both are found beyond Australia; the former is mostly a coastal plant and the other a more inland one.

The accompanying plate should aid people interested in recognising the two plants referred to in this article, should they come across them at any time, or should they have them growing on their properties, and the interest being taken in native fodder plants warrants the publication of the foregoing notes.

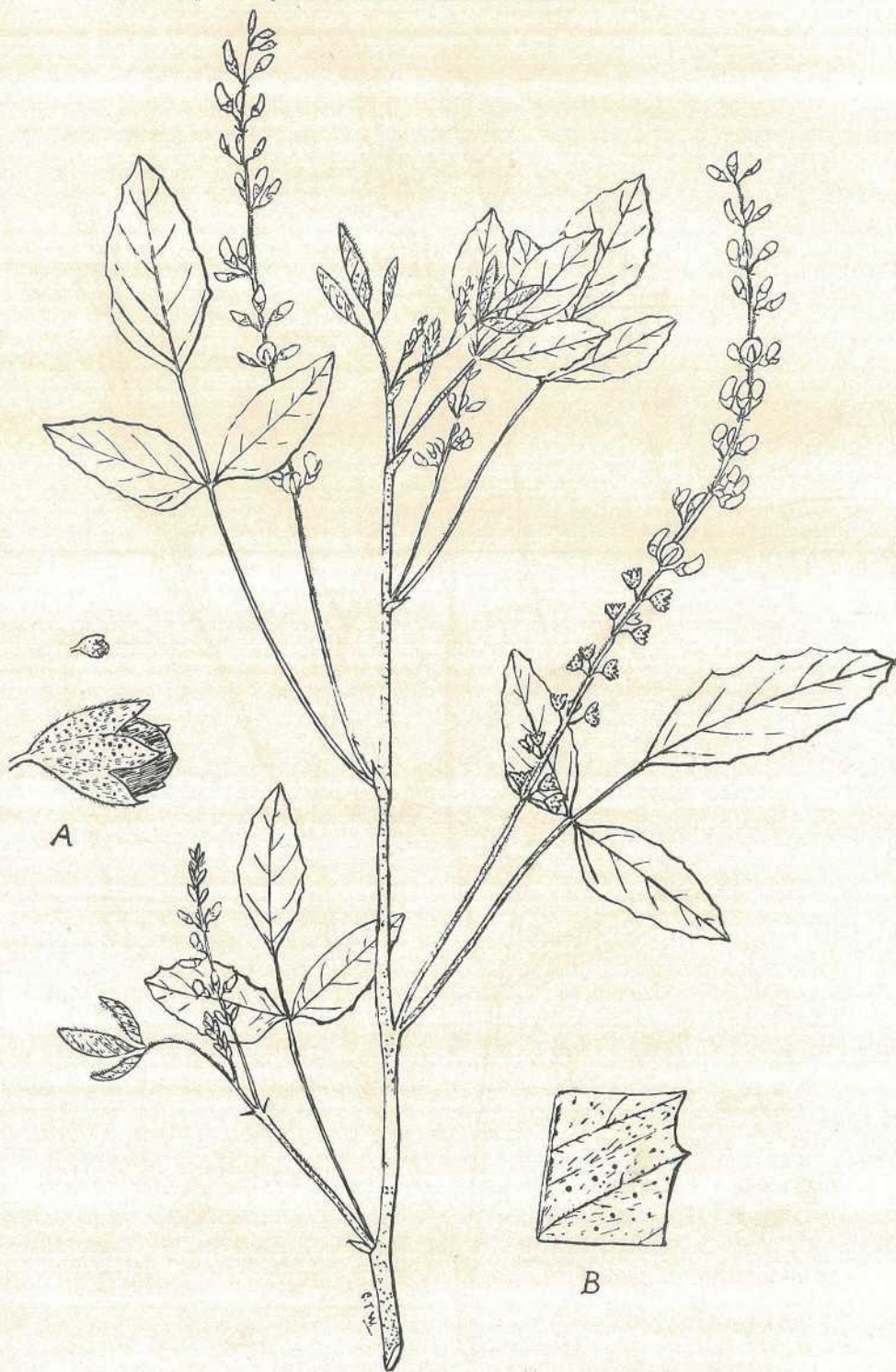


PLATE 31.—*PSORALEA CINEREA*. WILD LUCERNE, HERB-VINE OR URVINE.
(shoot natural size.)

A—Seed pod enclosed in the calyx, natural size and enlarged.
B—Portion of leaf surface, enlarged to show scattered hairs and black glands.



PLATE 32.—ALYSICARPUS RUGOSUS.

A—Pod with four articles; each, except the lowest one, contains one seed, and are easily broken off one from another. B—Seeds (all natural size).

HOW TO ESTIMATE THE YIELD OF COTTON LINT PER ACRE.

The yield of lint is estimated from the number of bolls on the plant thus:—Count the bolls on a number of plants of moderate size, and take the average number per plant. For every 15 bolls where the plants are in rows 5 feet apart, and 20 inches apart in the rows, the yield is usually about 100 lb. of lint (ginned cotton) per acre. Of course, this will vary slightly with the variety of cotton, and with the yield of lint per 100 lb. of seed cotton. On the average, 300 lb. of lint are obtained from 1,100 lb. of seed cotton. Sometimes, however, where the variety has large seeds, or where the seed cotton has been kept for an unusually long time, as much as 1,500 lb. is required to yield 300 lb. of lint. This refers to Sea Island cotton. In several cases in Queensland where Uplands cotton has been planted at distances of 4 feet by 18 inches (7,260 plants per acre), the average number of bolls per plant has been 300. By the above rule these plants should yield 300 lb. of clean cotton per acre. A crop of 1,000 lb. of seed cotton will yield about 300 to 400 lb. of lint, the balance being seed. An average crop of 1,000 lb. of seed cotton per acre, at 3d. per lb., would amount in value to £12 10s. per acre. On suitable land, crops of 1,500 to 2,000 lb. of seed cotton in Southern Queensland, which, at 4d. per lb., is equal to a return of from £25 to over £33 per acre.

THE PROFITABLE PEANUT.

Not long ago the "monkey" or peanut was considered a trifle for schoolboys. Many people still so regard it. It is one of the most nourishing foods on earth. It is estimated that the American crops are worth over £15,000,000 per annum. Farmers there are now putting thousands of acres into peanut cultivation. One man who could only clear a profit of £3 12s. per acre out of cotton, clears £13 5s. out of peanuts. Every part of the peanut is utilised according to Mr. Judson D. Stuart, who has just visited the peanut belt.

In the old days growers dug up the peanuts, picked them off the shoots—peanuts do not grow on the roots but on shoots which bloom and then dive into the ground to bear peanuts—put them in bags and sold them, and that was all.

To-day they use the tops for hay. Peanut hay is nourishing. It is easily cured, cattle like it, and thrive on it, and there is about £5 worth of peanut hay to the acre, sometimes more.

The peanut is of the same family as peas, beans, and other leguminous plants. It gathers nitrogen from the air, and deposits it on the roots in nodules. Whenever it is possible to plough the roots back into the ground they supply sufficient fertiliser. Some cut the hay and then plough the peanuts out, have them hand picked, and then plough the roots back into the ground, but this is not the quickest or most economical way. The customary method is to pull the entire plants, stack them on poles to dry the peanuts, then have the peanuts picked and the tops made into hay.

The peanut itself is full of money. The shells are not used for certain kinds of flaky breakfast foods, as has been said. They are ground into fine, velvety-white powder and sold to tin plate makers. There are but two things that will polish tin plate without scratching, middlings and peanut-shell powder, and middlings are now too expensive. Peanut oil is the most nourishing oil in existence, far better than cotton seed oil. It is used largely in place of olive oil.

The peanuts to be sold in the shell are put in drums, sometimes with a little marble dust, but not always, and whirled until the shells are smooth and white. Other peanuts are shelled and put into bags. These are for salted peanuts and also for peanut butter.

The cakes left after the oil is extracted make the highest-grade fodder for cattle. The United States Government is just now experimenting with peanut bread. The peanut butter is more nutritious than dairy butter, and excellent butter is made of peanut oil, a form of butter that no one can object to, as it contains no animal fat.

Even the boys are making gold out of peanuts. The U.S.A. Government has sent agents and instructors among them and organised clubs. These peanut clubs are teaching the boys how to beat their fathers at peanut growing, and it is not at all uncommon for twelve-year-old boys to rent an acre from their fathers, plant it with peanuts, and make a profit of £20.—"Popular Science Siftings."

Apiculture.

THE AMERICAN BEE JOURNAL.

PRACTICAL QUEEN REARING.

