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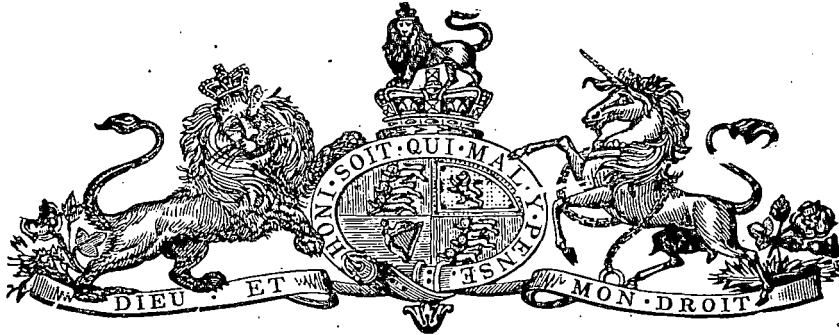
1901.

PARLIAMENT OF TASMANIA.

COUNCIL OF AGRICULTURE:
REPORT FOR 1900.

Presented to both Houses of Parliament by His Excellency's Command.

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COUNCIL OF AGRICULTURE.

REPORT FOR 1900.

Council of Agriculture, Hobart, 6th June, 1901.

SIR,

We have the honour to report as follows:—

PERSONNEL OF COUNCIL.

Mr. L. M. Shoobridge (Vice-President), Derwent; Mr. W. E. Bovill, Devon; Mr. S. Bendall, Westmorland; Mr. W. J. Thomas, Huon; Colonel Legge, Cornwall; Mr. G. M. Barnard, Launceston; Mr. A. Monnington, Wellington; Mr. F. W. Briggs, Dorset; Mr. M. Fletcher, jun., Hobart; Mr. J. R. Pillinger, Cumberland; Mr. Chas. Chipman, Pembroke.

In accordance with Section 5 of the Act, Messrs. Chipman, Allen, Monnington, and Colonel Legge retired at the end of July, 1900. Mr. Monnington was re-elected for Wellington; Mr. S. Bendall, for Westmorland. As no branch boards existed in the District of Cornwall, Colonel Legge was nominated by the Council. Mr. D. Hildyard was returned unopposed for the Agricultural District of Pembroke. Mr. Barnard retired in November, and Mr. W. Orr was elected to fill the vacancy.

OFFICERS OF THE DEPARTMENT.

Secretary and Chief Inspector, T. A. Tabart; Clerk and Sub-Editor "Agricultural Gazette," L. A. Evans; Entomologist, A. M. Lea; Poultry Expert, R. J. Terry; Dairy Instructor, A. Conlon; Agricultural Expert, H. J. Colbourn.

THE DAIRYING INDUSTRY.

Considerable activity has been displayed in Dairying since Mr. Conlon took up his duties. The adoption of co-operative methods must be accepted by our farmers as the only successful channel through which Tasmania can supply herself with butter, and also have a uniform surplus for export. That this view is gaining ground is well shown in the establishment of the Deloraine Butter Factory, and the active sympathy accorded the Dairy Instructor's efforts in several other portions of the State. The necessity for careful judgment in selection of animals and their feed, together with the free use of the babcock tester and judicious weeding, are points that receive due attention by our Expert on every possible occasion.

THE BOUNDARY FENCES AND OTHER ACTS.

Amendments suggested for the Boundary Fences, Cattle, and Sheep Dipping Acts, have, it is to be regretted, not yet been passed into law, as, until some such provisions exist, discontent is bound to prevail. The enforcement of the last-named Act is a most difficult undertaking, the wide range of time given for dipping makes the detection of infringements more a matter of accident rather than successful administration. The Council is of opinion that further legislation is necessary.

THE MANURE ADULTERATION ACT.

The Agricultural Laboratory is now in complete order, and over forty analyses of fertilisers sold in different parts of the State have already been made by Mr. Colbourn, besides several samples of soils. In only one case has there been any wide difference between the percentages found and those stated in the invoice-certificate of the vendor. Several unsatisfactory points present themselves, however, notably, the degree of solubility of the constituent parts, and the names under which some manures are sold. It is hoped that the Conference of Agricultural Chemists suggested by the Victorian Department of Agriculture will take place, and deal with these matters, and also arrive at some solution of the vexed question of fixing a minimum standard under which no manure

shall be exposed for sale. Ample provision is made under the Act for taking samples on delivery, and without this precaution on the part of farmers themselves, the department has no guarantee that manures which analyse satisfactorily when samples are taken from the store reach the purchaser in the same condition.

THE FRUIT INDUSTRY.

Much time has been devoted to discussing the proper attitude to be maintained towards the other States in regard to the admission of fruit and other trees, the whole object at the time being to guard against the entrance of San José Scale. Unfortunately, recent developments have brought this Scale to light in several portions of the State, and the present energies of the Entomologist and his assistants are being directed in an endeavour to get information as to its precise whereabouts. This course is a wise one, in order that Regulations may be framed to meet the exigencies of the situation, and at the same time hamper uninfected portions of the State as little as possible. A conference was held in Melbourne last year to discuss the relationship which should exist between the various Australasian States in the interchange of nursery stock. The department was represented by our Vice-President (Mr. Shoobridge) and Mr. Lea (Government Entomologist). It is hoped that provision of the sum of £200, to enable experiments to be carried out in the Huon District for the Black Spot of apples, will be made at an early date, otherwise much delay will occasion a season's loss of time.

ACKNOWLEDGMENTS.

