Ayrshire Cattle at Moumahaki Experimental Farm.]

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PLANT SELECTION AND BREEDING.

THE RUAKURA OAT.

PRIMROSE MCCONNELL.

THE Ruakura oat—the rust-resistant variety bred from a selected head of the Argentina oat in the year 1908 by the Horticulturist of the Farm, Mr. A. W. Green—is now being produced on a scale sufficiently large to enable it to be tested for disease-resistance on a practical scale under varying soil and climatic conditions throughout the Dominion. Five acres have been cropped this season, which have given a return of 90 bushels of first-grade seed and 9 bushels of second-grade to the acre, the progeny in four years of half the result of a single head selected from the growing crop of Argentina oats for its disease-resistant power. Besseler's Prolific oat (note the name), growing under similar conditions to the New Zealand resistant oat, has only yielded 25 bushels per acre.

That the Ruakura oat is rust-resistant, as far as Ruakura experience of it has gone, is undoubted. More than this, during the four years of its existence no sign of smut or root-fungus has made its appear-

The Ruakura Oat, and its Originator.

ance on it, this while two other varieties growing in the same field and alongside it were affected with rust, smut, and root-fungus, the last-named disease being particularly bad. It stood the test of six days of exceptionally wet, muggy weather without any perceptible change in the bright colour of the straw and seed-head, while the other varieties in the paddock were turned almost black. The test was an undoubtedly severe one, and speaks volumes for the constitutional power of the new oat. It is particularly gratifying that this farm has produced a definite rust-resistant oat, as the several oats from abroad claiming to be resistant proved under test at Ruakura to have here none of the resistance claimed for them.

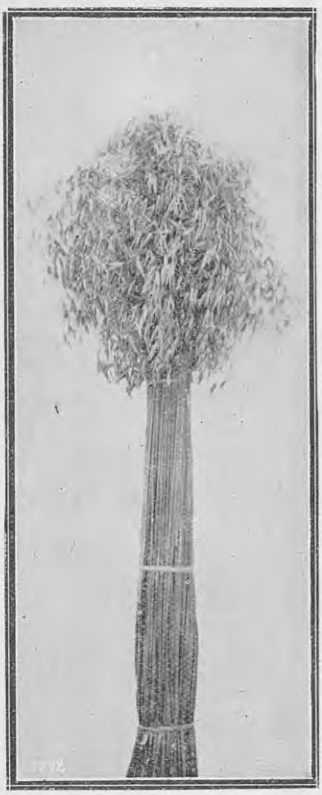
Slightly grey in colour, the oat is thin-skinned and is of fine quality, the bushel weight — the true test of value—being 46 lb. The heavy-weighing oat has naturally a good kernel. Though the quality of the oat is satisfactory, it can be improved from this viewpoint; indeed, selection to this end is now claiming the attention of the originator, Mr. Green. The quality of this season's product exhibits a decided improvement on that of last season, by reason of only carefully selected grain being used for last year's seed.

The history of the Ruakura oat is best told by Mr. Green himself, as it is he alone who has been responsible for this important evidence of the value to the agricultural world of the work of the plant-breeder. Mr. Green reports,—

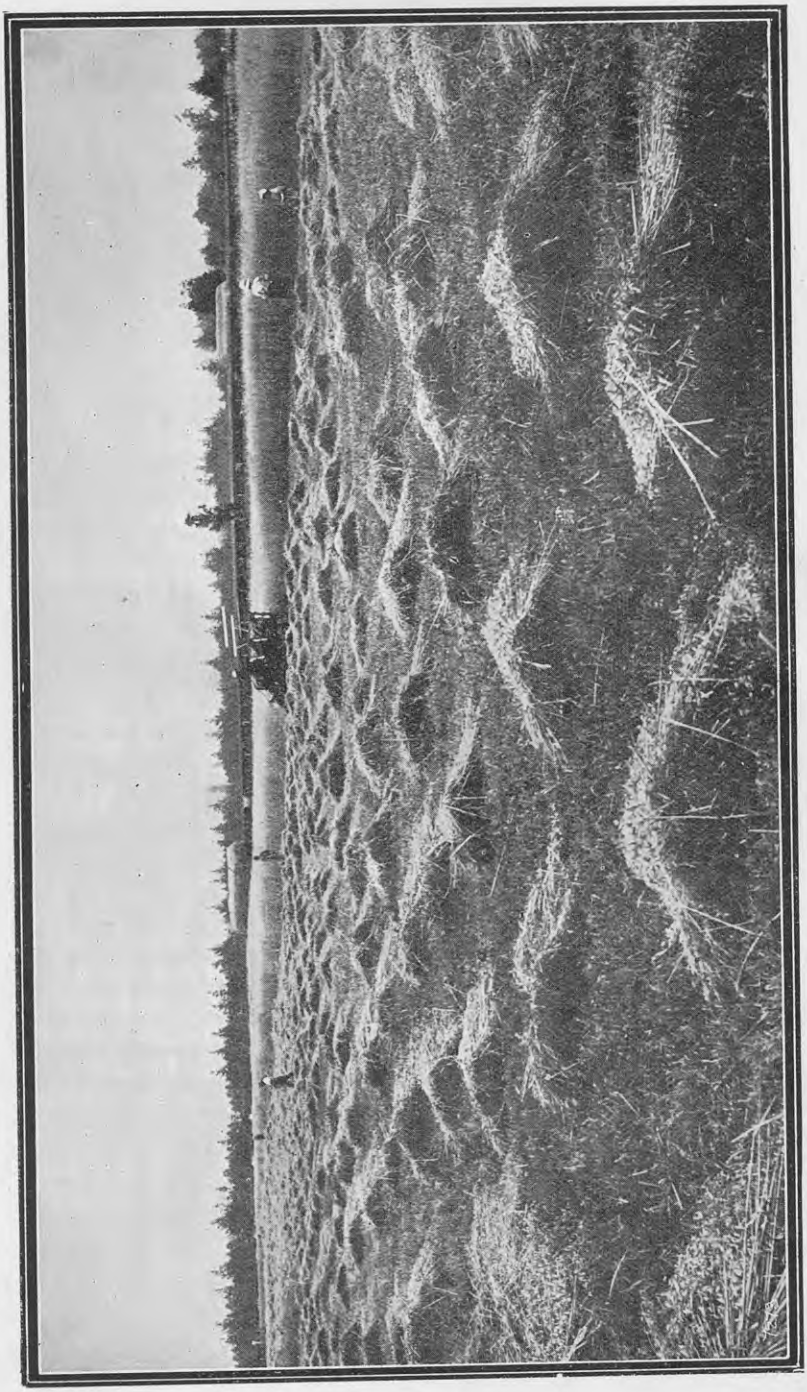
"Under instructions from the Director, Mr. E. Clifton, to make selections from Algerian, Argentina, and Red Rust-proof oats, in order to discover if a more highly rust-resistant oat could be obtained—these three varieties being less affected by rust than the remaining twenty-four varieties tested at Ruakura in the 1908 season—the work of selecting oats for rust-resistance was initiated. A previous attempt had been made to select for increased yield, but the result was nugatory, owing to all the varieties under test being rendered useless through rust. It was this experience that caused attention to be directed to selection for rust-resistance. In December, 1908, 1,050 single-head selections of the above three types were made, and were sown on the 15th September, 1909. Of these selections only seven were retained for continuance at the harvest on the 8th January, 1910. The seven selections were again sown separately, and out of these the foundation of the present strain, known as Ruakura Rust-resistant, was chosen. All along this one exhibited the strongest powers of rust-resistance.

"The crop from the single head reaped on the 2nd January, 1910, gave a yield of 376 heads, weighing, with 2 ft. of stem attached, 4 lb. 6 oz. The next year's test took the form of sowing half of this quantity and surrounding it with Tartar King oat, the most susceptible variety to rust at Ruakura. The remaining half of the 376 heads were reserved in case of a bad season destroying the selection sown. The sheaf of these heads is here illustrated. The following season seed-samples were distributed for testing in other districts, and the remainder of the seed, 12 lb., was sown on the 8th September, 1911, the resulting crop, harvested on the 23rd January, 1912, giving a yield of 16½ bushels. This was sufficient to sow 5 acres this year, not counting the grain contained in eight sheaves reserved for shows and 4 bushels distributed to other experimental farms and the Fields Instructors. From the 5 acres 90 bushels of firsts and 9 bushels of seconds per acre have been obtained.