The history of bee-keeping in Queensland dates back as far as 1860 and probably earlier, as bees were first introduced into New South Wales in 1822 by Captain Wallis, of the ship "Isabella." How they found their way to Queensland is not clear, but the writer's own experience is that in 1862 most of the pioneer farmers of Queensland kept bees—kept them in empty gin cases, candle boxes, and in other primitive contrivances. Bees, in those days, were found in hundreds of trees in forest and scrub. There were no scientific appliances for extracting the honey. Much was obtained by allowing the comb to drip, and the balance was saved by squeezing the comb in mosquito net. But, as happens in all new industries, improvements soon began. The gin case gave place to the Langstroth hive, uncapping devices, foundation comb, honey extractors, &c. About the year 1880 the Italian bees were introduced by Mr. Charles Fullwood, the race of black bees having been almost exterminated in Queensland by the bee-moth. From that time the industry took a new lease of life. There are few places on this earth more favourable for beekeeping than Australia, and Queensland in particular, and this, in itself, constitutes one of the difficulties of the beekeeper. In most parts of the State there is an abundance and a variety of honey-yielding flowers, chiefly on scrub and forest trees, and the climate could hardly anywhere be more suitable to the life and well-being of the honey bee.

Not only are the bees here able to gather honey and pollen during the whole year, but, in exceptional seasons, to even store some surplus honey during the winter months. With the introduction of more scientific methods than those of yore, bee-keeping in Queensland made great advances. What, however, is greatly to be desired is some good literature on the various phases of apiculture as adapted to Queensland conditions, such a book, for instance, as one lately issued by Frank C. Pellett, associate editor of the "American Bee Journal," Hamilton, Illinois. This very interesting and valuable publication is entitled "Practical Queen Rearing." Mr. Pellett, former State Apiarist of Iowa, is the author of several books, articles, &c., which, like that under notice, contain a fund of practical information and instruction on the subject of apiculture, of which he must have made a life study. He travelled far and wide in the United States to ascertain all the best methods of practice in use in the various apiaries of the Northern and Southern States, and has embodied in this work an exhaustive history of honey bees, their different races, their life history, their improvement by breeding, the equipment needed for queen-rearing, &c. As he rightly says, he has thought it well to make all his descriptions brief and to the point, eliminating all matter not of practical value. Other works, such as those of Doolittle, Alley, Sladen, and other well-known practical apiarists, have been freely consulted, and the book is profusely illustrated, most of the illustrations having appeared in conjunction with the many articles from the author's able pen which have appeared from time to time in the "American Bee Journal." We think we shall be borne out by our practical bee masters in this State when we express the opinion that such a valuable publication as "Practical Queen Rearing," is one that should find a place on the bookshelves of all apiarists. It may be obtained from the proprietors of the "American Bee Journal," Hamilton, Illinois, U.S.A. The price, inclusive of one year's subscription to that journal, is 1 dollar 75 cents.

Entomology.

REPORT UPON CANE GRUB INVESTIGATIONS AND OTHER PESTS

The General Superintendent of the Bureau of Sugar Experiment Stations has received the following report upon cane grub investigations and other pests from the Entomologist, J. F. Illingworth:—

During the month we have done considerable travelling, and by consultation with numerous leaders of the industry, in the various districts visited, we have been able to increase materially our knowledge of the habits of the various pests of sugar-cane.

Incidentally Mr. Girault and I have been devoting considerable time to the introduction of the tachinid parasites of the beetle borer (*Ceromasia sphenophori*) in infested districts. It will be recalled from former reports that these parasites had already been liberated at Moolaba, Babinda, and on the Mulgrave. During the past month we have secured fresh colonies and liberated these on the Johnstone and the Herbert. Those of the first locality were placed on the farm of Mr. R. Davis at Daraji; while on the Herbert they were placed at two points—Mr. Comba's farm, about 25 miles upstream, and in the mill nursery at Macknade.

INVESTIGATIONS AT MOSSMAN.

On all of our previous visits to Mossman, we had secured our supply of the parasites from the mill nursery, hence I was considerably disturbed to learn that this paddock had been burnt and milled, precluding all hope of securing further supplies there. A careful search of the district demonstrated that the beetle borers were scarcely in evidence anywhere; but, wherever found, there were unmistakable signs that the parasites were with them and that they were completely under control. On one farm I found these indications of the flies fully 15 miles from the mill nursery where they were liberated in 1910; and, what was most remarkable, there were several miles of forest country between these two points, with no sugar-cane. Evidently the flies have travelled up the country with the wind.

Upon the advice of Mr. C. J. Crees, the mill manager, we were able to locate a few borers on the farm of the Crees Bros. The pest had evidently come from a pile of discarded cane which had been dumped alongside the field when planting, for only a small semi-circular area in the field, opposite this rubbish, was affected. It was also very noticeable that most of the infested stools were rat-eaten, and the indication was that the rats had been digging out and feeding on the borer-grubs. Fortunately, most of the grubs that we were able to find in this spot were fully parasitised—the best material that I have ever seen. The benefited regions, where we are placing the parasites, certainly owe much to the public spirit of the Mossman Mill management, and to the public spirit of the above gentlemen, for assisting us in cutting up their crop to secure the parasites without recompense.

We sometimes hear criticism of the cultivation at Mossman, and it has been said that of the three kinds—extensive, intensive, and pretensive—theirs consisted largely of the latter. This is hardly just to the district, for the remark would never be made by one familiar with conditions there. Most of the Mossman soils are of a type very difficult to work under the climatic conditions. Consisting largely of clay, as most of them do, it is necessary to work them when the moisture content is just right; and since they are usually either too dry, or too wet, it is a difficult matter to turn them up without lumping. As is well recognised among the most experienced growers of the district, the abundant application of green crops will do much to alleviate this condition and put the soil in better tilth—even without the application of lime, which is now at a prohibitive price.

The rat pest, on some farms, is coming largely under control by clearing out weedy headlands and other areas bordering the cane fields. This is done in some cases by fencing close to the cane along streams and so forth, so that stock can be turned in to assist in keeping the waste places clean. It is an excellent idea, and if carried out generally, would do much to put the rats out of business. It certainly offers every facility for their natural enemies to get at them.

As indicated above, I took advantage of the occasion to try to learn what factors were responsible for the control of white grubs in the district. It will be remembered that this section was once badly affected.

Upon looking up the records at the mill, I found that after they started crushing in 1897, they paid out the following amounts for beetles and grubs collected:—1898, £16; 1899, £16; 1900, £88; 1901, £288; 1902, £656; 1903, £456; 1904, £548; 1905, £1,560 (the last year of the kanakas); 1906, £357.

During 1906 the growers decided to try out the use of carbon bisulphide, which had been recommended by French, the Victorian entomologist, for the control of the grubs, hence they discontinued payments for collecting the pest, and it was never resumed. However, as Mr. Harry B. Staples, who was mill chemist at the time, states in his report dated 16th August, 1910, the carbon bisulphide was not always satisfactory and never came into general use.

I was very much interested to learn, from the many interviews with growers, that the factors which we have been advocating are, evidently, the ones that have gotten the grubs under control at Mossman. These are, late planting and cultivation, resistant varieties, nitrogenous fertilisers, and the application of green manuring or other organic matter.

I learned from Mr. George Muntz, chairman of the board of directors of the mill, and one of the oldest growers of the district, that about the year 1906 there was a general change from early to late planting, and that this latter has been the practice up to the present time. He said that even after the mill ceased collecting grubs and beetles, as indicated above, this pest gradually became less and less in the district. Naturally, he concludes that late planting and cultivation is the explanation.

Mr. E. D. Hunt, an American, though a recent arrival, is making a success on a farm which was, up to the time that he took it, thoroughly infested with grubs. The soil is a sandy loam, lying along the river bank, hence is subject to occasional overflow. Late in 1915, Mr. Hunt planted a few acres of cane and treated it during November-December with about a bag (160 lb.) of sulphate of ammonia to the acre. He grows principally D 1135; and had continued the application of this fertiliser to all of his crop, with the result that he has never suffered from grubs, though feeding trees are abundant along the stream bordering his farm.

The farm of the late J. D. Johnson is another estate that was once badly infested. Mr. Johnson tried every possible remedy and was a great experimenter, but he had little or no success until he changed to D 1135 and late planting. His losses from grubs were immediately greatly reduced. There is little evidence on the place now of the presence of grubs.

Mr. R. A. Donnelly, another director of the mill and a grower of long experience, told me that he had no trouble from grubs for about five years after clearing his land from the scrub; but as the soil became poor the pest became evident and did great damage in places—as many as twenty-six grubs under a single stool of cane. He considers D 1135 very resistant and says that it will ratoon and make a very satisfactory crop after being attacked, while other canes die out so as to be worthless. He also considers late planting and cultivation very important as controlling factors, and called my attention to the success of these on the adjoining estate, which is known as the Syndicate. This place, though badly infested, was cleared of the pest by late planting and thorough cultivation.

Mr. J. M. Pringle, on a rather large estate of clay loam soil, also believes in late planting and the application of green crops to improve the tilth. Grubs have not been bad since D 1135 was planted in 1910. He once tried an experiment of planting B 147 alongside D 1135 and it was all destroyed by the grubs, while they did no noticeable damage to the latter variety. He uses meatworks manure on first ratoons and nitrates on later crops, with good success.