The Council desire to record their appreciation of the efforts made by Mr. F. W. Briggs, of Scottsdale, to awaken further interest in the study of grasses, and thus secure more attention to the pasture lands of the State. Mr. Briggs, at his own expense, has visited and lectured at some twelve different centres in the northern and north-western portions of Tasmania, bringing before members his experience of the many varieties of grasses and clovers coming under his notice. Satisfaction must also be expressed at the ready manner in which Mr. L. Rodway deals with any matters of botanical interest remitted to him for his report.

Mr. W. J. Thomas and M. Fletcher, jun., visited the Branch Boards at Woodbridge, Port Cygnet, Geeveston, and Franklin, in October last, and discussed matters of importance to fruit-growers with the members.

ENTOMOLOGICAL.

The value of having a skilled entomologist attached to the Departmental Staff has been felt very much during the past twelve months. In all discussions on Fruit Pests, Mr. Lea's advice has proved of paramount importance, whilst his labours on the Grass Grub, Peach Pests, Codlin Moth, Black Spot, and Pear Slug, deserve more than a mere passing notice by those vitally interested.

The recent discovery of the San José Scale by this officer upon twigs of a plum tree sent from Launceston, and its further identification in other portions of the State, together with the further confirmation of the Government Entomologists of Victoria, New South Wales, and Queensland, brings home to us the fact that Mr. Lea is an officer in whom the Council can place their confidence regarding the duties he undertakes.

CONFERENCES OF BRANCH BOARDS.

Thirty-nine Branch Boards of Agriculture sent representatives to the annual gathering held at Hobart in September last. A free pass on the railways is granted one delegate from each Board, and, to give the same facilities to those branches in portions of the State where no railways exist, it is proposed to extend the pass to Boards whose delegates travel by road or river. The proceedings of these conferences find space in the "Agricultural Gazette," and the meeting of the members of the Council with delegates from different parts of the State further promotes the efforts of the department.

REPORTS BY OFFICERS.

Attached will be found the reports of the different officers of the department, which speak for themselves. As they are, practically speaking, fresh appointments, a good deal of labour performed has not yet had time to make its mark; but, from what is therein set forth, it is apparent that much valuable work has been performed, which will show its result in the near future.

THE "AGRICULTURAL GAZETTE."

Although the Council's journal has been issued regularly during the period under review, and many valuable articles disseminated amongst the Branch Boards, it is felt that the time is at hand when an alteration should be made in its shape, so as to fall into line with the other Australasian States. The insertion of pictorial pages is also becoming necessary, as many of the advanced points brought forward by the various experts would be much more easily grasped by those who read the paper if illustrations could be inserted amongst the reading matter.

The Council desires to record its appreciation of the work done by the editor, Mr. Thos. Hogarth, and the sub-editor, Mr. L. A. Evans.

QUESTIONS DISCUSSED.

The following are some important points dealt with by us, and upon which recommendations have been made:—

"Bags In," Nursery Stock, Destruction of Blackberries, Sheep Stealing, Phosphatic Rock, Insectivorous Birds, Poisoned Grain Bill, Bull and Stallion Tax, Emergency Fund, Fruit Farm, Destruction of Sparrows, Railway Extension, Standard for Manures, Black Spot, Change of Weights, Voting at Conferences, Rail Freight on Manures and Lime, Pear Slug, &c.

THE BRANCH BOARDS OF AGRICULTURE.

The total number of Branch Boards stands at forty-seven, being a slight increase over the number in existence last year. Several district conferences have been held, at which important matters were discussed, and referred for the Council's consideration. The following papers have been read and discussed:—

- Bagdad*.—"Manuring Orchards," J. Palmer.
Cressy.—"A Scheme to Improve the Water Supply of the Green Rises District," W. D. Weston.
Ellendale.—"Improving Dairy Stock," "Fruit Growing," W. Millar.
East Mersey.—"Landlord and Tenant," S. V. Martin; "Our Potato Industry," C. A. Littler.
Forcett.—"The Sorell Sales," S. Ward; "Dairy Cows," "Permanent Pastures," Hon. W. Clifford.
Frankford.—"Co-operation in Dairying," H. Robinson.
Longford.—"Landlord and Tenant," H. Young.
Launceston.—"Landlord and Tenant," J. Lamont; "The Dairying Industry," G. M. Barnard.
Lilydale.—"Financial Aspect of a Co-operative Dairy for Lilydale," W. McKenna.
New Town.—"Cultivation of the Apple," A. H. Cato.
Port Cygnet.—"The Fruit Industry," "The Codlin Moth," W. Henshaw.
Queenborough.—"The Value of Nursery Inspection" (F. M. Webster), read by H. Watson; "Potato Scab," J. Langley; "Blight Proof Stocks," J. Osborne, jun.
Railton.—"Rabbit Proof Fences," "Seed Testing," "Evil of Destroying Birds," "Catch Crops," "Agricultural Research in America," J. Blenkhorn.
Sassafras.—"Poultry for Farmers," E. H. Loudon.

THOMAS A. TABART, *Secretary*.

 GOVERNMENT ENTOMOLOGIST'S REPORT.

I VERY much regret having to notice the San José Scale (*Aspidiotus perniciosus*) as a pest occurring in Tasmania. On April 1st, Mr. C. Smith (the codlin moth inspector at Launceston) saw some minute larvæ crawling over a Japanese plum tree* in his garden; on examining the tree, he found some scale insects; these he sent to me, and, on examination, they proved to be the San José Scale. I immediately went to Launceston, and on that trip found it (in company with Mr. Smith) in three gardens and a nursery. Subsequently (on 27th April), I found it at New Norfolk, and, still later, at Glenorchy and Sandy Bay. As to when the districts in the southern part of Tasmania became infested, I have no means of judging, and, having heard the most contradictory reports and statements, prefer to place none of them on record.