"It has never been claimed that the new oat is absolutely rust-proof. What can be claimed is that it is the most resistant to disease of all the varieties tested at Ruakura."



HALF OF THE ORIGINAL 376 HEADS.



4. *W. Green, photo.*] Harvesting this Season's Crop of the Ruakura Oat.

FORAGE FOR DAIRY COWS.

T. W. LONSDALE.

A QUESTION which often proves perplexing to the dairy-farmer, and one which requires serious consideration, is how to provide a supply of early spring forage for in-calving cows. The subject is of vital importance, as each spring numbers of cows drop their calves before the ordinary pastures are producing more than sufficient to maintain life. At such times the value of artificial feeding is inestimable. Numerous crops are well adapted for supplying the dairyman's requirements, and the virtues of several have already been expounded by the writer.

A plant which has not received the attention it merits for this purpose is chou moellier, though it has formed the subject of numerous favourable reports. As forage for dairy cows it probably excels.

An important experiment in this connection has been conducted at the Moumahaki Experimental Farm, the primary object of which was to test the value of various forage crops for fattening lambs for the early market. On the 29th March, 1912, several acres were sown with rape, Buda kale, thousand-headed kale, silver-beet, and chou moellier. The seed was sown on ridges 26 in. apart, and the plants were afterwards singled to, roughly, about 15 in. apart. The crop was horse-hoed late in the autumn and during the early spring, but very little cultivation could be given owing to continuous rains. With the exception of silver-beet (which was sown at the rate of 6 lb. of seed per acre) the other varieties of forage received 3 lb. seed per acre. The manure, $3\frac{3}{4}$ cwt. per acre, was similar throughout, being basic superphosphate, 3 cwt.; sulphate of potash, $\frac{1}{2}$ cwt.; and nitrate of soda, $\frac{1}{4}$ cwt.

Chou moellier produced the heaviest crop, and on the 16th September, when stocking commenced, the approximate yield was 20 tons per acre. It was not so readily eaten as rape, though as cow-feed it certainly appeared pre-eminent.

Considering that chou moellier thrives during the winter, is easily cultivated, transplants readily, and gives a wealth of feed during the early spring, it will amply repay the farmer to give it a trial next autumn.

A SWEDE EXPERIMENT.

CO-OPERATIVE TEST AND CHEMICAL ANALYSES.

TWENTY-EIGHT varieties of swede turnips, grown under the co-operative experiment scheme, and superintended by Mr. A. Macpherson, officer in charge of co-operative field experiments in the South Island, were submitted for analysis to Mr. B. C. Aston, Chief Agricultural Chemist. These were grown on the farm of Mr. Joseph Smith, Stirling. All varieties were sown on the 2nd November, 1911, on soil uniform in character. They were treated alike as to cultivation and fertilizers applied, and were harvested on the 25th July, 1912.

Mr. Aston reports as follows: "Each individual root was analysed for percentage of dry matter. The roots were arranged in classes according to weight, the average percentage of dry matter in each class being given. The percentage of dry matter is considered to be a correct index of the feeding-value of the turnip."

In the report giving results of the analyses the Agricultural Chemist gives in each variety the average weight of roots, the number of roots, and the mean dry matter. For the purpose of reference, however, this has been extended by giving the average dry matter per cent. in each, and placing each variety in order according to that percentage. The yield of roots per acre is also given, with the total dry matter per acre in tons which such yields gave.

ANALYSES.

Variety.	Average Weight of Roots, in Pounds.	Number of Roots.	Mean Dry Matter per Cent.	Average Dry Matter per Cent.	Yield of Roots per Acre, in Tons.	Total Dry Matter per Acre, in Tons.
Sutton's Queen	6½	6	12·2			
	5	14	13·1			
	4	9	13·3	13·03	38·63	5·03
	3	4	13·5			
Montgomery's Skirvings, Purple-top	8	3	12·1			
	7	3	12·1			
	6	5	12·5	12·97	55·22	7·16
	5	7	13·1			
	4	21	13·3			
Nimmo and Blair's John Bull ..	6	11	12·3			
	5	16	12·5			
	4	19	13·2	12·77	43·53	5·56
	3	3	13·3			

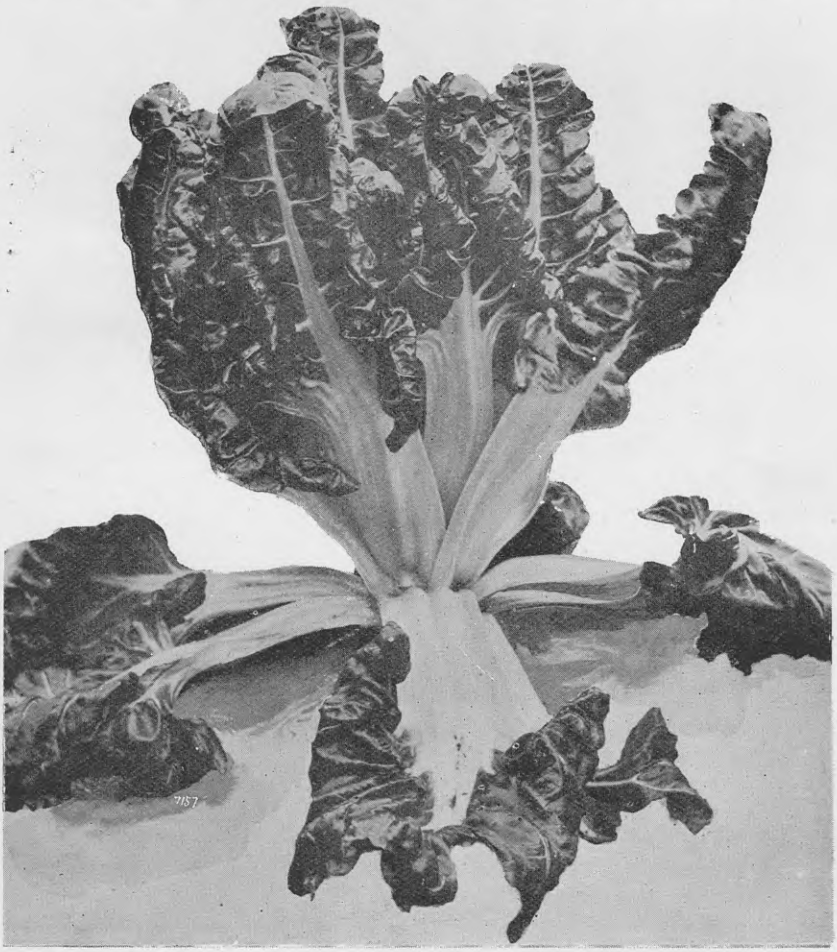
Variety.	Average Weight of Roots, in Pounds.	Number of Roots.	Mean Dry Matter per Cent.	Average Dry Matter per Cent.	Yield of Roots per Acre, in Tons.	Total Dry Matter per Acre, in Tons.
Hurst and Son's Perfection ..	7	6	12·4			
	6	6	12·4	12·73	41·35	5·26
	5	13	13·0			
	4	9	12·8			
Hurst and Son's Kangaroo ..	8	3	12·0			
	7	4	12·2			
	6	10	12·9	12·73	38·63	4·91
	5	18	12·8			
	4	14	12·0			
Garton's Green Tankard ..	8	3	12·0			
	7	3	12·5			
	6	12	12·3	12·57	43·25	5·43
	5	10	13·2			
	4	17	12·8			
	3	5	11·6			
Garton's Pioneer	8	3	12·0			
	6½	5	12·3			
	5	15	12·6	12·53	42·71	5·35
	4	15	12·6			
	3	9	12·6			
Webb and Son's Imperial ..	7	8	12·4			
	6	6	11·8			
	5	8	12·5	12·47	40·80	5·08
	4	9	12·9			
	3	5	12·6			
Hurst and Son's East Lothian..	8	4	12·4			
	7	11	11·8			
	6	18	12·2	12·36	38·90	4·84
	5	21	12·5			
	4	11	12·9			
	3	5	12·4			
Garton's Perfection	8	4	11·7			
	7	4	12·1			
	6	4	12·0	12·31	46·52	5·72
	5	13	12·4			
	4	9	12·4			
	3	10	12·6			
Garton's Victory	8	3	12·3			
	7	3	12·0			
	6	7	12·3	12·19	41·35	5·04
	5	16	12·0			
	4	17	12·1			
	3	4	13·2			
Garton's Model	7½	5	11·1			
	6	19	12·3			
	5	12	12·3	12·14	39·99	4·85
	4	16	12·0			
	3	8	12·5			
Webb and Son's Giant King ..	7	7	11·8			
	6	8	12·1			
	5	6	12·3	12·11	44·07	5·33
	4	3	12·5			
Hurst and Son's Select Monarch	8	8	11·4			
	7	10	12·1			
	6	10	12·1	12·10	39·71	4·80
	5	16	12·4			
	4	6	12·3			
Hurst and Son's Best of All ..	6	6	11·3			
	5	16	12·4			
	4	9	12·0	12·08	46·79	5·65
	3	3	12·2			