Mr. Pringle also told me that Mr. Low, on the adjoining farm, formerly greatly troubled by grubs, got good results from late planting and thorough cultivation. He said the soil was too wet for early planting (before May)

Mr. W. S. Johnson, who is managing Drumsara for S. Johnson, senr., began farming in the district in 1908. He informed me that late planting was the general practice at that time. D 1135 was beginning to be used. He planted misses in a field of Goru with this variety and all the Goru was eaten out by the grubs, leaving the D 1135 apparently uninjured. Hence, he considers the latter very resistant to grubs.

Evidence dealing more particularly with the value of sulphate of ammonia as a controlling factor was supplied by a number of growers in addition to those already referred to above.

The extensive estate of the late R. O. Jones was subject to serious losses from the grubs during the early years of the mill. He stated before the Royal Commission (6th November, 1911) that he cultivated 450 acres of cane in 1905 and lost 250 acres completely through grubs—fully £5,000 worth. At that time, just before he died, he said: "No human intelligence, so far, can contend with the grubs' depredations, and I do not think anybody has studied the subject more than I have." The estate was broken up into smaller farms and the sons took charge in 1911. They began the general use of sulphate of ammonia in November of that year, and planted part of the land to Mauritius beans. The cane crop was planted early, but in spite of that it did not suffer from grubs, and from that time they have had no further trouble. Mr. W. P. Jones told me that all the surrounding farmers used sulphate of ammonia persistently and that he considers it the active agent in the control of the grubs.

The farm of Crees Bros., a light sandy soil along the river bank, was once badly affected by grubs. The former owner applied large quantities of carbon bisulphide with little apparent result. However, after changing from meatworks manure to sulphate of ammonia, a few years ago, the grubs left and there has been no sign of them since.

Mr. H. H. Smith, who has been growing cane in the district for the past twelve years, told me that his fields were formerly eaten out by grubs but not seriously since he began the use of sulphate of ammonia. He plants early and applies about 3 cwt. of the ammonia to the acre in two dressings, during December and January. On one occasion he left a few rows untreated in a field of Goru, and these suffered badly from grubs. Naturally, he is a firm believer in the application of this manure.

Mr. Donnelly also experimented with sulphate of ammonia, by digging up the stools after it had been applied. He found the grubs limp and inactive, though in no case dead.

As an instance of a farm which has had no sulphate of ammonia, I visited the place of Mr. W. Bunn, at Cassowary. The soil is heavy clay loam and sticks to the plough when wet. Mr. Bunn told me he had no trouble from grubs for several years after clearing the land, but for a number of years now they have been always in evidence. He has used meatworks manure alone; and he told me that he found many large grubs under the stools when they were blown out by the recent cyclone.

I submit this evidence, for it appears to me that it may be far-reaching in controlling the pest in other districts. At any rate, the practice of these better cultural methods has its principal value outside of their relation to grub-control.

HERBERT RIVER DISTRICT.

The principal cane-growing areas lying along the river have ideal soil to work; but I was surprised to find the fields in such a weedy condition. The great drawback, as I learned later, is the labour market during the cutting season, the men

demanding up to 30s. a day for chipping. Meatworks is practically the only manure in general use; though sulphate of ammonia has given excellent results wherever tried. Furthermore, there has been no general practice of green-manuring in recent years; and I was also surprised to learn that the growers do not recognise the value of the mill compost, for hundreds of tons of this valuable manure is piled up in ricks and has been leaching away for years—the present supply is being used for ordinary filling of mud-holes and the ashes for surfacing the roads. If put up in bags this product should command a considerable market value.

As is well known, this district was once subject to serious injury from grubs; and, since the pest has largely disappeared in recent years, I was interested in investigating the matter.

There seems to be a definite relation of grub-infestation on the Herbert to feeding trees, for the areas which were infested in the early days are now free, while the farms that suffer at present are the outlying ones, bordering the scrub and forest—especially in proximity to the hills, which are covered with timber.

The management at Macknade gave me every possible assistance and kindly furnished me itemised figures of the beetles collected in their district during the past twenty years, with the amount of cash expended. These figures show that decidedly the worst infestation was from 1897 to 1901; then, from 1902 to 1915 the numbers were greatly reduced, and after the latter date, which was the year of the drought, the pest practically disappeared, except on the farms most distant from the mills.

It may be interesting to note that during the above period the mill paid out £11,272 17s. 10d. for 334,022 quarts of beetles, without any noticeable decrease in the pest from year to year. The marked reduction after 1915 was evidently due to natural causes, and was probably in no way connected with the hand-picking.

Very little cane in this district is burned before cutting—last season only about 5,000 out of 130,000 tons; but the trash is largely burned afterwards, so that it is not conserved for humus. It appears to be the general custom to take off only one ratoon crop and to plough this out and plant cane again immediately.

The burning of trash has evidently had a deterrent effect upon the beetle borers, for they are by no means a serious pest in the district. Even on the farm of Mr. Comba, near Hawkin's Creek, most of the grubs were right down in the butts, and it was very hard to discover any of the damage without first cutting cane.

Mr. W. Walker, who has been connected with the industry for the past forty years at Macknade, gave me a number of his interesting observations.

In the days of the kanakas, he said, the trash was removed to every third row and he found that grubs were always in these trash rows and the cane of these rows suffered during dry weather. This may evidently be explained in that the grubs, which naturally develop under trash, are forced down into the soil by drought and are then compelled to feed upon the cane roots.

At another time, Mr. Walker observed that the beetles were attracted to the lights of the quarters, and later on, when the grubs began to do damage, it was worst in the cane bordering these buildings—the beetles evidently going back from the light to the cane to lay their eggs. He also noticed that the beetles went with the wind from a fig-tree which stood in the field, and the cane was usually considerably more infested on that side.

Regarding the beetle borer, Mr. Walker informed me that they were first seen nine years ago, and that they must have come from plants received from New Guinea. The moth borer, however, which is a native insect, he said, was very troublesome as far back as 1889. This insect, which is well controlled by parasites, has done little injury in the district in recent years.

Mr. W. Authur, who is considered one of the best agriculturists of the district, once suffered severely from grubs, but not for the last five or six years. He uses

green-crops which he ploughs in preparatory to early planting. His soil is clay-loam and rather heavy, but he keeps it in good tilth by conserving his trash—none is burned. The single crop of ratoons is volunteered, and the double trash worked into the soil with a green-crop before planting another series of cane. He cultivates the plant-crop well, and applies about 5 cwt. of meatworks to the acre. It is his intention to use sulphate of ammonia on his ratoons during December, if it can be procured. I noticed that his headlands and fence-rows were clean—a factor important in the control of rats and other vermin.

Evidently the immunity from losses by grubs on this farm is due to the cultural methods, for the owner supplies the required humus and ploughs at a season when the beetles are depositing their eggs—December to February.

DESTRUCTION OF TACHINID PARASITES AT THE MULGRAVE.

I regret being compelled to report that our colony of tachinid parasites of the beetle borer was destroyed through the lack of co-operation on the part of the farmer on whose place the breeding-cage was located.

The understanding was that the borer-infested field was not to be cut until the end of the season and the part just around the cage was not to be burned.

I was considerably disturbed to find, on 10th October, when I made a visit to the cage, after my return from the Herbert River, that the whole field had been burned and cut, and the cage had been dumped out and torn up in moving it into the adjoining field of young plant cane.

Mr. Girault and I not only made two trips to Mossman to get this work started, but we have also had to make frequent journeys out to this farm, so that the parasites would have every opportunity to become established.

It is certainly discouraging to find that they now have no chance. The flies that we liberated, having reproduced, are dead, and the offspring are destroyed in the burn and the milling—it is only by a miracle, if any got away.

I have not been able to see the farmer in charge of the place, for he was away from home; but the matter was reported to the management of the Mulgrave Central Mill, since they were so urgent that we co-operate in the matter of establishing these parasites in the district.

THE LANTANA SEED-FLY.

I was interested to note the remarkable distribution of the Lantana Seed-fly. It has apparently spread all up and down the coast, since its liberation in the Cairns district in February, 1917. I found them well established at Mossman and even as far south as the Herbert River—where they were found all over the district. It is certainly remarkable that so small a fly could cross the natural barriers between the above districts, for there must be considerable stretches with no lantana for them to feed upon.

These insects are doing excellent work wherever established. The eggs are laid in the flowers and the infestation is noticeable even on the green fruit, for it becomes discoloured with brown streaks, and usually withers and falls before becoming ripe. In practically every case, the kernel of the seed is destroyed, so that it will not germinate. This in no way affects the parent plants, however, and they will live on for years if not cut out. I would strongly urge that everyone lend a hand in destroying this weed, if it is found on his premises, now that nature is stopping the spread.

Note by General Superintendent.—With reference to the expressed opinion as to the resistant powers of the variety of cane known as D1135 to the attacks of grubs, it may be pointed out that this cane is not resistant to grubs in Southern Queensland.

MOSQUITO DESTRUCTION.