As soon as it became known that the scale was in Tasmania, I advised that a hurried inspection of all the nurseries be made, to be followed by a lengthier and more careful one, nurseries being undoubtedly the principal means by which the pest is distributed from centre to centre. Also, that a hurried examination be made of as many orchards as possible in the principal fruit-growing centres. It was also recommended that our native trees and shrubs be examined when in the vicinity of infested orchards, as it is obvious, if these are attacked, that the control of the scale would be much more difficult.

Two inspectors were applied for, and granted, to assist me in the work of inspection, and also, to examine the native trees in infested districts; these inspectors (Messrs. R. A. Black and H. D. Griffith, both amateur entomologists) are now at work.

So far, since its known occurrence in Tasmania, it has been searched for without having been found at Kangaroo Valley, Broadmarsh, Bagdad, Burnie, Devonport, Deloraine, Lilydale, Scotts dale, Ringarooma, Evandale, Huonville, and Port Cygnet; quite possibly, however, on extended research being made, it will be found in some of these districts.

In Canada, this pest is reported to have four broods in a year; in the United States, from four to six. Here, I am not in a position to state the number, but imagine it is not less than four. The insects at present (June) are dormant, and the majority about half-grown.

To date, it has been seen in Tasmania on the apple, pear, peach, plum, cherry, and hawthorn.

So far, I have not seen a single tree at Launceston, New Norfolk, Glenorchy, or Sandy Bay that has even been moderately injured by this insect; and I have, therefore, come to the conclusion that in Tasmania it is not a serious pest, despite the bad reputation that it comes to us with. The reason for this, I believe to be the great number of insects and mites which prey upon it. Even the trees at Launceston, which we know brought the pest to that town from Sydney, were not seriously injured, and, on some of them the scale was found with difficulty, and had spread (and that but very lightly) to but very few of the neighbouring trees, although they had been in the gardens for six years.

* This tree, and some other Japanese plum trees, found to be infested in Mr. Smith's garden, and in another garden some five miles away, were imported from Sydney in 1895.

The natural enemies I have observed feeding on this pest in Tasmania are as follow:—

1. *Leis conformis*; a large, yellow ladybird-beetle, with black spots, and which is very common in Tasmanian orchards.
2. *Orcus Australasiæ*; a large, blue ladybird-beetle, with six or eight reddish spots; feeds on many other scale insects as well.
3. *Rhizobius hirtellus*; a minute, hairy, ladybird-beetle, with reddish head and thorax, and dark elytra; seen also feeding on the scale in the New South Wales and Western Australia.
4. *Scymnus vagans*; a very minute, hairy, black, ladybird-beetle, frequently seen eating red spiders (*Tetranychus*).
5. A very minute, shining, hairless, black ladybird-beetle, seen only at Launceston and New Norfolk, and probably belonging to the genus *Lipernes*.
6. A ladybird-beetle similar to the last in many respects, but narrower, and belonging to the genus *Scymnus*.
7. A small, narrow, flat, red bug, very common where the scale is at all thick, and frequently found feeding on the mussel scale.
8. Small, mite-like tick, seen only at Sandy Bay.
9. Mite, like red spider, but flatter, and very active.
10. Mite, like the last, but rather sluggish in its movements, also seen attacking several other sorts of scale insects.
11. *Tyroglyphus*; near to, if not, *malus*, also attacks the black or brown scale *Lecanium oleæ*...
12. *Tyroglyphus*; a very minute mite, marked posteriorly by two large red spots. In an orchard near New Norfolk, I searched for nearly an hour before I could find a single living specimen of the San José Scale, but dead specimens were abundant, and under them were often to be seen specimens of these useful mites; under one scale, as many as 24 specimens of these mites were seen on one occasion. The two red spots show up very distinctly, and, on a first glance, appear like eyes.
13. *Tyroglyphus*; seen on scale-infested apples only.

I have, therefore, seen thirteen enemies of this pest in Tasmania, and, probably, many others will be seen in the summer, the late autumn and winter being very unfavourable seasons for the observation of these insects.

The San José Scale is known to be a native of Japan, in which country it is widely distributed; it is not, however, there regarded as a serious pest, and this is, in all probability, owing to the abundance there of its natural enemies.

As regards remedies for this pest, the evidence on this head is so conflicting that I am at a loss what to recommend, having personally had no experience with any remedy, except fumigation. The principal remedies used in various parts of the world are:—

- Sulphur, lime, and salt.
- Soft soap.
- Kerosene, kerosene emulsions, and mechanical mixtures.
- Crude petroleum.
- Fumigation by means of hydrocyanic acid gas.

The remedy that at present appears to be in most favour in the United States and Canada is soft soap (made with potash and whale or fish oil); this is used at the rate of 2lbs. to the gallon of water, and very good results have been obtained with it; the soaps used, however, appear to differ very much in quality.

Fumigation with hydrocyanic acid gas is also largely recommended, but it has the disadvantage of being highly dangerous to human life, and of being rather more expensive than many sprays. Except in very badly infested trees, however, it is absolutely fatal to all insect life.

Sulphur, lime, and salt mixture is largely recommended in California, and has been used with good results in Australia; but in very many cases (even when used at double the ordinary strength) it has failed to give satisfaction. It is, however, a spray well worth using, on account of the comparative ease with which it is made, and the very slight amount of danger to the trees when sprayed upon in winter, even when it has been badly prepared and used. It is, moreover, one, the preparation of which is familiar to many of our orchardists.