Variety.	Average Weight of Roots, in Pounds.	Number of Roots.	Mean Dry Matter per Cent.	Average Dry Matter per Cent.	Yield of Roots per Acre, in Tons.	Total Dry Matter per Acre, in Tons.
Hurst and Son's XL All ..	8	4	12·2			
	6	8	11·8			
	5	7	11·7	12·02	44·88	5·39
	4	13	12·1			
	3	5	12·5			
Garton's Keepwell	7	4	11·9			
	6	8	11·6			
	5	7	11·8	12·01	43·25	5·19
	4	8	12·3			
	3	6	12·5			
Sutton's Champion	6	7	11·6			
	5	19	11·8	12·00	39·44	4·73
	4	17	12·3			
	3	4	12·4			
Garton's Cropwell	7	3	12·2			
	6	10	11·6			
	5	14	12·0	11·99	40·26	4·82
	4	16	12·2			
	3	5	12·0			
Sutton's Elephant	7	5	11·4			
	6	5	12·1			
	5	19	12·0	11·97	50·87	6·08
	4	9	12·1			
	3	5	12·1			
Sutton's Magnum Bonum ..	8	5	11·8			
	6½	18	11·7			
	5	14	12·2	11·95	35·63	4·25
	4	10	12·0			
	3	9	12·1			
Webb and Son's New Empire ..	7	6	11·1			
	6	10	11·9	11·87	39·34	4·68
	5	9	12·2			
	4	10	12·0			
Nimmo and Blair's Standard ..	6	10	11·5			
	5	12	11·8	11·80	41·35	4·87
	4	10	12·1			
Garton's Incomparable ..	8	3	12·3			
	7	3	11·6			
	6	6	11·9	11·78	52·23	6·15
	5	5	11·4			
	4	10	11·8			
Webb and Son's New Buffalo ..	7	7	11·5			
	6	8	11·7			
	5	14	11·8	11·72	42·16	4·94
	4	10	11·9			
	3	8	11·6			
Hurst and Son's Lord Derby ..	8	3	10·2			
	7	7	12·0			
	6	9	11·5	11·67	43·52	5·07
	5	11	11·8			
	4	6	11·9			
	3	5	11·9			
Sutton's Crimson King ..	8	5	11·3			
	7	11	11·5			
	6	5	11·5	11·66	43·80	5·10
	5	12	11·8			
	4	8	11·6			
	3	7	12·1			
Garton's Superlative	6	4	10·5			
	5	15	10·8	10·97	38·90	4·26
	4	13	11·3			

THE GREAT WHITE OR SWISS CHARD BEET.

PRIMROSE MCCONNELL.

THE specimen shown in the photograph is one of the white beets selected by Mr. Davies, Wellington, from the ordinary strain of silver-beet for its superior leafstalk, and was grown at Ruakura Farm of



Instruction. It is a biennial plant, differing from the red beet in having a smaller and much-branched root, instead of a large fusiform fleshy tap-root. It has larger leaves, with thick succulent leafstalks, having strong white ribs and veins. It is cultivated in gardens

entirely for the leaves, which are boiled as spinach, and for the leafstalk, which, when separated from the lamina of the leaf, is cooked and eaten as asparagus under the name of "chard."

It is not every one who cares for this vegetable, but some prefer it to cabbage; being more easily cultivated, it affords a winter supply of an excellent substitute for that vegetable. A sowing should be made annually, for, although the plant is biennial, it runs to seed during the second year, and leaves gathered from the shots or shoots are of poorer quality than the first radical leaves.

Experiments are at present being carried out at Ruakura to test its value as a stock-food, which, if successful, will bring it into general use on all sheep-stations on account of its being so easily grown.

It will adapt itself to various soils and climates, and will stand feeding off several times in a season.

POTATOES AT RUAKURA.

A. W. Green.

This season's potato crop at Ruakura Farm of Instruction is the most even and the healthiest crop yet grown. This success, I believe, is mainly due to selection of seed, while the better-constructed potato-shed, for storing tubers during winter, has no doubt assisted in improving the crop. With the object of securing the best seed for planting, the following methods were adopted for storing, sprouting, and selecting the tubers. The tubers were placed in shallow boxes, so that a current of air could pass between them, and all be exposed to light. The light had the effect of turning the tubers green, thereby keeping them firm, and preventing untimely sprouting. Finally, with good seed, it produced strong, sturdy sprouts. A good opportunity for selection was afforded when these sprouts were developing, for at this period weak sets can be detected by their weak eyes; and weak-eyed sets should never reach the potato-field. It is often due to these that a light crop is obtained, and the seed sample for next year is thereby ruined. A few of the varieties which are showing up above the average at Ruakura are Gamekeeper, Irish Queen, Commercial, Up-to-Date, Northern Star, Sutton's Bountiful, Conquest, Daniel's Sensation, and Gold Coin. The last-named variety was the first to come into flower, and, although it cannot be called a first early, it has the advantage of quickly maturing its crop. One spraying has been applied, and the crop is free from blight.

WESTERN WOLTHS GRASS.

AT Ruakura three acres were sown with the above grass on the 14th May, 1912, and, although the winter was wet and some of the land in question naturally so, the first crop averaged 15 tons per acre of green forage. The grass was fit for cutting on the 7th October. It was carted out to horses and cattle (including milk cows), and it was relished by all the stock. The milking-cows maintained their flow of milk well while being fed on it. The second crop was allowed to ripen for seed, and has been reaped with the binder. Had this been required for green forage, it was available for that purpose on the 1st December, with an average weight of 12 tons per acre. Provided the weather is reasonably moist, a good third crop of green fodder should be available in a few weeks' time. The great drawback to this grass is that it removes so much fertility from the soil, and under New Zealand conditions its cultivation should be confined to strong soils. It is an annual. If sown in May it undoubtedly comes in at a time when there is often a scarcity of feed; but a crop of, say, oats and tares, or, say, barley and tares, could be available at the same time and would be better fodder and much better for the soil. Possibly the best use to which this grass can be put is to feed it off in its young stage with lambs or sheep, netting the paddock off in plots so as to allow the fed-off plots time to recover. The western wolths undoubtedly grows a much greater weight per acre than the ordinary Italian rye-grass.

LUCERNE.

SINCE cutting the plots on the 23rd October the rate of growth has been variable with the several varieties. Arabian and Peruvian outgrew all others during the first three weeks. Since then Hunter River and Colonial have gained on them, so that now Colonial is heaviest. American made greater growth during this month than in any previous month dating from sowing. Turkestan remains dwarf, resulting in the lightest crop. Plots testing what results can be obtained from single lucerne-plants have been laid off. In conjunction with these are tests to judge what benefits may be derived by using highly nitrogenous manures to lucerne and leguminous crops, also to compare soil-inoculation *versus* no inoculation *versus* stable manure. All the new strains of lucerne received were sown in these plots. Without exception the germination was over 90 per cent. Since appearing above ground the seedlings started away strongly, and a good stand of each new variety is assured.—*A. W. Green, Overseer of Orchards and Gardens, Ruakura Farm of Instruction.*

HOME SEPARATION.