We are obliged to Mr. W. R. Colledge, Brisbane Associated Friendly Societies' Dispensary, for the following very interesting paper on this subject, which appeared in the "Comptes Rendus," Hebdom. Sc. Acad. Sc. Paris, and translated by Mr. Considine. It refers to a method of mosquito destruction which might be usefully followed by suburban gardeners and small farmers in many parts of Queensland, and we draw attention to it, as mosquitoes are now beginning to be troublesome. The article is entitled: "Parasitology.—A new method of destroying mosquitoes by alternating their breeding places, by MM. Edom et Sergeant."

Under Mediterranean climatic conditions, the average length of the life of mosquito larvæ in water till metamorphosed into the perfect winged insect is about three weeks (sixteen to twenty-five days).

We suggest the name "mosquito-breeding places" (gîtes) for the accumulations of water favourable for the reproduction of these insects.

These breeding places are sometimes of considerable size; such as lakes, pools, inaccessible marshes, and large streams. Only the labour of the engineer, that transforms the face of the land, suffices to deal with these large breeding places.

But sometimes breeding places of very limited size cause infestation of a whole region.

In a number of villages the maintenance of malarial mosquito breeding-places is freely kept up by water flowing from small springs, fountains, small reservoirs, washing pools, and irrigation canals. Trickling streamlets grow and widen out to form pools, in which the water is constantly changed without any strong flow, and which form excellent breeding-places for the anophelines.

Since commencing our first anti-malarial campaign in 1902, this type of breeding-place has been dealt with by the recognised anti-larval measures, such as replacement by masonry and concrete, cleansing, maintenance of repairs, mowing of herbage, application of kerosene, filling in of cattle hoof tracks, control of waterways, and efficient drainage.

For the last ten years we have experimented with success with a new and simpler method of procedure, in the Tell region of Algiers.

It frequently happens that the breeding-place is on the course of a single stream. On this we dig two channels, which, each for a week in turn, carry all the water. The water is turned into either channel at will by a simple earth dam or a water gate.

Each channel in turn during its week of use becomes the breeding-place of egg-laying anophelines and hatching larvæ. Then comes a dry week without water, when the channel is dried by the heat of the weather and the larvæ perish.

Each channel is alternately wet and dry for a week at a time, all the labour required being a few strokes of a mattock to break the one dam and rebuild it in the other channel, or double water gates may be used with advantage.

The arrangement may be varied. Instead of digging two channels, the water may be spread to the right or left by a series of secondary dams, in such a way that it may be absorbed by the ground or evaporated off within eight days. The water is not turned onto the same ground for some weeks. In this method little earth dams are used.

The method of drying off the breeding-places gives excellent results with but very little attention, and expense is considerably reduced. At a very moderate estimate, costs are reduced to a tenth of those of the usual anti-larval methods.

Summary.—A mosquito breeding-place of a permanent character is not necessarily dangerous. The remedy lies in substituting two alternating ones for the single permanent one.

In the Mediterranean region, mosquito larvæ require a breeding-place to be permanent for about three weeks. If this period is broken, so that each portion is alternately wet and dry for a week at a time, the larvæ cannot survive.

Science.

Snake-Bites and Their Treatment.

We have received several letters from subscribers and others, asking for the best cure for snake-bite, and as the reptiles are now beginning to be more numerous as the summer weather advances, we republish an article on the subject of snakes and the remedies for their bites which appeared in this Journal in March, 1911. In a most interesting pamphlet on "The Venoms of Australian Snakes" (1906), Dr. F. Tidswell, M.B., shows that in 87 cases of black snake bites, no deaths resulted. The tiger snake was responsible for 15 deaths out of 33 cases; the brown snake, for 15 out of 32; and the death adder for 5 out of 10 cases. Arranged in order of lethality, the death adder appears as the most lethal snake (50 per cent. of deaths); but close to it comes the tiger snake (45.5 per cent. of deaths); next, but far below, comes the brown snake (fatality, 18.7 per cent.); and, lastly, comes the black snake, to which *no fatality is attached*.

A correspondent has written suggesting that, in the interests of miners, some information should be given in the Journal concerning snake-bites and the best known methods of treating them. It is an undoubted fact that men engaged in mining and in prospecting run great risk from snakes, both on the surface and in abandoned shafts, which often have to be reopened; and, as such men are generally far removed from medical aid, it is well that they should know the best thing to do when anyone is bitten, and that the means to be adopted should be as clearly and widely made known as possible. Unfortunately, as far as internal remedies are concerned, investigations by competent authorities go to prove, as will be more fully explained later on, that to be armed with a reliable antidote is not nearly such a simple matter as the correspondent mentioned seems to think. He has been informed that the poison of the death adder acts on the nerves, while that of the black, brown, and other venomous snakes acts on the blood; and suggests that the miner be made familiar with a specific for each class of bite of such a nature that he could be provided with it, and ready for any emergency. Dr. A. Muller, however, in his work on "Snake Poison: Its Action and Its Antidote," came to the conclusion, after full investigation and experiment, that all snake venom is a nerve poison; but Professor Martin, who, when in Australia, also made a study of the subject, seems to draw some distinction, inasmuch as he refers to the futility of the generally accepted remedies to prevent the clotting of blood caused by all Australian snake poisons except that of the death adder. Dr. Muller advocated the strychnine cure as a remedy in all cases of snake-bite; but, as he admits that it may be necessary at some stage of the treatment to administer strychnine in doses which, in the absence of the snake poison, would be fatal, it will be seen how dangerous it might be to try such a remedy without professional aid, even if later investigations had not considerably discredited—as indeed they have—this form of remedy. As to having the right antidote available, it is true that anti-venomous serum has been mentioned in this connection, but, as one must apply the right antidote to the right snake, this remedy is hardly practical under ordinary conditions.

HOW TO DISTINGUISH NON-VENOMOUS FROM VENOMOUS SNAKES.

In cases of snake-bite, it is, of course, very important to determine whether the reptile inflicting the injury is venomous or not. Many persons have undergone much pain and often risk from heroic treatment for bites which they have supposed to be those of venomous snakes, but which a knowledge of the external characters of the different species would have shown to have been perfectly harmless. Indeed, it is believed that not a few persons bitten by harmless snakes have been killed either by fright or the treatment to which they have been subjected; while many records of recovery under certain treatment are unreliable on account of the doubt existing as to whether the reptiles inflicting the bites were really venomous. A case occurred in New Guinea (Papua) a few years ago. A member of an exploring party was bitten by what appeared to be a black snake. The man was treated with various remedies, but soon died. The snake was sent to Brisbane and proved to be perfectly harmless. The man simply died of fright or injudicious remedies.

As a matter of fact, far more of the Australian snakes are non-venomous than is generally supposed. The late Dr. Krefft, for many years Curator of the Australian Museum, Sydney, and a recognised authority on Australian snakes, describes twenty-one innocuous and forty-two venomous snakes of this country; but of the latter, he says, not more than five species are dangerous to man or the larger animals,

and these retire underground for nearly five months of the year. The four Queensland snakes which are mostly to be dreaded are the death adder, the black snake, the brown snake, and the tiger snake. To the miner, prospector, and ordinary bushman, many opportunities are afforded of examining dead snakes; and, with a little observation and study, he might soon be able to tell at a glance the poisonous from the harmless species.

In the first place, on opening the mouth of a non-venomous snake, a row of small teeth will be seen along each jaw, and when such a snake bites he leaves two

rows of small punctures, thus— . . . In the venomous snake, these small teeth

are rudimentary, and leave no marks; but towards the outer edge of the upper jaw there are two fangs, and the punctures left by the bite from these are two in number, thus— . . . These fangs, which are the means by which the poison is conveyed from the snake to the person bitten, are not always in a state of projection, and it may be necessary to press the gum down with a stick or penknife before they can be seen; but this should be done with caution, and when it is certain the snake is dead. Sometimes, however, the punctures are not sufficiently distinct for them to be accepted as a reliable guide; but where the snake is seen there are other characteristics which will assist in the identification. According to Dr. Krefft, the gape of the mouth of the non-venomous Australian snake is usually curved upwards;

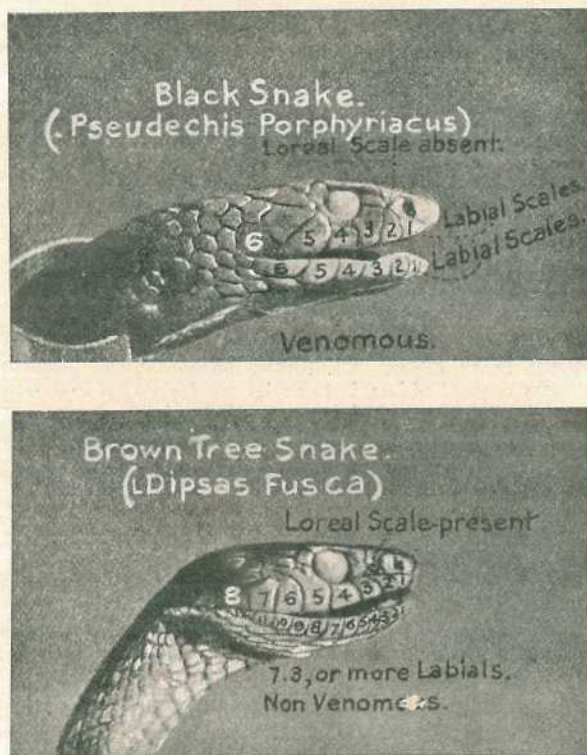


FIG. 1.—HEADS OF VENOMOUS AND NON-VENOMOUS SNAKES.