Crude petroleum is not obtainable in Tasmania, it being considered too dangerous a liquid to be allowed to cross the equator in ships.

Pure kerosene has been largely used in the United States and Canada, with the result that many trees have been freed from the scale, whilst many other trees have been killed outright by it, or severely injured; it is highly recommended in New South Wales. Various mechanical mixtures of kerosene and water have been used, with varying results, as also with kerosene and milk, and kerosene, soap, and water.

In Tasmania, excellent results have been obtained against the mussel scale by painting the trees with various machine oils.

Should it be determined to carry out experiments against this pest, I would suggest an orchard at Sandy Bay or New Norfolk being selected for the purpose.

Spraying experiments against the Codlin Moth were continued during the past season. I regret that the results obtained for the spraying were very poor, but this, I am convinced, was due solely to the heavy rain that fell whilst spraying was going on, and shortly afterwards.

I have to thank Mr. H. S. R. Wright, the Warden of Glenorchy, for having placed part of his orchard at my disposal. This part, he assured me, was the most severely infested piece of orchard that he possessed. The trees (all of which were "Sturmern") at the ends and sides of this piece of ground were more infested than those in the middle.

On several occasions, when very large numbers of grubby apples had to be counted, the whole of the day's picking was measured out in bucketsful; these were afterwards reduced to numbers, according to the average numbers contained in ten buckets; in most cases, however, the exact numbers were counted. Early in the season, the proportions between those apples struck in the eye and those struck in the side were taken, but, later on, sufficient time could not be spared to obtain these figures.

The number of apples returned as clean were estimated by one of Mr. Wright's men on March 20, with the addition, however, of those apples which had fallen to the ground free from grubs.

The orchard at my disposal was divided into seven sections, according to the materials used; following are particulars of the sprays used, together with the results obtained.

SECTION I.

Paris green 1lb. to 200 gallons water, with lime.
48 Bearing trees.

Oct. 26.—First time sprayed. The lobes in excellent condition.

Heavy rain at night.

29.—Heavy rain.

Nov. 2.—Heavy rain. The heavy rain that fell on these three days probably rendered the first spray useless.

Nov. 21.—Second time sprayed.

<i>Grubby.</i>	<i>Clean.</i>	<i>Total.</i>	<i>Percentage grubby.</i>
8 945	11,551	20,496	43

SECTION II.

Paris green 1lb. to 150 gallons water, with lime.
42 Bearing trees.

Oct. 30.—First time sprayed. Lobes in fairly good condition.

Nov. 2.—Heavy rain.

Nov. 21.—Second time sprayed.

<i>Grubby.</i>	<i>Clean.</i>	<i>Total.</i>	<i>Percentage grubby.</i>
3,917	8,204	12,121	32

SECTION III.

Unsprayed.

51 Bearing trees.

<i>Grubby.</i>	<i>Sound.</i>	<i>Total.</i>	<i>Percentage grubby.</i>
10,340	6,781	17,121	60

SECTION IV.

Paris green 1lb. to 200 gallons, with lime.
29 Bearing trees.

Oct. 31.—First and only time sprayed. Lobes in fairly good condition.

Nov. 2.—Heavy rain.

<i>Grubby.</i>	<i>Clean.</i>	<i>Total.</i>	<i>Percentage grubby.</i>
2,371	2,318	4,689	55

SECTION V.

Arsenic (1lb. to 400 gallons) and soda, with lime.
35 Bearing trees.

Nov. 1.—First time sprayed. Lobes in fairly good condition.

2.—Heavy rain.

21.—Second time sprayed.

<i>Grubby.</i>	<i>Sound.</i>	<i>Total.</i>	<i>Percentage grubby.</i>
3,833	2,282	6,115	62

SECTION VI.

Arsenate of Lead, 1lb. to 200 gallons of water.
35 Bearing trees.

Nov. 1.—First time sprayed. Lobes in fairly good condition.

2.—Heavy rain.

21.—Second time sprayed.

<i>Grubby.</i>	<i>Sound.</i>	<i>Total.</i>	<i>Percentage grubby.</i>
4,317	4,549	8,866	48

SECTION VII.

Unsprayed.

4 Bearing trees.

Grubby.	Clean.	Total.	Percentage grubby.
1,571	334	1,905	82

In regard to the four trees in Section 7, one of the trees was very small, and could hardly have borne more than 50 apples, most of which were struck. From a second tree, all the fruit was picked, in one day; on it were 59 clean apples and 374 grubby ones; of these, 147 had been struck in the side and 227 in the eye. From a third tree, 223 grubby apples were taken on the first picking, 560 on the second, and 56 on the third—a total of 849 grubby apples to one tree. These trees, however, were in a corner of the orchard where hedges and poplars gave abundant shelter to wandering grubs.

The results obtained were much poorer than during the preceding season, and much poorer than they would have been had not rain so considerably interfered with them. Another reason, doubtless, was the fact that a considerable number were struck very late in the season. The last moth came out in my breeding cage on January 23, but on February 15 I obtained a living egg, and on the following day noticed many apples that had then been struck quite recently; it would, therefore, appear that there had been a partial second brood.

The most successful result obtained was in Section 2; but even there the percentage (32) of grubby apples was very high.

Altogether, from 244 sprayed and unsprayed trees, 35,294 grubby apples were picked, to an estimated total of 36,019 sound ones, or a percentage of 49; and, doubtless, many grubby apples were overlooked.