CARE OF CREAM ON THE FARM.

G. M. Valentine.

It is a well-established fact that the quality of the manufactured article depends principally on the character of the raw product, and this applies with special force to cream separated on the farm and delivered to a distant manufacturing centre, often at infrequent intervals. Further, it has been conclusively proved that good butter can be made from gathered cream, if this has been carefully handled and delivered in a good condition to the factory. Given a daily delivery of well-cared-for cream, it is possible to make just as good butter under home separation as under the whole-milk principle; but as this is not always possible—in fact, the system is generally in operation where transit difficulties make a daily delivery impracticable—the necessity for care on the part of the farmer in the handling of the cream is seen to be a vital consideration in the success of the undertaking.

Cleanliness essential.

If there is one principle more than another which should be emphasized in the successful handling of cream it is that of cleanliness. With milk and all its products this is the great secret of success, and the farmer separating his own cream should paste this fact in his hat if he would succeed in producing the best article and thereby afford the factory-manager a chance to turn out a first-grade butter. Let it always be remembered that it is the first-grade article that brings the first-grade price, a fact particularly emphasized this season. Conditions on all oversea markets have enabled buyers to discriminate more strongly than in the past between first and second qualities. It therefore behoves the farmer who is unable to make a daily delivery of his cream to take such care of it that he will be able to land it at the factory in the best order possible under the circumstances.

The general principles laid down in regard to handling milk on the farm under the whole-milk system apply with equal force where home separation is in vogue. Having produced a clean milk, this should be at once removed to the separating-room, never under any circumstances being separated in the milking-shed. A special room should be provided for the separation, at least 30 yards from the milking-shed, and it should be located on the windward side of the shed. This should never be used for any other purpose. It should have a concrete floor, be

provided with good drainage-facilities, be well ventilated, and be furnished with a good supply of water both for cooling and washing purposes.

COOLING THE CREAM.

If possible, separating the cream should be carried on simultaneously with the milking process, as the cleanest skimming is obtained when the animal-heat is in the milk. An efficient cooler should be provided, in order to reduce the cream to the lowest possible temperature. As the amount of water required to cool the cream is comparatively small, this should present no serious difficulty. It is also advisable to provide a trough of cold water, preferably running, in which to stand the cream-cans, in order to maintain their contents at a reduced temperature. Should a satisfactory supply of water for a cooler not be available, the trough system will have to be depended on, and the cream frequently stirred to reduce the temperature. The stirring is necessary in any case to break up the froth which collects on the surface of the cream. For this purpose nothing is better than the perforated plunger generally used in factories. Being made of metal it is easily kept clean. It is not to be thought that, where cream is delivered daily to a factory, the cooling is unnecessary. I have sometimes seen cream delivered every day, but which had been carelessly handled, arriving at a factory in a worse condition than a two days' supply which had been handled with every care and had been effectively cooled.

Under no circumstances should cream from one skimming be mixed with that from another skimming, unless it has been previously well cooled, as this is one of the causes of that worst of all defects in home-separated cream known as the "fermented" flavour. The most unsatisfactory of all suppliers to the home-separation factory is he who places a can under the separator and does not touch it again till it has received the cream from several milkings, neither stirring nor cooling, the cream being thus held at the very best condition for the development of acidity and of undesirable flavours. While held on the farm the cream-can should be covered with a light cheese-cloth to keep out dust, and this cloth should be thoroughly washed and then dipped in boiling water each time it is used.

THE SEPARATOR.

On the care of the separator largely depends the success of home separation. Unless this is kept sweet and clean it is impossible to secure the cream in a sound state. Thorough cleaning after every time of use is imperative—not merely the running through the machine of some hot water, but the dismantling of the machine and the effective cleansing of all the parts. The idea that it is not necessary to wash the machine more than once a day is entirely wrong, and if practised will invariably cause rapid deterioration of the cream.

Having finished separating, first wash the various parts of the machine with warm (not hot) water to which has been added a little washing-soda or a reputable cleansing-powder. A brush should always be used in preference to a cloth, which rapidly becomes unsanitary. Thoroughly scald with boiling water, and place to air, preferably in the sun but in a sweet atmosphere, until again required. With this process no drying is necessary.

Cream-cans.

It is very necessary that the cream-cans should be thoroughly cleansed and scalded. Although in the majority of cases the cans are washed at the factory, it is most desirable that they should be cleansed again before being used, and the method advised for the separator applies also in this case.

Carriage of the Cream.

Having taken every care to produce a well-conditioned cream, it is necessary to see that it is handled in transit in such a manner that it will arrive at the factory in the same good order. If left on the roadside to be picked up, it must be protected from the sun by any simple means, provided it is effective. The farmer's interest in his cream should not end at this point. He should see to it that the same care he has taken with it on the farm will be exhibited by the men responsible for its conveyance to the factory. Bad flavours are frequently developed by reason of the sun striking on the unprotected can.

Payment according to Quality.

The care of the cream throughout all stages of production and handling is a vital matter to the farmer. In the majority of home-separation factories in this country to-day the one price is paid for all grades of cream, a practice much on all-fours with the old unsatisfactory system of paying for milk by the gallon. But the day is near at hand when cream will be paid for according to the condition in which it reaches the factory as well as for its butter-fat content. The men who handle their cream properly should assuredly be recompensed in money value for their trouble, just as the men who fail to realize their duty in this connection and thereby reduce the market value of the factory's output should be penalized.

The First and Last Word.

There is one word of advice on this subject which cannot be repeated too often; it is the first and the last word on the successful handling of dairy-products, and it is the secret of success at the present advanced stage of the industry just as it was when the dairy-farmer and butter-maker were working under the most crude conditions. This all-important word is CLEANLINESS.

BROOM OR CLOVER RAPE (OROBANCHE MINOR).

A. HUGHES.

THERE are several species of broom-rapes, but the only one naturalized in New Zealand is the lesser or clover broom-rape, *Orobanche minor*. As I have had several inquiries about it, and have seen it in paddocks of clover in the North Canterbury district, it may interest farmers to know something about it, or enough to identify it if found in their fields. This parasitic plant is destitute of green-colouring matter, and so, unlike green plants in general, is impotent to manufacture sugar and starch from carbon-dioxide and water to meet its food requirements. Broom-rape is wholly a parasite, and becomes a robber of other plant-life. The seed is sometimes sown accidentally with clover, and when it germinates becomes attached to the roots of the crop. To get command of the food in the plant to be robbed the parasite has a special tool called a sucker, which is inserted into the root of the host plant. Owing to this peculiar mode of attack it is commonly called a root parasite. Once the robber gets command of the food resources of a plant it immediately turns them to good account, for it transforms them into a corpulent underground body called the tuber, from which proceed the roots, or suckers, that attach themselves to the clover. The stem is erect and fleshy, bearing small colourless pointed scales instead of leaves. It is from 8 in. to 12 in. high, and is at first a yellowish-brown colour, turning darker in shade as it grows older. At the free end it bears flowers of a dirty-white colour. These produce oblong capsules full of numerous minute seeds of a dark colour. To prevent the attack of the broom-rape the seed of the red clover must be absolutely free from the seed of the parasite. If any spot in the clover-field shows signs of the parasite the plants there should at once be dug out and burnt, to prevent seeding. On no account should broom-rape plants be allowed to seed.

NOTE BY A. H. COCKAYNE.

The broom-rape (*Orobanche minor*) is, in Europe, looked upon as a very serious clover-parasite, and is said to cause wholesale destruction in fields that are devoted exclusively to clover-growing. It is especially detrimental in those clover crops that are grown for seed.

Where present it is said to seriously diminish the yield of seed and to lower its quality.