while in the venomous it forms a straight line. Again, an important distinction is to be found in the labial (lip) scales. Dr. Krefft says that of the labials there are seven or more in non-venomous snakes, while in the venomous "there are generally only six (we may say always six—never more)." He adds that "it may safely be asserted that by these shields alone can the harmless or venomous character of snakes be ascertained. This rule does not apply to sea snakes, nor to blind snakes of the family *Typhlopidae*, but to Australian venomous and innocuous colubrine snakes only." Another distinctive mark is that in the non-venomous snake

there is a loreal scale, which is absent in nearly all Australian snakes. This loreal scale is a supplementary scale which, in the non-venomous snake, is to be found on the cheek between a labial scale below and a frontal scale above, and between the ocular and nasal scales. In the venomous snake these four scales—the labial, frontal, ocular, and nasal—all unite at one point, and are not separated from each other, as in the harmless snake, by the loreal scale.

The head and mouth characteristics which distinguish the two classes of reptiles can be seen at a glance from the accompanying production of excellent photographs (Fig. 1) taken from Nature by the late Dr. John Thomson, of Brisbane, who was a keen student of this subject, and who kindly placed his pictures and other useful information readily at our disposal for the purposes of this article.

Dr. Thomson also had in his possession a diagram (in the shape of Fig. 2) showing, in such a way that "he who runs may read," the chief distinguishing features between the venomous and harmless snake. This diagram, which was originally prepared to illustrate a lecture, should be cut out, and kept by persons in the bush in some place where it may be readily and often seen, so that its points may become impressed on the mind.

TO DISTINGUISH VENOMOUS FROM NON-VENOMOUS SNAKES BY HEAD CHARACTERISTICS (KREFFT).

<i>Venomous.</i>	<i>Non-venomous.</i>
GAPE OF MOUTH, STRAIGHT	GAPE OF MOUTH, CURVED UPWARDS
LABIAL SCALES, SIX	LABIAL SCALES, SEVEN OR MORE
LOREAL SCALES, ABSENT	LOREAL SCALES, PRESENT
BITE MARKS . . .	. . .
	BITE MARKS . . .
	. . .

FIG. 2.

Dr. Krefft states that an Australian snake that is not thicker than a man's little finger, whatever may be its length, cannot by its bite endanger the life of an adult human being. It may be added that the true *freshwater* snake is always harmless, while the saltwater or sea snakes are always poisonous. Few of the tree snakes are venomous; while the carpet snake and the so-called "green snakes" are innocuous. Very often a thick woollen sock or stocking will prevent injury from the bite of a snake, as the fang may not penetrate sufficiently far for the poison which passes down its groove to be injected beneath the skin. There is a very widely accepted belief that the death adder inflicts injury by a *sting* from its tail, but this is not the case.

The general symptoms exhibited by persons bitten by a venomous snake are: Great anxiety, depression and prostration, feeble and intermitting pulse, profuse cold sweats, vomiting, hurried respiration, indistinct speech, dilation of the pupil of the eye, drowsiness, and finally, in fatal cases, unconsciousness and convulsions.

TREATMENT OF SNAKE-BITE.

Professor Martin, late of the Melbourne University, who some time ago was appointed Director of the Lister School of Preventive Medicine in London, before leaving Melbourne, delivered a lecture embodying the results of several years of research into Australian snake poisons. The results of his investigations are somewhat disappointing as far as the generally accepted remedies are concerned. He says that for all snakes except the death adder the only remedy that is of the slightest use is the ligature, applied immediately. He adds—

"If the bite be on the tip of the finger, the ligature may be tied round the base of the finger, if done instantly. If not, we must go higher. It is no use tying anything round the wrist or forearm, nor round the leg below the knee, for in these places the limb consists of two bones, and the circulation cannot be stopped by a band of any sort. We must go above the elbow or above the knee, where there is only a single bone. The ligature must be tied as tight as possible—twisted tight with a stick—for no blood must pass. In half an hour's time the ligature may be removed.

"All the usual remedies, such as ammonia, strychnine, and chloride of lime injections, whiskey, and exercise, are powerless to check the clotting of blood caused by all Australian snake poisons, except that of the death adder. Cutting out the piece and gashing the limb to make it bleed is equally futile. Anti-venomous serum is a remedy, but hardly a practical one, as you must apply the right antidote to the right snake."

Other authorities do not go so far as Professor Martin with regard to scarifying the wound and administering stimulants, and, so far as they are not likely to be injurious, these means will probably continue to be followed as extra precautions. Dr. J. Ashburton Thompson, when Chief Medical Officer of the Government Health Department of New South Wales, issued specific directions for snake-bite treatment. He first advises the use of the ligature, which is to be loosened for five minutes after the first half-hour; then tied and screwed up again. At the end of the second half-hour the ligature may be removed altogether. Dr. Thompson, in continuing his directions, says:—"In places where a ligature cannot be tied, as on the neck or face, pinch up the bitten part between the finger and thumb, and cut it out. In any case, the bitten part should be cut into by numerous little cuts over and around the bite, for about $1\frac{1}{2}$ inches round, and sucked by the mouth freely and perseveringly; and this can be done without danger by any person. Stimulants, such as brandy, whiskey, gin, rum, in small quantities at a time (a few teaspoonfuls), or strong tea or coffee or wine may be given if the patient be faint."

The removal of the ligature as described is a very necessary precaution, for at least one case has occurred in Queensland where, through keeping it on too long, mortification set in, and amputation of the arm had to be resorted to.

Professor Kreffit, in his work previously referred to, says:—"The whole treatment resolves itself into this: *Suck the wound, if possible, at once; apply a ligature; lacerate the punctures, and wash the part with water or urine; keep moving, and do not despond.* Half the number of fatal cases have resulted from fear, many persons having died simply because they lost heart, did not attempt to tie a ligature, or were afraid to lacerate the wound and suck it."

A Croydon paper some time ago published particulars of a case in which a cure had been effected by rubbing vinegar into the wound; but in this case the ligature was first applied and the wound scarified. The vinegar was used in consequence of the person treating the patient having seen an extract in the "Queensland Agricultural Journal" from an Indian paper, which described experiments successfully made with it on animals which had been bitten by snakes.

The late Mr. John Wilson, Brisbane, said that in Ceylon he was very successful in saving the lives of coolies who were bitten by cobras or tie-polongas when picking coffee. As soon as a man was bitten, a ligature was put above the wound, then a pin was pushed through the skin, a piece of twine was twisted round the projecting part of the pin and drawn tight. This raised the bitten part, which was cut off with a sharp knife.

The vinegar cure is described in the "Queensland Agricultural Journal" in the issues of January, 1903, January, 1904, and February, 1905. Three authenticated cases of cure of snake-bite by the vinegar treatment have been reported to us since the first article appeared in the Journal.—Ed. "Q.A.J."

ANOTHER ARTICLE ON THE SAME SUBJECT DETAILS AN EASY METHOD OF PREVENTING DEATH FROM SNAKE-BITE.

For the next three or four months snakes of all kinds will be in full vigour and activity, and although deaths from snake-bite are rare in Queensland, still those whose business takes them into the neighbourhood of swamps will run the risk of unwarily treading on a black snake in the same way as the bushman whose work lies on dry ridgy land is liable to make acquaintance with a death adder. Queensland snakes are, as a rule, shy, and nearly always try to escape from man, but when suddenly molested they are apt to show fight, and a deadly stroke of the poison fang may endanger the life of a victim who is far from medical help. We therefore think that a timely publication of a paper under the above heading, by Sir Lauder Brunton, Sir J. Fayrer, and Dr. L. Rogers, which appeared in the Proceedings of the Royal Society (Eng.), Vol. 73, No. 494, p. 323, will be appreciated.

Following is an abstract of the paper:—

The treatment advocated in this paper is the net result of experiments made with the venoms of each main division of snakes, including especially that of the cobra. The Australian black and brown snakes belong to the same family as the Indian cobra, and the venoms of all these snakes, it may be parenthetically remarked, have the effect of clotting the blood of any person or animal bitten. The venom of death adders does not have this effect.

The experiments show that if cobra venom be mixed with a 1 per cent. solution of permanganate of potash the activity of the poison is destroyed and it becomes innocuous. Further, that if a solution of the permanganate be injected into the tissues close to the place where snake venom has been just previously injected, say within from one or two up to five or even ten minutes after the injection of the venom, either no symptoms of snake-poisoning occur or a fatal result is averted, and the poisonous effects are more or less mitigated.