Should it be determined to carry out experiments against this pest next season, I would recommend an orchard at Glenorchy being selected for the purpose.

Following are a few brief notes made during the season:—

1900.	1900.
Oct. 3.—A few apple blossoms out.	Nov. 21.—Last day of spraying.
23.—Most petals fallen.	Noticed a great many moths whilst spraying.
26.—Commenced to spray.	Lobes closed.
Lobes in excellent condition for spraying.	1901.
Heavy rain at night.	Jan. 23.—Last moth appeared in breeding cage.
Nov. 1.—Saw 5 moths whilst spraying.	Feb. 15.—Obtained a living egg on an apple.
2.—Heavy rain.	16.—Noticed many apples quite recently struck.
5.—First moth out in breeding cage.	

The pear or cherry slug is certainly a serious pest in Tasmania, and I have been surprised at the apathy of many people in allowing it to obtain such a hold in their orchards, considering the ease with which it can be destroyed. Many cherry trees are yearly killed by it, and every season hundreds of pear trees are seen with the pears hanging by themselves, every leaf having fallen, owing to the insects' attacks; plum trees are also frequently injured. I am informed there is near Launceston a hawthorn hedge for 32 miles, and every yard of which has been attacked by this pest.

Spraying experiments were carried out against this pest at Glenorchy with very gratifying results, arsenic and soda and Paris green having proved completely successful against it.* The principal remedy used for this pest in Tasmania is hellebore, certainly a very useful spray for a small orchard or garden, and having the decided advantage of not being a dangerous poison; but where a considerable number of trees have to be treated, either of the arsenical poisons are much better, as they are not only much cheaper, but are more reliable.

An article was given in the June number of our publication on the underground grass grub (*Oncopthera intricata*). This insect I regard as by far the most serious indigenous pest of Tasmania, and hope this season to devote considerable time to it, as very little is known of its earlier stages, and practically no remedial measures of any value have been used against it. The same insect occurs in Victoria, but has, apparently, somewhat different habits there, judging from letters and specimens which I have received from Mr. C. French.

A pest which needs to be watched, though, probably, it will never be very troublesome, is a small mite that attacks the roots of trees. At an orchard near Port Cygnet, six apple trees were seen to be in a dying state. On examining their roots, a mite was found to be the cause of the injury. This mite is very small, being seen by the naked eye only with great difficulty; it belongs to the genus *Tyroglyphus*, and in appearance is similar to the cheese mite (*T. siro*). It causes the bark of the trees to become brown, spongy, and dead from just above or level with the ground to where the mass of roots branch out, some of the roots, also, being attacked. So far, I have only seen it at another orchard at Port Cygnet and at Moonah.

* A report on the results obtained was published in the February number of the Departmental publication.

Many consignments of fruit have been examined at Hobart and Launceston for fruit flies, and a considerable number of cases of peaches and a few of nectarines, oranges, and persimmons, which were found to be infested by these pests, were destroyed, the last consignment destroyed being some persimmons, in May. Numerous small parcels of plants from the other colonies have also been inspected, and most of these, being unaccompanied by certificates, were destroyed or re-shipped.

A special trip was made to Launceston to examine the orchards and gardens that had been infested by the Mediterranean Fruit Fly (*H. capitata*), and the local inspector also watched these places. As a result, we can now confidently claim that this pest has been exterminated from Tasmania, in consequence of the treatment carried out by the department.

During the past season, statements were made that a fruit fly had established itself at Hobart and Glenorchy; these statements, however, were erroneous in every instance, the insect that had caused alarm having been one of the "ferment" or "vinegar" flies (*Drosophilus*).

I have attended the meetings of a number of branch boards of agriculture, or fruit boards, to give advice on various subjects, and have delivered lectures at the principal fruit-growing centres on insect and fungoid pests. For the purpose of illustrating these lectures, many lantern slides were prepared by a Hobart photographer (Mr. Beattie) and by Mr. Conlon, of the department.

Several consignments of one of our most useful ladybird-beetles (*Leis conformis*) have been sent to West Australia (where the species does not occur), and these have, on the whole, arrived in good condition; it is intended to send more consignments of this useful beetle to that colony. In return, we hope to procure a very useful ladybird-beetle (*Chilomenes quadripustulatus*) that is quite common in West Australia, but occurs in none of the other colonies. A consignment of several of our smaller ladybird-beetles was also sent to California, but was not a success. The value of this kind of work is recognised more and more year by year; as instances of this, there may be mentioned the visit to Tasmania and elsewhere of an entomologist (Mr. G. Compere) sent out by the State of California to procure useful insects; Mr. Koebele has also been again on tour, and several entomologists have been to Japan for this purpose; India, also, has been trying to procure useful insects from Australia.

In September last, the vice-president of the Council and myself went to Melbourne to attend a conference in regard to nursery stock, &c. In company with delegates from other colonies, we visited many orchards and nurseries at Melbourne, Emerald, Harcourt, Wangaratta, and Richmond, and, personally, I examined some orchards and gardens at Albury, in New South Wales.

As a result of this conference, we recommended that nursery stock should be allowed to be imported into Tasmania from Victoria under certain restrictions; also, that all the nurseries in Tasmania should be periodically inspected.

I have also prepared many notes on the different pests that have come under my notice in Tasmania, paying special attention to those of the apple,* the intention being to issue a handbook on these pests as soon as possible. For this purpose, a number of drawings have been made, but, having been greatly pressed for time, all artistic work has been abandoned for the present, and till pressure slackens.