In New Zealand it has been naturalized for many years past, and in certain localities is excessively abundant. There are fields in the Auckland District where nearly every clover-plant appears to be affected, and the whole ground is thickly studded in the early summer with the thick erect brownish-red asparagus-like shoots of the parasite. After the broom-rape comes into flower the stems, which hitherto have been fleshy, dry up, and all the aerial portions die away, fresh shoots being again developed in the following year. It is very peculiar that no complaints have ever been received that the broom-rape injures the vitality of the clover-plants to any appreciable extent. I have specially studied this parasite in the Auckland District, where it appears to be spreading rapidly, and is now everywhere to be found, but have not noticed any appreciable difference in the vitality of affected and unaffected plants. When it is considered that the whole of the food-supply necessary to produce the broom-rape, which is quite a large plant compared with the size of the host, is derived from the plant on which it is parasitic, it would appear that the drain on the affected plants should result in a very serious diminution in their vitality. In general, however, affected clover-plants appear to be quite vigorous, and in no cases have plants been seen whose death could be attributed to this parasite. Nevertheless it seems incredible that clover-plants can be made to provide all the food necessary for the development of the broom-rape without considerably impairing their yield. Sweet-peas attacked by broom-rape have been frequently received, and in all these cases a serious diminution in growth had resulted from the attack. Again, last year in the Wairarapa a crop of affected parsnips came under my notice, and the development of the roots of all the affected plants was seriously interfered with, finally resulting in considerable distortion.

From the above it can be seen that the question of the seriousness of broom-rape in New Zealand is a debatable one, and the opinions of farmers who may have had experience of this parasite in their pastures would be especially valued. No attempt is made in New Zealand to prevent the seeding of this weed parasite—a matter of great importance if it is shown that it really causes any harm.

Distribution in New Zealand.

Broom-rape is exceedingly abundant throughout the whole of the Auckland Province. It is also common in Taranaki, but further south is comparatively rare. In Canterbury it has been naturalized for many years in odd localities, but does not appear to be spreading.

No specimens from Otago or Southland have as yet been received by me.

Host Plants in New Zealand.

Broom-rape has been recorded on the following plants in New Zealand: Red clover, alsyke, white clover, birdsfoot trefoil, trefoil, burr clover, sweet-peas, parsnips, hawkweed, dandelion, and cats-ear.

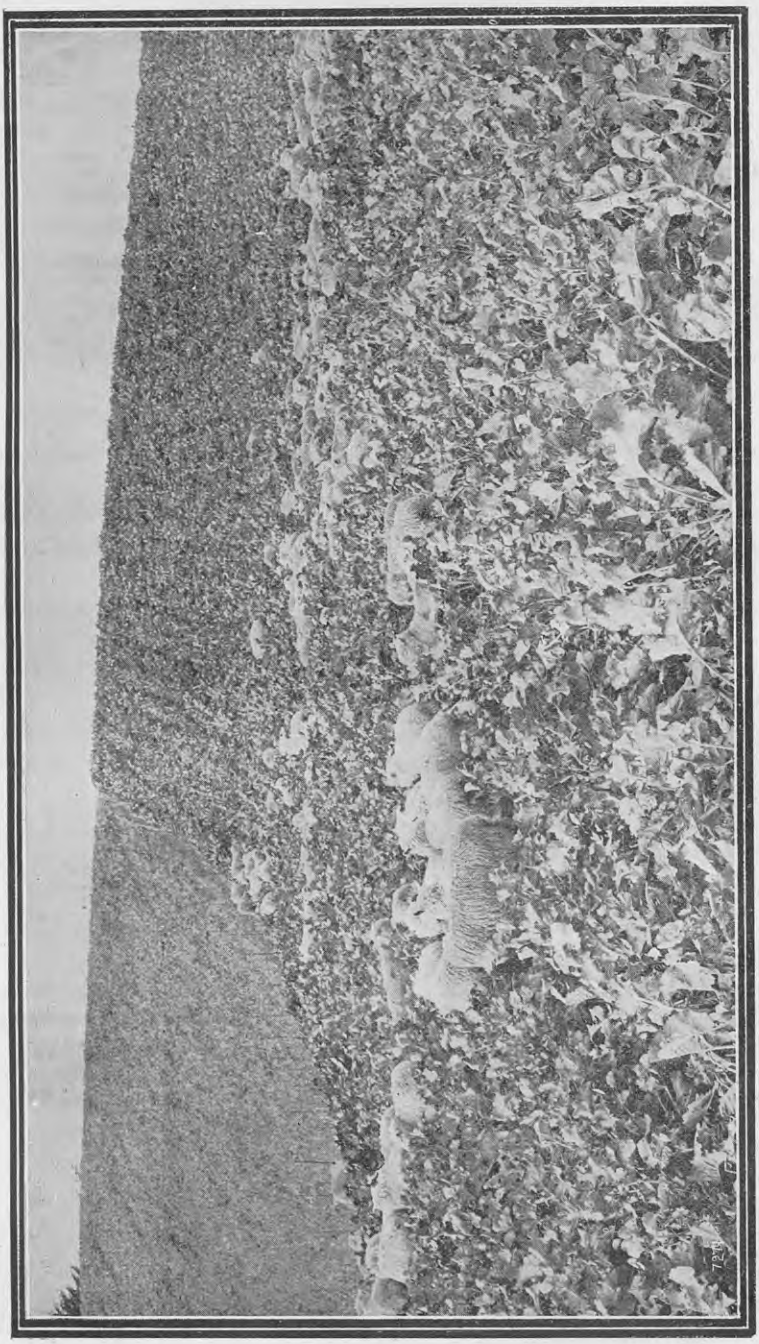
Seed-dispersal.

In many agricultural books it is suggested that broom-rape is regularly distributed in clover-seeds. This is very unlikely, as the seed is so small that it is almost impossible for any to remain in clover-seed even if this seed is very imperfectly dressed. Perceval records finding broom-rape in clover-seed, but the seed-station at Zurich during thirty years never noted it in any commercial samples. In our own seed-testing no broom-rape has ever been found in any samples that have been submitted for examination. The seed is exceedingly minute, being amongst the smallest of any seeds belonging to the flowering-plants. In consequence, it can be easily transported great distances by the wind. I hold that animals must play a very important part in the disposal of broom-rape, as the seeds can easily be carried about in the wool and hair of animals that graze on areas where this plant is at all abundant.

THE SOYA BEAN.

A MEDICAL point of view is given in the *Lancet* of the 21st January, 1911: "On account of the great nutritive value of the Soya bean it is well worth medical attention, more particularly for diabetic cases, because of its low proportion of starch. For making biscuits, soup-powder, infant and other foods, it will be widely used in future when its dietetic value becomes better known." In the United States it has been found that the yield of crops of all kinds is increased where they follow Soya beans, wheat in large fields showing an increase of 5 bushels per acre over that grown on land alongside that had not been under beans. Wheat generally follows a nitrogenous crop in the usual rotation schemes on the Continent. As a fodder crop, as a soil-renewer, and as a green manure, the Soya bean has been successfully grown in countries other than its native habitat, and under varying climatic conditions. There are over three hundred known varieties and hybrids of the Soya bean.—*Journal of Agriculture, Victoria.*

The successful farmer knows his soil, his seed, and his manure.
He does nothing by guesswork.



Sheep on the Rape Crop at Moumahaki Experimental Farm.

DAIRYING.

WINTER FEEDING AND, INCIDENTALLY, SOME REMARKS ON THE GENERAL TREATMENT OF THE DAIRY COW.

PRIMROSE MCCONNELL.

THE feeding of the dairy cow is of the greatest importance, and it is essential that every dairy-farmer give the matter careful study in order to determine the system which is most suitable for the locality in which he is farming—a system which should be designed not merely with the object of producing the highest results regardless of cost, but one which will produce the maximum of result at a minimum of cost.