The result varies according as the interval which elapses before the antidote is applied is longer or shorter, and is successful in the same measure as the permanganate is actually able to overtake the venom and mix with it before it has been absorbed by the system. *For whatever part of the venom is brought into actual contact with the permanganate is rendered inert and harmless*, whilst the antidote has no effect whatever on that part which has been actually absorbed into the system. It is therefore of no use taken internally, and of very problematic value if applied to or injected into the snake-bite after any considerable lapse of time, especially if no ligature has previously been applied to stop the circulation in the locality of the bite.

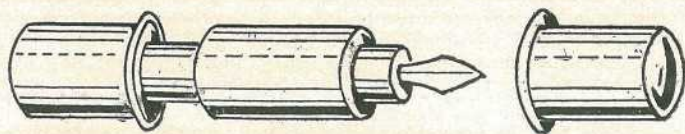
It is estimated that the solid permanganate of potash will neutralise its own weight of venom when directly mixed with it, either solid or in a solution; moreover, it acts on every class of venom, including that of death adders, &c.

Snake venom is cumulative in its action, which means that the ultimate effect is always that of the whole quantity of venom injected into the body and left undestroyed in the wound, and therefore certain to be eventually absorbed by the tissues; for the portion of venom first absorbed does not in any appreciable degree lose its effect as time goes on, nor is it quickly eliminated, but continues its poisonous action upon the system after the remainder of the venom becomes gradually absorbed and actively poisonous, and thus the effect increases or accumulates as the absorption progresses.

It has been estimated that the average amount of venom injected by a full-sized cobra is not more than what would equal 10 lethal doses for a man. Further, in many cases, the full dose will not actually be injected into the human tissues, for various reasons, such as the hindrance afforded by clothing, &c.

The plan now proposed is (after first ligaturing the limb by means of a strip of bandaging or other material tied loosely around it, and then twisted up tightly with a stick) to make a free opening into the site of the bite, deep enough to reach to the lowest point reached by the snake (half an inch should always be sufficient), and to rub in crystals of permanganate of potash. The punctures made by the fangs should be freely cut into, and the permanganate introduced and well rubbed round (being wetted with a few drops of water or even saliva), until the exposed tissues present a uniformly blackened appearance; or alternatively, a solution in water of the permanganate (made, say 1 in 10 in strength) could be used as a hypodermic injection into the punctures.

Sir L. Brunton has designed a suitable instrument for use, which can be carried in the pocket. It consists of a lancet-shaped blade, about half an inch long (long enough, in fact, to reach to the deepest point of a bite by the largest snake). This is set in a wooden handle, about $1\frac{1}{2}$ inches long, which is hollowed out at the other end so as to form a receptacle to hold the permanganate. Two wooden caps are fitted on the ends, one to protect the lancet, and the other to keep in the permanganate.



It is to be noted that this treatment is directed solely against the actual unabsorbed venom in the wound. The subsequent treatment, by strychnine, alcohol, or otherwise, of any symptoms of snake-poisoning which may arise is not interfered with.

N.B.—Never let it be forgotten to loosen the ligature for a few minutes half an hour or so after it has been put on, as otherwise gangrene of the limb may cause its loss, if no worse happens.

General Notes.

LIST OF SOCIETIES.

DALBY.—The Annual Show of the Dalby Pastoral and Agricultural Association will be held on 29th and 30th April, 1919.

The Show dates of the Eastern Downs Horticultural and Agricultural Association, Warwick, have been fixed for 11th to 13th February. The Dalby Pastoral and Agricultural Association will hold its Annual Show on 31st July and 1st August. 5th, 6th, and 7th February have been fixed for the Show of the Stanthorpe Agricultural Society.

A WEED DESTROYER.

Many garden paths, notwithstanding the late dry weather, are covered in parts with grass and weeds; consequently, a considerable amount of hoeing is necessary. These weeds can easily be destroyed by one or two methods. One is to make a strong solution of rock salt, the better if it can be obtained from salted hides. Watering the paths with this will effectually banish weeds. Another remedy is to dissolve 3 lb. of arsenate of soda in 12 gals. of water, and copiously water the paths. Care must be taken not to distribute the solution too near to grass or other edgings of flower beds. If a watering can is used for this purpose, it must be thoroughly cleansed with clean water before being used for watering plants.

AN EXPERIMENT IN VINE TOPPING.

Mr. E. H. Rainford, formerly Instructor in Viticulture to the Department of Agriculture, Queensland, deprecated in his writings on this subject the practice of indiscriminate topping of the vine which many vinegrowers indulge in, maintaining that it is decidedly disadvantageous instead of beneficial, and that it should only be practised when cultural operations render it necessary.

With a view to getting some fact to support the argument, he made an experiment on some vines, with the following result:—

In the middle of three rows of Mataro or Espar vines, at one of the State farms, twenty vines were topped to about 12 inches length above the last bunch of grapes, shortly after the berries had set and were the size of large shot. The topping was renewed twice when the laterals had made sufficient growth to allow it.

Result.—The bunches coloured at least a week later than those on the vines on either side, in some cases ten days later. When the grapes were picked, the grapes of the vines that had not been topped contained 20 per cent. of sugar, while those of the topped vines contained 16.5 per cent. of sugar, and there was decidedly less colouring matter in the skins. Had the grapes of the topped vines been allowed to hang for some time longer, they might have gained a little in sugar, but not much.

Surely this goes some way towards proving that excessive topping is hurtful, and not beneficial; but, as conclusions should never be drawn from a single experiment, other experiments were made with similar results.

This experiment has been well borne out by a previous experiment on Isabella vines. In this case, an amateur gardener pruned off all the tops of his vines, a foot or two above the fruit, of which there was a splendid show on the vines; but the result of topping, so far from benefiting the grapes, proved a positive injury.

In the succeeding season he left the vines severely alone, and, as a consequence, the vines, which in the previous season produced 3 cwt. of grapes irregularly ripened, yielded nearly double the quantity and the grapes ripened well together.

THE LUCE CANE HARVESTER.

It will be remembered that both at the Conference of sugar-growers convened by the Government, and at the council meetings of the Australian Sugar Producers' Association, reference has been made to the importance of securing definite information as to the adaptability of the Luce Cane Harvester to the necessities of the Queensland canegrower. We have never heard that this is a miller's question in any special sense; but it is a fact that the association has devoted much time and attention to the possibility of securing a thorough trial of the machine under Queensland conditions. Perhaps next time some of our opponents are casting around for proof of the one-sidedness of this organisation, they will not forget its work in connection with the Luce Harvester. But what they started out to deal with is an article in the "Louisiana Planter" of 31st August, giving a general review of the sugar situation in Queensland, basing its remarks on information evidently gleaned from the columns of "The Australian Sugar Journal." In this article, which is wholly of a friendly tone, there is a reference which will be read with interest here. The writer says:—

"The loss of the kanaka labour, and the making of Queensland a white man's country made the cutting of cane in the field alone cost over a dollar a ton. (How much more?—Editor.) It is suggested that the Government should buy a Luce Cane Harvester for its own account, taking it out to Queensland, and exploiting it there under Queensland conditions, which, of course, would be desirable, if not absolutely necessary, as all such machines must be adapted to any peculiarities of the conditions under which they are to work."

Drawing a parallel from experience in the use of rice harvesting machinery in Louisiana, the writer adds,—"Just such a line of reasoning is urged for the cane fields of Queensland, Australia, where labour is securing probably a higher reward for its services than is given anywhere else on earth, excepting (sic) perhaps it be in Louisiana."

The Australian Sugar Producers' Association has already set on foot inquiries from authoritative sources in Hawaii and in America, and it is hoped that useful information may shortly be available on which to base definite action towards the objects in view, namely, the actual trial of the machine in Queensland, should its record elsewhere justify further expense.—"Queensland Sugar Journal," 7th November.

THE SUGAR CROP ESTIMATE.

The General Superintendent of the Bureau of Sugar Experiment Stations (Mr. H. C. Easterby) states that he has now received the midseason's estimates of the tonnage of cane expected to be put through the rollers this season. If matters run smoothly it is anticipated that approximately 1,801,200 tons of cane will be crushed this year. Allowing $8\frac{1}{4}$ tons of cane to 1 ton of sugar, then the tonnage of raw sugar to be manufactured in Queensland should be about 206,000. The Commonwealth consumption is now stated to be 283,000 tons, a large increase on the two previous years, but no doubt due to the export of sugar in jams. This would leave a deficiency of 77,000 tons. Assuming that New South Wales makes about 20,000 tons, this would still leave a shortage of some 57,000 tons. The present probabilities are that next year's shortage will be still greater.

USE OF MOLASSES FOR STOCK.

Considerable anxiety has been occasioned in some of the sugar districts, owing to the currency of a report that, under legislation recently introduced in the Queensland Assembly, farmers and others would no longer be able to procure molasses from the mills for the purposes of stock feeding. From inquiry, we are able to state that there is no truth in this report. The Stock Foods Bill, recently submitted to Parliament, and which, by the way, cannot be dealt with until next session, does not affect the sale of molasses as such. It deals only with "concentrated or prepared stock food," together with hay and chaff.—"Queensland Sugar Journal."