Special attention has been paid to preparing a number of cabinet drawers to illustrate the life-histories of the destructive and useful insects occurring in Tasmania (these drawers can be used for exhibition purposes). Large numbers of insects not at present known to be destructive have also been collected and set up. This work, though not, perhaps, absolutely necessary from certain points of view, is still very desirable, and is carried out by the Government Entomologists of all the Australian States.

Some time has been spent in identifying and technically describing our ladybird-beetles; many of these are so useful that it is certainly desirable that we should be able to refer to them by name. Some time, also, has been devoted to similar work in connection with a family of very destructive boring beetles (*Scolytidæ*). A list of the described Tasmanian beetles has also been prepared.

I must again point out that the department possesses scarcely any literature dealing with technical and economic entomology; I myself have a fair amount of Australian and American literature, but many of the most valuable works that are in constant requisition appear to be entirely absent from Hobart. For information as to the name and nature of a number of diseases of the apple, I have to thank Mr. D. McAlpine.

No experiments against Black Spot were carried out for the Council during the season. For the coming season, I have recommended that experiments should be carried out at only one locality (preferably Huonville or Port Cygnet). It appears to me that extensive experiments carried out in one orchard are far better than small experiments carried out in many orchards, necessitating constantly travelling about, and the expenditure of much time and money; the time, also, in which the best results can be obtained by only one spraying is so limited in extent that very different results must, of necessity, be obtained, should many orchards be selected for experiment. At the end of the season, however (and periodically during its duration, if desired), orchardists and others interested could be invited by advertisement, or through the various fruit boards, to see the results obtained.

* Thirty-four species of insects have been observed in Tasmania attacking the fruit, leaves, trunk, or roots of the apple alone; few of these, however, are serious pests.

In the Huon districts, during the past season, many orchardists sprayed their trees for the first time, and, on the whole, with very gratifying results, especially where the trees were sprayed just when the blossoms were showing pink. The season, however, appears to have been less severe for the Spot than the preceding one.

Voluntary combination amongst orchardists for the checking of pests is a thing greatly to be desired. As an object-lesson for such combination, I may cite the Kangaroo Valley. In the orchards of that valley (I am informed by many residents of it), Black Spot, Mussel Scale, and Codlin Moth were very severe pests a few years ago. Mr. Morton G. Hickman informs me that some years ago as many as 20,000 bushels of fruit were lost to the valley through Black Spot alone. I am also informed that many trees were severely injured, and a number killed, by the Mussel Scale, and that a large percentage of fruit was rendered unsaleable owing to its being scaly. On the several occasions on which I have had the pleasure of visiting the orchards in this valley, I was struck by the cleanliness of the trees, orchard after orchard being visited, with scarcely a trace of the mussel scale to be seen, a circumstance strikingly at variance with some other districts in the Island. Black Spot during the past season was certainly very much less in evidence than one would reasonably have expected, considering the amount of rain, fogs, and mists that occur in the valley; this season, Mr. G. Hickman tells me he hardly lost a bushel of fruit through Black Spot, and two seasons ago he lost 2000 bushels through this one pest alone.* These gratifying results were obtained almost solely by the use of the sulphur, lime, and salt mixture, a mixture certainly inferior to the Bordeaux mixture as a fungicide, but much superior for scale insects, and, probably, the best all-round spray known. I am also informed that in the valley the Codlin Moth has been (by spraying, picking, and bandaging) very greatly reduced in numbers, and that a number of the orchardists even hope to entirely cleanse their orchards from it.

I have, &c.,

ARTHUR M. LEA, *Entomologist.*

DAIRY INSTRUCTOR'S ANNUAL REPORT.

1st July, 1901.

SIR,

I HAVE the honour to furnish a report on my first year's work in the service of your Department as Dairy Instructor.

The procuring of the necessary equipment for efficiently carrying out the work of a dairy instructor was proceeded with immediately on my commencing duty. Lectures on modern dairying, in most instances illustrated by the aid of the Department's limelight apparatus and slides, have been given at the following places:—Forcett (2), Fingal, Sheffield, Latrobe, Deloraine (2), Chudleigh, St. Marys (2), Woodsdale, Port Esperance, Elizabeth Town (2), Exton, West Meander, Pyengana, Hobart (2), Westbury, Scottsdale, Ringarooma, Stanley (3), Montagu, Wynyard, Lilydale, Port Cygnet, Frankford. These lectures have been well received, and the attendance good, except in one or two instances, where insufficient notice was given. In each district as many private dairies were visited as time would allow, and instructions and advice given where necessary.

Practical Dairy Work.—Four days were spent at the Pardoe Estate, East Devonport, where I was engaged in making cheese daily, and gave all necessary information for the manufacture of cheese on the Canadian Cheddar system. Full demonstrations on this system were also given on two days at the Southern Tasmanian Agricultural and Pastoral Society's Show at Hobart. The manufacture of cheese was carried out in a marquee erected on the show-ground, and was very largely attended by the public. I am indebted to Messrs. W. E. and H. Shoobridge for supplying a portion of the plant used, and for assistance rendered; also to Messrs. A. G. Webster and Son for supplying plant and steam power. Practical demonstrations have also been given at the Emu Bay Factory, Burnie, and the Irishtown Factory, Circular Head.

Agricultural Shows.—I have attended four Agricultural Shows during the year, viz.:—Hobart, Launceston, Longford, and Lilydale. At these shows my services were available for demonstrations in milk and acidity testing, cheesemaking, and general dairy work.