Before touching on the food question I would just like to say a little on one or two other points which in my opinion are of the utmost importance in the successful management of the dairy herd. I consider the first question every dairy-farmer should ask himself is, " Do my cows pay for all the food they consume and yield a little profit as well, or are some of them merely ' boarders ' ? " When we take into consideration the fact that in New Zealand the average butter-fat yield per cow per annum is only about 160 lb., it is easy to realize that a very large number of cows are being kept at an absolutely dead loss to the farmer, and that in many instances the profit realized from cows of high milking-capacity is completely wiped out by the loss incurred through keeping " boarders." It is also important to grasp the fact that no amount or kind of extra feeding will make the " boarder " pay—in fact, the more she is fed the greater will be the loss; while, on the other hand, the cow of great milking-capacity will give a good return for liberal treatment in the matter of feeding. Now, the only way which will enable the farmer to determine between the profitable and the unprofitable cow is by the use of the scales and the Babcock or other tester; and, depend upon it, the use of these will afford many a surprise, as it will be found that the cow or cows which previous to testing were considered to be the best may prove to be second-rate only—indeed, much inferior to others which may have been set down as being the least profitable of the herd. Speaking from my own experience, I am also quite certain that as soon as testing is commenced the interest in the herd increases; and the same applies to employees, if they are worth their salt. The farmer will then find himself more

willing to carry out by every means within his power that which will tend to produce a good all-round result; in fact, it will make dairying a much greater pleasure to him than it previously has been. As soon as the "boarders" have been detected, cull without mercy. Perhaps the farmer may plead that he cannot buy other cows to fill their places; but is he not better off with twenty cows, all of which give a good profit, than with forty, twenty of which are kept at a loss? and, as I previously stated, the loss on the one half may completely wipe out the profit on the other half.

Many farmers do not know whether their cows are being worked profitably or not; many say that it is too much trouble to keep records, and that it does not pay for the time spent over it. On the other hand, every farmer who has tested his cows and culled the unprofitable ones knows that it does pay and that it is very little trouble. It is blind policy to simply total up the proceeds at the end of the season and divide the result by the number of cows; it gives no idea whatever of the possibilities of a herd.

Perhaps one of the most important questions a dairyman can ask himself is, "In the matter of breeding am I adopting the best means of building a high-class herd?" One thing is very certain—you cannot afford to buy scrub bulls at so-many shillings per leg. When you have made an independent fortune you can afford to indulge yourselves in that direction, but not before. Whether you have to beg, borrow, or steal him, procure a high-bred sire from a well-known milking strain, and you are on the direct road to success. I am not advocating any special breed—that is for the farmer to decide; but I do advise, once a breed has been chosen, to stick to it through thick and thin. No good permanent result has ever been obtained through crossing and recrossing—it is the direct road to the Bankruptcy Court; and in my opinion it is much easier to improve a breed than to manufacture one. We are in no need of new breeds; but we are in great need of more good individuals of the existing breeds. It may be better to have a good animal of unknown breeding than a common pedigree animal, but it is a fact that in order to produce the best animals we must stick to some one breed and use sires of the desired type of this particular breed continuously. When it has to be admitted that, even when exercising the greatest care in the choice of a sire, the results are sometimes disappointing, it can safely be concluded that to breed from an animal simply because it happens to be of the male sex, or to buy animals in the open market simply because they happen to be of the female sex, can only lead to disaster.

Proper feeding and care of the young bull as well as the cow must not be overlooked, as it is of the utmost importance, and if bred for

sale the half-starved animal will be only a scrub in the eyes of the public.

There is yet another important point which I must mention—namely, gentle treatment. The very best feeding, if accompanied by a kick and a growl, will not induce a cow to yield to her utmost capacity. As a matter of fact, a cow that is abused in any shape or form will yield milk of less quantity and poorer quality than if she were treated with gentleness, and exhaustive experiments recently carried out in America prove this up to the hilt. The man who kicks or otherwise ill-treats a cow should be flogged without mercy. A reasonable amount of shelter is also necessary, otherwise some of the nerve force which would be spent in the production of milk is spent in maintaining the heat of the body.

It will be generally agreed, I am convinced, that the above recommendations are inseparable from, and must, indeed, go hand-in-hand with, good feeding if the best results are to be obtained from dairy herds. It is now a well-known fact that milk and butter-fat yielding capacity of breeds of cows and of individuals is hereditary, and that this natural function can be artificially developed only to a limited extent. This, of course, applies more to the butter-fat than to the milk yield, for the quantity of the latter may undoubtedly be increased by certain systems of feeding; but no system of feeding will appreciably increase the percentage of butter-fat.

Liberal winter feeding of the dairy cow is undoubtedly of the utmost importance, and it is a deplorable fact that a number of cows in New Zealand die in winter through starvation. It is absolutely essential that the cow should reach her period of lactation in fit condition, and this cannot be accomplished on bare winter pasture alone. Having a large stomach-capacity, the cow requires a bulky feed. This should be of two classes, a succulent feed and a dry one. The combination may consist of roots and hay—mangels and lucerne for choice. The amount necessary for an in-calf cow will depend on the breed and size. The average cow will consume 10 lb. of hay and from 20 lb. to 30 lb. of mangels. A good supply of mangels is invaluable, and no other food is more successful in stimulating the milk-flow. For the best results a limited quantity should be carted to the grass paddocks daily. To turn cows into a mangel-paddock, thereby wasting about as much as they consume, is, in my opinion, the very worst policy. Even with a supply of good hay alone a herd of cows may be very successfully brought through the winter; but something more succulent is required when the cows calve early, in order to stimulate the milk-flow. For this purpose nothing is better than the mangel. In a report on last year's mangel crop that appeared in the *Journal* I made some strong statements as to

the value of the crop to this farm, and the results that I might expect from its use. It is satisfactory to be able to state that the results immediately obtained, and the results still being indirectly obtained, have more than justified every statement then made. In calculating the cost of any farm crop we are too apt to look on the immediate results only, and forget that every farm operation we carry out affects not only the present but must affect the future, and that it is a step either in the direction of success or failure, apart from the bearing it may have on the present circumstances. For this reason it is always unwise to judge of the profit obtained through any farm operation by immediate results only. There is no doubt as to the value of quick returns, but if it is the farmer's intention (as it should be) to settle down and permanently improve a farm, in every operation carried out he should have an eye to the future.

It is true that the growing of a mangel crop costs money, and, as a matter of fact, a poor crop of mangels can be grown only at a dead loss. On the other hand, no crop gives a more handsome return for liberal treatment. It is astonishing the amount of feed that may be obtained from one acre only. I am aware of the difficulties of the labour question, and the area cultivated must be determined by the labour available to cultivate that area thoroughly; but I am quite certain that the key to success in dairy-farming lies in the reduction of the areas of many of the farms and the adoption of a more intensive system of cultivation. A small farm well cultivated and carrying a small herd of high-class cows will pay handsomely and will be a pleasure to the owner, while a large area badly farmed and carrying scrub cattle is nothing but a continual worry and loss to all concerned. At the present moment there are farmers in New Zealand farming as little as 50 acres and who are making more profit than many who are farming 500.

In advocating the value of a root crop I am not overlooking the value of ensilage, but my own opinion is that in New Zealand ensilage is more valuable as a summer feed than as a winter feed, particularly in periods of drought.

Apart from the root crop or ensilage, it is quite possible to grow green feed all the year round. For winter and early spring use no feed of this class can, in my opinion, surpass tares and oats. If sown at intervals from March until July there will be a succession of crops of the highest feeding-value from the dairyman's standpoint, and no feed will produce a higher quality of butter and cheese. The growing of a legume and a non-legume together not only produces better feed for the cows, but also keeps the land in better condition. This is a very important point. Tares are also a fine weed-smotherer. We have

winter tares at Ruakura sown on the 10th May which are over 8 ft. in height; and we have one plot of 3 acres sown on the 18th October which has made phenomenal growth and is now almost ready for cutting for green feed. I am quite aware that the New Zealand dairyman is looking for a crop suitable for turning his cows on to without the trouble of cutting and leading off, but on small areas intensively cultivated this system can find no place; and the time is fast approaching when the soiling system will take the place of the present more wasteful one.

Hay made from millet is highly spoken of, and, if cut just when coming into flower, makes a nice soft hay which is relished by all stock. It also grows a very great weight per acre.

The great objection to all annual fodder crops is the labour year after year of ploughing, sowing, and reaping. On the other hand, lucerne, once well established, lasts for years; and when all other fodder crops are a failure through drought the lucerne paddock will be green and flourishing, and the farmer can "cut and come again" as often as he chooses. For winter use hay made from this plant has no equal; in fact, it is the greatest gift ever bestowed on the dairyman. It may not be possible to grow lucerne on all soils, but the experience at Ruakura points to it succeeding over a great area of New Zealand. I would advise the dairy-farmer to make every effort to establish this plant almost regardless of cost, for in it he will find a stock-food that will satisfy nearly all his requirements.