The Markets.

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

Article.							OCTOBER.
							Prices.
Bacon	...	...	...	...	...	lb.	9d. to 10d.
Barley	...	...	...	...	...	bush.	4s. 9d.
Bran	...	...	...	...	...	ton	£4
Broom Millet	...	...	...	...	...	"	£30 to £50
Broom Millet (Sydney price)	...	...	...	...	...	"	£60
Butter (First Grade)	...	...	...	...	...	cwt.	154s.
Chaff, Mixed	...	...	...	...	...	ton	£9
Chaff, Oaten	...	...	...	...	...	"	£9 to £10
Chaff, Lucerne	...	...	...	...	...	"	£5 to £14
Chaff, Wheaten	...	...	...	...	...	"	£6 10s. to £8
Cheese	...	...	...	...	...	lb.	11½d.
Flour	...	...	...	...	...	ton	£12
Hams	...	...	...	...	...	lb.	1s. 6d. to 2s.
Hay, Oaten	...	...	...	...	...	ton	...
Hay, Lucerne	...	...	...	...	...	"	£8 to £10
Hay, Wheaten	...	...	...	...	...	"	£9 5s.
Honey	...	...	...	...	...	lb.	3½d. to 5d.
Maize	...	...	...	...	...	bush.	5s. 11d. to 6s.
Oats	...	...	...	...	...	"	3s.
Onions	...	...	...	...	...	ton	£39
Peanuts	...	...	...	...	...	lb.	9d. to 1s.
Pollard	...	...	...	...	...	ton	£5 10s.
Potatoes	...	...	...	...	...	"	£18 10s. to £19 10s.
Potatoes (Sweet)	...	...	...	...	...	cwt.	5s. 3d. to 6s. 2d.
Pumpkins (Cattle)	...	...	...	...	...	ton	£13 to £16
Eggs	...	...	...	...	...	doz.	8½d. to 11d.
Fowls	...	...	...	...	...	per pair	4s. to 8s.
Ducks, English	...	...	...	...	...	"	4s. to 5s. 6d.
Ducks, Muscovy	...	...	...	...	...	"	4s. to 7s. 6d.
Geese	...	...	...	...	...	"	8s. to 10s.
Turkeys (Hens)	...	...	...	...	...	"	5s. 6d. to 14s.
Turkeys (Gobblers)	...	...	...	...	...	"	18s. to 27s. 6d.
Wheat (Milling)	...	...	...	...	...	bush.	4s. 8d. to 4s. 10d.

VEGETABLES—TURBOT STREET MARKETS.

Asparagus, per dozen bundles	...	...	...	...	...	...	5s. to 12s.
Beans, per sugar-bag	...	...	...	...	...	...	10s. to 15s. 6d.
Beetroot, per dozen bundles	...	...	...	...	...	...	1s. to 2s.
Cabbages, per dozen	...	...	...	...	...	...	10s. to 15s.
Carrots, per dozen bunches	...	...	...	...	...	...	1s. to 1s. 6d.
Cucumbers, per dozen	...	...	...	...	...	...	1s. to 2s. 3d.
Lettuce, per dozen	...	...	...	...	...	...	1s. to 1s. 3d.
Marrows, per dozen	...	...	...	...	...	...	3s. to 7s. 6d.
Parsnips, per dozen bunches	...	...	...	...	...	...	1s. 6d. to 3s.
Peas, per sugar-bag	...	...	...	...	...	...	10s. to 15s.
Sweet Potatoes, per sugar-bag	...	...	...	...	...	...	1s. 6d. to 2s. 6d.
Tomatoes, per quarter-case	...	...	...	...	...	...	7s. to 10s.

SOUTHERN FRUIT MARKETS.

Article.	NOVEMBER.	
	Prices.	
Bananas (Queensland), per case	12s. to 15s.	
Bananas (Tweed River), per case	10s. to 15s.	
Bananas (Fiji), per bunch	10s. to 12s.	
Bananas (G.M.), per bunch	5s. to 6s. 6d.	
Bananas (G.M.), per case	22s.	
Cherries, per 12lb. box	24s.	
Lemons (Local), per bushel-case	4s. to 5s.	
Mandarins, per bushel-case	20s.	
Oranges (Navel), per case	24s.	
Oranges (Other), per case	5s. to 11s.	
Oranges (Queensland), per case	...	
Papaw Apples, (Queensland), per case	12s.	
Passion Fruit, per bushel-case	30s.	
Pineapples (Queens), per double-case	10s. to 12s.	
Pineapples (Ripleys), per double-case	8s. to 9s.	
Pineapples (Common), per double-case	7s. to 8s.	
Tomatoes (Queensland), per half-case	2s. to 6s.	

PRICES OF FRUIT—TURBOT STREET MARKETS.

Apples, Eating, per case	13s. to 17s.
Apples, Cooking, per case	10s. to 14s.
Bananas (Cavendish), per dozen	2d. to 5d.
Bananas (Sugar), per dozen	2d. to 6d.
Cape Gooseberries, per quart	9d.
Cherries, per case	7s. to 20s.
Citrons, per hundredweight	16s.
Cocoanuts, per sack	15s. to 25s.
Custard Apples, per quarter-case	...
Lemons (Lisbon), per case	10s. to 15s.
Mandarins, per case	...
Mangoes, per case	6s. to 9s.
Oranges (Navel), per case	...
Oranges (Seville), per hundredweight	12s.
Oranges (Other), per case	12s. to 16s.
Papaw Apples, per half-bushel-case	1s. 6d. to 3s. 6d.
Passion Fruit, per quarter-case	8s. to 10s.
Peanuts, per lb.	9d. to 1s.
Pineapples (Ripley), per dozen	1s. 6d. to 6s.
Pineapples (Rough), per dozen	1s. 6d. to 6s.
Pineapples (Smooth), per dozen	1s. to 4s. 9d.
Strawberries, per dozen boxes	3s. to 9s.
Tomatoes, per quarter-case	7s. to 9s. 6d.

TOP PRICES, ENOGGERA YARDS, OCTOBER, 1918.

Animal.	OCTOBER.	
	Prices.	
Bullocks	£27 17s. 6d. to £33 15s.	
Cows	£17 12s. 6d. to £21	
Merino Wethers	42s. 6d.	
Crossbred Wethers	44s.	
Merino Ewes	34s.	
Crossbred Ewes	32s. 3d.	
Lambs	34s.	
Pigs (Bacon)	...	
Pigs (Porkers)	38s. 6d.	

RAINFALL IN THE AGRICULTURAL DISTRICTS.

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

Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.		Divisions and Stations.	AVERAGE RAINFALL.		TOTAL RAINFALL.	
	Oct.	No. of Years' Records.	Oct., 1918.	Oct., 1917.		Oct.	No. of Years' Records.	Oct., 1918.	Oct., 1917.
<i>North Coast.</i>					<i>South Coast—continued:</i>				
	In.		In.	In.		In.		In.	In.
Atherton ...	0·94	17	0·25	4·17	Nambour ...	3·27	22	0·42	1·77
Cairns ...	2·08	36	0·15	7·21	Nanango ...	2·42	36	1·02	1·97
Cardwell ...	2·02	46	0·14	8·00	Rockhampton ...	1·86	31	0·01	1·53
Cooktown ...	1·17	42	Nil	1·30	Woodford ...	2·74	31	1·00	1·09
Herberton ...	0·94	31	0·20	1·19					
Ingham ...	1·55	26	1·24	1·95	<i>Darling Downs.</i>				
Innisfail ...	3·11	37	0·96	5·04	Dalby ...	2·15	48	1·51	1·22
Mossman ...	3·76	10	0·34	4·99	Emu Vale ...	2·46	...	1·06	2·72
Townsville ...	1·24	47	Nil	0·37	Jimbour ...	1·92	...	1·59	0·96
					Miles ...	2·05	33	0·88	2·78
<i>Central Coast.</i>					Stanthorpe ...	2·68	45	1·24	2·87
Ayr ...	0·93	31	0·02	0·32	Toowoomba ...	2·73	46	1·78	2·92
Bowen ...	1·08	47	Nil	0·54	Warwick ...	2·35	31	0·87	2·57
Charters Towers ...	0·69	36	0·06	0·70					
Mackay ...	1·93	17	Nil	0·91	<i>Maranoa.</i>				
Proserpine ...	1·89	15	0·52	1·02	Roma ...	1·76	44	1·11	1·89
St. Lawrence ...	1·91	47	0·15	3·13					
<i>South Coast.</i>					<i>State Farms, &c.</i>				
Biggenden ...	2·35	...	0·03	1·20	Bungewongorai ...	1·32	4	0·84	1·86
Bundaberg ...	2·20	35	0·04	2·39	Gatton College ...	2·42	...	0·68	1·21
Brisbane ...	2·68	67	1·14	1·58	Gindie ...	1·55	5	0·04	0·05
Childers ...	2·23	23	0·10	1·68	Hermitage ...	2·08	...	0·98	2·39
Crohamhurst ...	3·57	25	0·80	1·67	Kairi ...	1·38	4	...	3·35
Esk ...	2·46	31	0·92	2·86	Kamerunga ...	1·75	...	Closed	3·30
Gayndah ...	2·45	47	0·36	1·51	Sugar Experiment Station, Mackay	1·85	...	Nil	0·82
Gympie ...	2·77	48	0·99	0·56	Warren ...	2·93	4	Nil	1·19
Glasshouse M'tains	3·13	10	0·33	1·55					
Kilkivan ...	2·76	39	0·21	0·56					
Maryborough ...	2·79	47	0·55	1·79					

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

GEORGE G. BOND, Divisional Officer.