Council and Branch Boards of Agriculture.—I attended the November meeting of the Council at Scottsdale, the Conference of Branch Boards at Hobart, in September, at which I read a paper on "Dairy Inspection," and meetings of the Associated Boards at Ulverstone and Westbury.

Photography.—The photographic outfit supplied has been of great assistance to me, and many valuable negatives touching upon dairy matters have been secured. From these I have prepared lantern transparencies for lecture purposes. These slides have become an important feature, and their use has enabled me to efficiently illustrate the subject-matter of the lectures.

Bacteriology.—The necessary appliances for carrying out bacteriological examinations of dairy produce have been imported, and the laboratory is now equipped for the work. Cultures have been made from cheese, showing abnormal conditions caused by gas-producing bacteria. These have been photographed, and slides prepared in the usual manner. Examinations of water and milk have also been made, and I am indebted to Dr. G. Sprott for assistance rendered in the examination of milk for *Bacillus Tuberculosis*.

* See my report on black spot, or apple scab, in the *Gazette*, for June, 1900.

Dairy Conference.—I attended the eighth annual conference in Melbourne of the Australasian Butter and Cheese Factories' Managers, in May. After the conference, Mr. G. S. Thomson, N.D.D., Government Dairy Instructor for South Australia, accepted my invitation to visit Tasmania. Mr. Thomson was greatly impressed with the dairying possibilities of the districts visited, and delivered a valuable address to a crowded meeting at Deloraine.

State Schools.—A memo. from the Honourable the Minister of Education, asking that I be permitted to visit the State Schools and deliver elementary addresses on the composition of milk and general dairying subjects, having been referred to me, I have the honour to state that I am strongly in favour of such a course being adopted, and am prepared to take up the work as opportunity offers.

Mileage.—I have travelled during the year, 7793 miles by rail, 1745 by steamer and road, making a total of 9538 miles, and an average of 795 miles per month.

New Factory.—The Western Co-operative Dairy Company commenced operations at Deloraine on the 15th of February, the opening ceremony being attended by the Honourable the Premier and the Honourable the Minister of Agriculture.

I am convinced that co-operative dairying will become firmly established in the near future; but, to acquire and maintain a good reputation for export dairy produce, a more comprehensive scheme of dairy inspection and Government supervision of exports is necessary. I am personally grateful to the press, more especially the Northern journals, for much valuable assistance rendered, and for the practical manner in which they have assisted in furthering the interests of modern dairying generally.

I have the honour to be,
Sir,
Your most obedient Servant,

AUGUSTUS CONLON, *Dairy Instructor.*

To the Honourable the Minister of Agriculture.

REPORT OF POULTRY EXPERT.

Quarantine Station, Brown's River Road.

1st July, 1901.

SIR,

I have the honour to submit a report *re.* my duties as Poultry Expert and Caretaker of Quarantine Station.

I am fully satisfied with the increased interest that is being taken in poultry in the districts visited, which also extends in a less degree to adjoining localities, as attendances have invariably been large. Some of the results of this interest is to be seen in improved fowls sent to the sale-yards, which will still further improve, especially in the north and north-west of the State, where a fair percentage of good stock is to be seen on farms. There is also an increased number of poultry shows and societies, two of which are directly due to my appointment. The parent societies are on a sounder footing, owing to increased support. These encourage the importation of fresh blood, a certain percentage of which must find its way to the farmer.

Experiments were made in the value of poultry manure as against various artificial manures. The value of poultry manure for certain crops has been impressed on farmers. I intend continuing these experiments on a much larger scale this season. Other experiments, various methods of preserving eggs, value of various stones as grit, laws of incubation (a study that is still in its infancy), diseases and their remedies.

Correspondence is a serious call on my time, over 2000 letters having been answered, exclusive of official communications. There has also been 173 articles written on various poultry subjects.

Lectures have been delivered in the following districts:—Launceston, Hobart, and Longford; three agricultural shows were also attended at those places. Poultry shows were attended at Hobart, Launceston, and Franklin; judging was done at the latter show.

Districts Visited.—Bagdad, Bismarck, Beaconsfield (2), Westbury (2), Ringarooma, Devonport (2), Sorell, Franklin, Campbell Town, Clarence, New Norfolk, Frankford (2), Cressy (2), Ulverstone (2), Wesley Vale (2), Forcett, Ellendale, Kempton, Glenorchy, Glenora, Launceston (2), Glengarry (2), Scottsdale, Burnie (2), Sheffield (2), Bream Creek, Queenborough, St. Marys, Wynyard, Forest, Barrington, and Spring Bay.

I would suggest the following helps to the industry:—An Export Produce Act; all other States are grading the poultry they are exporting. The necessity of grading was strongly impressed when shipping poultry for the Royal yacht Ophir. Greater facilities for visiting farmers on their farms, and giving personal advice. Improved arrangements for carriage of eggs from poultry farm to farmers, Southern and East Coast districts to be visited.

Quarantine.—Seventeen head of cattle, twelve sheep, and one pig have entered quarantine at this station. Three heifers calved while undergoing six months' quarantine; calves were hand-reared. At present in quarantine, eight head of Jerseys, three of which are being treated for Warbles.

I am,

Sir,

Your obedient Servant,

ROBERT J. TERRY, *Poultry Expert.*

To the Honourable the Minister for Agriculture.

REPORT OF THE AGRICULTURAL EXPERT.

Hobart, 25th June, 1901.

SIR,

I have the honour to lay before you the report of my first year's work in connection with the Department of Agriculture, commencing from 1st June, 1900:—

LECTURES UPON AGRICULTURE.