The dairy herd at Ruakura Farm of Instruction is now receiving chou moellier as a supplementary fodder to the rather dried-up pastures.

The work of the four main experimental farms of the Department was investigated by 712 farmers and others last month. The visitors to the different farms were as follows: Ruakura, 497; Weraroa, 95; Waerenga, 60; Moumahaki, 50.

"At the cattle show in Guernsey," writes F. G. McKay, "the dam of any bull exhibited—if on the island—has to be shown at the same time. The dam of a bull having been tested for milk and butter-fat production, a certificate of such test is taken into consideration in awarding prizes."

The last London Dairy Show brought out a very fine type of the non-pedigree milking Shorthorn—Model Maid. She gave, under the show-yard conditions, 16½ gallons of milk in two days. The percentage of butter-fat ranged from 2·93 to 4·51.

CULTIVATION OF THE VINE UNDER GLASS.

(Concluded.)

S. F. ANDERSON.

PESTS OF THE VINE.

THE most common and worst pest known to the grower of vines under glass in this Dominion is the

Mealy-bug (Dactylopius adonidum).

This belongs to the order *Coccidae* or scale insects. Quoting from leaflet No. 21 (T. W. Kirk, F.L.S.): "This insect is common throughout the world, and in warmer portions of the globe frequently causes extensive damage, especially to grape-vines under glass. The common name 'mealy-bug' is given because the insects (female) are more

LEAF AND SMALL BRANCH OF GRAPE-VINE.
Showing mealy-bugs on both stem and foliage. All figures natural size.
From nature.

or less covered with a yellowish-white mealy-looking powder which they throw out from their bodies, the object being principally to provide protection from enemies, but it also serves to conceal their eggs. The mealy-bug when full-grown is about $\frac{1}{8}$ in. long, being in colour white tinged with yellow, and a brown band on neck. The margins of the body are armed with a number of spines, and there are two long cottony threads extending backwards from the last segment of the abdomen. Mealy-bugs are dreaded on account of the enormous rate at which they multiply, a single female laying several hundred eggs a day."

Methods of Distribution.—Without doubt birds play a very important part in the distribution of scale insects by carrying them on their feet and legs. The young mealy-bugs are very small, and might easily be carried from their footing by a strong gust of wind and deposited some distance away. When once this insect gets into a vinery very rarely is this entirely cleared of it. Very few growers, indeed, claim to have done so. The bark of the vine, woodwork of the house, and the soil at the base of the plant afford cover for the eggs. Prevention is what must be looked to by those going in for vine-culture under glass. See that the vine-house is placed away from trees, shrubs, and hedges. Do not allow any pot-plants or creepers of any kind to be put in the vine-house. The raising of seedling plants in the vine-house, provided the boxes used are clean, may be done. Where the work of the vine-house is conducted in a methodical manner, and not too large an area is placed under the care of one man, every part comes under attention so often that the presence of any pest can or should be detected. When found it should be treated at once, and a search made for others. It has been found on the foliage at the top of the house and on no other part of the vines, proving that it can be carried by the wind.

Treatment of the Vines when the Insect has become lodged in the House.—When first discovered a small bottle of methylated spirit and brush should be kept, and diligent search made for the insect and eggs, and when found touched with the spirit. This destroys both effectively. Should, however, the mealy-bug have obtained too extensive a hold to be controlled by the above treatment, the vine-house must be fumigated with the hydrocyanic-acid gas. Before attempting to use this remedy the operator must realize that he is dealing with a very deadly gas, one or two full breaths of which would probably be sufficient to cause death. With proper precautions, however, there should be no danger in its use either to plant or man. The following directions should be carefully followed :—

Time of Day to fumigate.—Fumigate in the evening between sunset and dark. Strong light induces injury to foliage. Choose an

evening when the atmosphere is still. Never fumigate during a high wind.

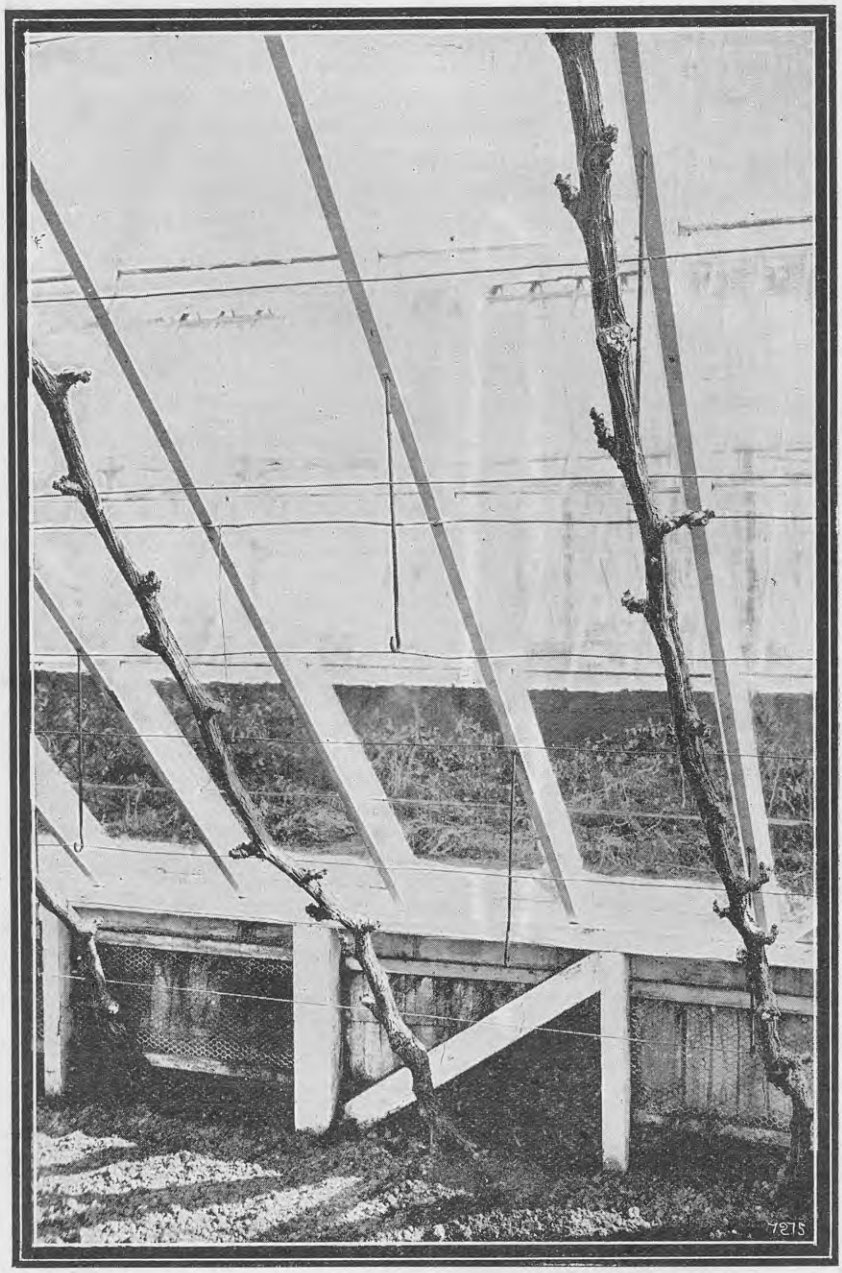
Condition of Foliage and Fruit.—Do not fumigate vines in the early spring when the foliage is very tender. The fruit should be as large as small marbles, and the shoots should have hardened before the first fumigation. The plants and top soil should be dry; moisture absorbs the gas and renders the atmosphere less poisonous to insect-life. Moisture on the foliage will take up the gas, and, acting as a diluted acid, cause extensive burning of the leaves.

Fumigating-material.—The cyanide to be used must be 98 per cent. pure; lower percentages have occasioned severe burning. For every 100 cubic feet of space in the house use $\frac{1}{3}$ oz. by avoirdupois weight of cyanide of potassium, $\frac{1}{3}$ oz. by measure of commercial sulphuric acid of 1·843 specific gravity, 1 oz. of water by measure.