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 nearest to 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—27½ 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 January.

THE SOUTHERN COAST DISTRICTS.

The fruit of the month in this part of the State is the grape, and its gathering and marketing will occupy the attention of growers. Care should be taken to cut the fruit when cool and dry, and if it has to be sent any distance the stems of the bunches should be allowed to wilt before the fruit is packed, as the berries will then hang on to the bunch better, and the bunch carry in better order. Select the fruit carefully, grade it, and pack firmly so that it will not bruise in transit. If to be sent long distances, pack in crates holding from four to six 6-lb. baskets. Pines will be ripening in quantity towards the end of the month. Gather before fully coloured, and, whether for Southern or local markets, pack and handle carefully to prevent bruising. Do not ship the fruit too green for the Southern markets, as doing so is apt to spoil the trade. Send good fruit to the canneries. Small pines and crippled fruit are no good to canners, and the sooner our growers realise that it only pays to grow good fruit the better for them and for the canners, as if the latter cannot get good fruit it is impossible for them to put a line of goods that will not only be a credit to the State, but for which a world-wide market can be obtained.

Passion fruit should not be allowed to lie about for days on the ground before gathering, as if so they are apt to become fly-infested.

Watermelons and rock melons are still in season.

Watch any late peaches, Japanese plums, or other fruits liable to be infested with fruit-fly, and gather and destroy all infested fruit, or, better still, grub the trees out and burn them as they only breed flies to destroy more valuable fruit. Mangoes will be ripening during the month. See that all fly-infested fruits are destroyed, as they will only breed up further crops to destroy later ripening fruits.

Citrus orchards can be cyanided during the month for scale insects, and spraying for Maori with the sulphide of soda wash should be continued where necessary.

Mangoes can be budded during the month, as well as citrus and deciduous trees. Tropical fruit trees can be transplanted, taking care to choose dull weather and to cover same from the direct rays of the sun till they have become firmly established. Pines and bananas can still be planted.

THE TROPICAL COAST DISTRICTS.

See that all bananas are covered with netting, as the fly is usually at its worst at this time of year.

Mangoes will be going off. See that they are not allowed to remain about on the ground to breed flies for the autumn crop of oranges. Longan, litchi, and other fruit are in season. As the month is often a very wet one, little cultivation can be done in the orchards. Strong undergrowth should, however, be kept down with a hoe or scythe. Tropical fruits of all sorts can be planted. Look out for Maori on citrus fruits, and spray when necessary.

THE SOUTHERN AND CENTRAL TABLELANDS.

January is a busy month in the Stanthorpe district, apples, pears, plums, peaches, and nectarines being in season. Do not gather the fruit too immature; at the same time, don't allow it to be over-ripe. Gather dry, handle carefully, grade and pack

in attractive cases. Keep the fruit as cool as possible, and ship in well-ventilated cars. Keep a sharp lookout for fruit-fly, and take every possible means to prevent its spreading, even going as far as to gather and destroy the whole of the fruit on any infected trees, as if kept in check during the month the bulk of the fruit ripening during February will be free.

Keep a sharp lookout also for codling moth; examine the bandages on the trees at least every ten days, and destroy all larvæ found therein; also gather and destroy all moth-infected fruit.

Gather Bartlett pears as soon as they are large enough, and store away in a cool shed to ripen; when they show signs of ripening, market, not before. If sent down green they will sell for cooking, and only fetch a small price. The right stage at which to gather is when the fruit is fully developed, and the flesh has lost its woody flavour, but is still quite hard. This is usually before the fly has stung it, and if gathered at this stage the fruit will ripen up properly without shrivelling, and develop its full flavour.

These remarks apply also to the Downs country, which is somewhat earlier than Stanthorpe.

The crop of the month in the Western tablelands is the grape; and the remarks I have made respecting this fruit when grown in the Southern Coast districts apply equally here. The fruit should be gathered dry, and wilted before it is packed. Too large cases are often used; cases holding from 20 to 30 lb., or crates holding six 6-lb. baskets, are preferable, the latter being the best package for shipping the fruit long distances. Keep the orchards well cultivated, and, where water for irrigation is available, give citrus trees a watering during the month, unless there has been a sufficient rainfall. When the orchard is irrigated, see that thorough cultivation follows the irrigation, so as to conserve the moisture in the soil.

Red Scale, which is prevalent on citrus trees in the dry Western country, should be treated during the month. Cyaniding is the best remedy.

Farm and Garden Notes for January.

FIELD.—The main business of the field during this month will be ploughing and preparing the land for the potato and other future crops, and keeping all growing crops clean. Great care must be exercised in the selection of seed potatoes to ensure their not being affected by the Irish blight. Never allow weeds to seed. This may be unavoidable in the event of long-continued heavy rains, but every effort should be made to prevent the weeds coming to maturity. A little maize may still be sown for a late crop. Sow sorghum, imphee, Cape barley, vetches, panicum, teosinte, rye and cowpeas. In some very early localities potatoes may be sown, but there is considerable risk in sowing during this month, and it may be looked upon merely as an experiment. Plant potatoes whole. Early-sown cotton will be in bloom.

KITCHEN GARDEN.—A first sowing of cabbages, cauliflower, and Brussels sprouts may now be made in a covered seed bed, which must be well watered and carefully protected from insect pests. Sow in narrow shallow drills; they will thus grow more sturdy, and will be easier to transplant than if they were sown broadcast. The main points to be attended to in this early sowing are shading and watering. Give the beds a good soaking every evening. Mulching and a slight dressing of salt will be found of great benefit. Mulch may consist of stable litter, straw,

grass, or dead leaves. Dig over all unoccupied land, and turn under all green refuse, as this forms a valuable manure. Turn over the heavy land, breaking the lumps roughly to improve the texture of the soil by exposure to the sun, wind, and rain. In favourable weather, sow French beans, cress, cauliflower, mustard, cabbage, celery, radish for autumn and winter use. Sow celery in shallow well-drained boxes or in small beds, which must be shaded till the plants are well up. Parsley may be sown in the same manner. Turnips, carrots, peas, and endive may also be sown, as well as a few cucumber and melon seeds for a late crop. The latter are, however, unlikely to succeed except in very favourable situations. Transplant any cabbages or cauliflowers which may be ready. We do not, however, advise such early planting of these vegetables, because the fly is most troublesome in February. For preference, we should defer sowing until March. Still, as "the early bird catches the worm," it is advisable to try and be first in the field with all vegetables, as prices then rule high. Cucumbers, melons, and marrows will be in full bearing, and all fruit as it ripens should be gathered, whether wanted or not, as the productiveness of the vines is decreased by the ripe fruit being left on them. Gather herbs for drying; also garlic, onions, and eschalots as the tops die down.

FLOWER GARDEN.—To make the flower-beds gay and attractive during the autumn and winter months is not a matter of great difficulty. Prepare a few shallow boxes. Make a compost, a great part of which should consist of rotten leaves. Fill the boxes with the compost; then sow thinly the seeds of annuals. Keep the surface of the soil moist, and when the young seedlings are large enough to handle lift them gently one by one with a knife or a zinc label—*never pull them up by hand*, as, by so doing, the tender rootlets are broken, and little soil will adhere to the roots. Then prick them out into beds or boxes of very light soil containing plenty of leaf mould. Then keep a sharp lookout for slugs and caterpillars. Keep a supply of tobacco dust on hand, and scatter this in the path of the slug, and he will cease from troubling you.

All kinds of shrubby plants may be propagated by cuttings. Thus, pelargoniums, crotons, coleus, and many kinds of tropical foliage plants can be obtained from cuttings made this month. After putting out cuttings in a propagating frame, shade them with a piece of calico stretched over it. Be careful not to over-water at this season. Propagate verbenas, not forgetting to include the large scarlet Foxhunter. Verbenas require rich soil. Palms may be planted out this month. If the weather prove dry, shade all trees planted out. With seed-boxes, mulch, shade, water, and kerosene spray, all of which imply a certain amount of morning and evening work, the flower garden in autumn and winter will present a charming sight, and will afford light and profitable work for girls with spare time on their hands.

An exhaustive booklet on "Flower Gardening for Amateurs" has been issued by the Department of Agriculture and Stock, and may be obtained from the Office. Price, 2s.

Another useful publication is "Market Gardening in Queensland." Price, 1s, also issued by the Department.