Date.	Place.	Subject.	Present.
1900.			
June 30	Bellerive	"Manures"	20 adults
July 11	Ringaroomu	"Soils and Manures"	18 "
" 12	Scottsdale	Ditto	15 "
" 13	Karoola State School (in the afternoon)	"Plant Life"	30 children
" 13	Lilydale (in the evening)	"Soils and Manures"	30 adults
Aug 8	Ellendale	Ditto	20 "
" 9	Glenora	"Farm Crops"	14 "
" 20	Gordon	"Soils and Manures"	12 "
" 21	Woodbridge	Ditto	30 "
" 22	Kettering	Ditto	20 "
Sept. 17	Bismarck	"Manures"	25 "
" 26	Hobart, at Conference of Branch Boards	"Ensilage"	50 to 60 adults
Oct. 13	Adventure Bay	"Soils and Manures"	20 adults
Mar. 14	Bagdad	"Manures"	18 "
April 9	Kempton	"Artificial Manures"	14 "
May 23	New Town	Ditto	22 "

The foregoing lectures were in every case illustrated, as far as possible, by demonstrations and experiments appropriate to the subject-matter, and bearing upon the application of science to agriculture in a practical way. The experiments excited much interest, and the lectures were upon each occasion well received by those present. Questions were always invited at the end of the discourse, and answered to the apparent satisfaction of the audience. Although the number in attendance was not generally large, nevertheless, those present were for the most part representative men, members of the local Branch Board, and the class to profit by the information given. When upon the lecture trips, I visited, as far as time and opportunity served, farms in the several districts, and advised upon the application of manures, and the cultivation of crops. I have since heard that where my advice was attended to good results have followed. In connection with the lectures generally, I would respectfully point out that the lack of an elementary knowledge, which is prevalent in the case of the average farmer, of the scientific terms one is unavoidably compelled to make use of in imparting instruction upon the most vital facts and principles connected with the growth of crops and the proper use of manures, is one of the chief drawbacks to the entire success which might otherwise attend courses of lectures upon agricultural science: in proportion to the degree of education or previous preparation brought to bear upon the subject by those present, so would there be an increased interest and comprehension shown. In several cases, I found the State schoolmaster had devoted much time to the study of agriculture, and appeared to possess a very useful knowledge of it, acquired from reading and practical observation outside. Such men always regretted that no opportunity had been afforded them to attend centres of instruction, where they might acquire definite instruction in elementary science, accompanied by demonstrations and experiments, which they might afterwards reproduce for the benefit of the scholars attending their schools, who would, in that case, when they came to take up with farming on their own account, bring to bear upon their occupation a far better understanding of the principles underlying modern agriculture. For the schoolmasters something on the lines of the vacation classes started in England a few years ago, and with which at one time I had a great deal to do, should be of service.

Chemical Analysis and Laboratory Work.—Some delay was experienced in getting the new laboratory fully equipped to deal with the analysis of soils and artificial manures, owing to the fact that some of the apparatus had to be procured from England.

The first lot of manures I had to deal with were samples of those used in connection with the West Devon potato experiments. So far as the manures were concerned, they accorded satisfactorily in chemical composition with their invoice certificates; and my report upon the composition of the

soil in which the potatoes were planted accorded very well with the subsequent yields. More recently, I have dealt with the samples of manures imported by merchants at Hobart, Launceston, Devonport, and Burnie. Two tabulated statements of these appear respectively in the May and June numbers of the *Gazette*. It will be seen from these that, with one exception, the analyses agree approximately with those given upon the invoice certificates. Owing to the present scarcity of bones in the market, and the prejudice in favour of using them instead of other forms of phosphatic manures shown by farmers, there seems to be a growing tendency with manufacturers to make mixtures containing sufficient bone material to enable the manure to be sold as bonedust, whereas the nitrogen and phosphoric acid contained therein, although agreeing nearly enough with the declared amounts present, may, nevertheless, be derived from other sources than bones, and possess an action very distinct from the same substances when contained in the latter. As this point has been under consideration by a Committee of the Council, and is awaiting further elucidation, there is no occasion to enlarge upon it at the present stage, except to state that several samples with which I had to deal in making the analyses for the Department fully bore out in their composition the facts alluded to in the foregoing.

In addition to the analysis connected with manure inspection, I have had sundry samples of soils and manures sent in by farmers; also lime, a boiler incrustation, and the sediment from a sheep-dipping apparatus, in which the arsenic had become too concentrated, and had done injury to a valuable stud sheep. I am at the present time dealing with some soils sent in from the New Town district, where I lately lectured.

Agricultural Gazette.—It was stipulated when I first took office that I should contribute an article per issue of the *Gazette* upon Agriculture. This I have regularly done, and also one upon Arboriculture, a subject with which I am qualified to deal.

Office and Outside Work.—I have regularly assisted with the clerical work of the Department of Agriculture whenever my duties connected with the Laboratory and Lectures have permitted of my doing so. I also attended the planting and manuring of the West Devon potato plots, and the West Devon Produce Show, where I assisted in the judging and in the working-out of the yields of potatoes in the competition connected therewith.

In December last, I inspected the ensilage stacks of Mr. W. E. Shoobridge and Mr. C. W. Fysh, at Macquarie Plains, taking temperature, &c. Samples of ensilage have been recently brought into Hobart by Mr. Fysh, the quality of which was excellent, proving the success of the experiment, which it is intended to carry out on a much larger scale in the coming season.

I have the honour to be,

Sir,

Your obedient servant,

HENRY J. COLBURN, *Agric. Expert.*

To the Honourable the Minister for Agriculture.