Method of applying the Chemicals.—Provide earthenware basins that will hold from 6 to 12 quarts according to size of house to be fumigated—a basin for every 10 ft. of the house. Divide the quantity of the chemicals by the number of basins, then place the water and sulphuric acid in the basins and put them in position. Weigh out the cyanide into pieces of paper or saucers and place one at the side of each basin. The cyanide may want breaking up into pieces; it should not be in lumps larger than a filbert nut. When all is ready and all openings closed excepting the door, commence at the far end and put the cyanide into the acid and water, taking care to keep the head away from the gas arising, and work backward and out of the door. When this is accomplished close the door and leave the fumes in one hour. When fumigating in the dormant season—viz., when the leaves are falling—the gas may remain all night. The doors and ventilators should be thrown open at the end of the hour and nobody permitted to enter the house for thirty minutes, and then with caution if the gas can be noticed.

Caution.—When breaking up or handling the cyanide on a warm evening with the hands perspiring, the hands should be washed immediately on finishing. If the quantity to be prepared is large, the hands should be washed more than once and the mouth washed out with water. In handling the sulphuric acid it should be poured into the vessels without splashing, as it will burn the hands if these come in contact with it.

Example of calculating the Cubic Contents of a House for the Quantity of Chemicals required.—Assuming the size of the house is 51 ft. long,



A Five-year-old Vine.

Taken in one of the vine-houses of Mr. Thomas Waugh, nurseryman, Lower Hutt, showing the appearance of the vine-rod after pruning.

16 ft. wide, sides 3 ft. high, and the pitch of the roof 40°, the cubic content will then be,—

	Cub. ft.
Body of house, 51 ft. by 16 ft. by 3 ft.	2,448
Content of roof: Draw a line across the house from top plate to top plate, and from that a vertical line to apex of roof. This will be about 7 ft. 9 in. Take the half of this and call it 4 ft. Then multiply the square of the house by 4—viz., 51 by 16 by 4. This equals	3,264
Total cubic contents then equals	5,712

Quantity of Chemicals required.—We may call the space 5,700 cubic feet. Then, as the calculation is per 100 cubic feet, the quantity of cyanide of potassium will be $57 \times \frac{1}{3} = 19$ oz.; sulphuric acid, $57 \times \frac{1}{3} = 19$ oz.; water, 57 oz. This divided amongst five basins will give $3\frac{4}{5}$ oz. each of the cyanide and sulphuric acid and $11\frac{2}{5}$ oz. of water to each basin.

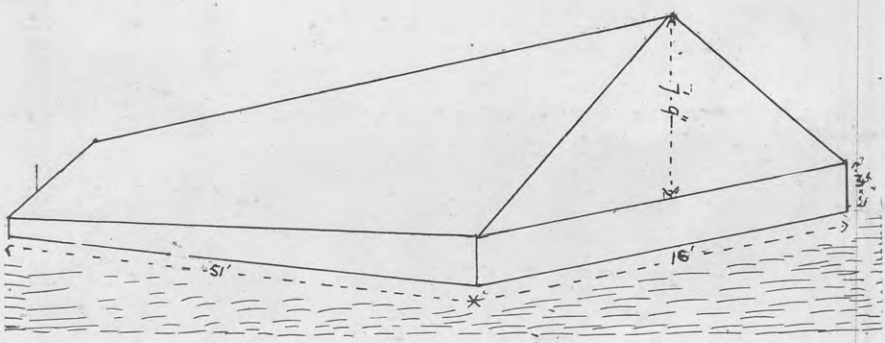


Diagram showing how the measurements are to be taken.

The fumigation does not, however, destroy the eggs, so it may be that a second fumigation will be necessary. This should be done just as the berries are beginning to colour. After the fruit has been gathered, and when slight injury to the foliage would not matter, a third fumigation, a little stronger, should be given. If the first has been found effective the second might be omitted.

The winter treatment of the vine has very much to do with success in freeing it from pests. If this work has to be summed up in one word it would be "cleanliness." Cleanliness is as essential in plant as in domestic houses. As soon as the leaves fall, the pruning is completed, and the house cleared of all rubbish—the vine-rods should have all the loose bark removed, but only that which can be easily

A WELL-GROWN VINE.

Taken in one of the vine-houses of Mr. J. Longton, Candilli Vineyard, Ferry Road, St. Martin's, Christchurch.

rubbed off with a bit of sacking or coarse glove. There should be no scraping when doing this. Keep a good lookout for any deposit of mealy-bug eggs. These are easily detected by the white patch of cottony material, and should at once be destroyed by touching with methylated spirit. It would be well when rubbing off the loose bark to have old newspapers spread under the vines to catch the rubbish. When the work has been finished these can be burned, so that eggs that escape notice may be caught and destroyed. When this has been done the house should be washed down with hot water if possible. If this cannot be obtained use cold with a good pressure behind it, but the vine-rods should have the water hot. No harm will come from this, and no insects or eggs can stand it. The vine-rods should now be painted with the following: Get a quantity of good plastic clay and dry it thoroughly, then powder it up so that it can pass through a ¼ in. sieve; measure off with a 6 in. flower-pot nine potsful of the dry sifted clay, and mix thoroughly through it one flower-potful of coal-tar. Place in a small tub and bring up to the consistency of paint with hot water, and keep well stirred while in use. Put on with a stiff brush, taking care not to scrub the buds, but just dab round them. When the rods have dried they may require looking over again, and any part that has been missed can then be treated. This clay and tar mixture has given excellent results. A word of caution is necessary here. It must be made with a good plastic clay. Ordinary soil or any containing too much sand or soil will not do. Should the proper clay not be obtainable, use a mixture of 8 oz. of Gishurst's compound to a gallon of water, with clay added to give it the consistency of paint, and apply with a brush. Another good paint for this purpose is made as follows: 4 oz. soft-soap, 4 oz. nicotine, 4 oz. Little's sheep-dip, 2 oz. turpentine, and add sufficient sulphur to form a thick cream. Dissolve the soft-soap in hot water, then stir in the other ingredients and make up to 1 gallon of the mixture. Apply with a brush.

Mildew.

The next most serious pest is the mildew (*Oidium Tuckerii*). The spores of this disease seem to be always present, only requiring the conditions favourable to development to be seen on the under-side of the leaves in small round grey patches, which can be detected more clearly when held up to the light. It spreads to the young fruit and growing tips with astonishing rapidity. Like almost all of our fungoid diseases, if the grower waits until he can see it much injury may have been done. Prevention, then, is most important in order to keep the house free. As soon as the vines have started into growth dust lightly but thoroughly with sulphur on a cloudy day when the house is cool and the foliage dry. Three or more dressings will be

A Fine Vinery in Full Bearing, taken in one of Mr. Thomas Lee's Houses, Whangarei.

required during the season. The earlier ones are the most important. Sulphuring the vines should never be omitted.

Red Spider (Bryobia pratensis).

This tiny sucking insect is capable of doing considerable mischief if allowed to multiply. When numerous its presence will be indicated by the brown or rusty appearance of the foliage. Examination of the under-sides of the leaves will show the pest in various stages of existence. Usually along the midribs the brown- to red-coloured eggs as well as the adult spiders will be seen. This insect may always be expected to make its appearance during dry seasons or in houses that are allowed to become too dry. When a daily syringing of the foliage is carried out, as recommended under the head of "Syringing the Vine," the chances are that it may never make its appearance, as it does not like moisture.

Thrip (Thrips minutissima).

This insect is also found in the vine-houses of the Dominion. The same conditions that favour red spider also encourage thrip. These are not easily seen, and may disfigure the fruit a good deal before being noticed, particularly that of the late kinds, such as Gros Colman. If the house is regularly syringed these insects do not often get a firm hold.

Scalding of the Leaves.

This is a very common trouble in the cultivation of vines under glass in the Dominion. It may also occur on the fruit. It is due to improper ventilation. A delay in opening the ventilators on a summer's morning and a hot sun coming on the moisture-laden leaves is the chief cause. When spraying the vines in the afternoon the top ventilators should be open to permit free circulation of the air to dry the vines again. It has been already stated under the head of "Ventilation" that there should always be some circulation of air, and where this is attended to the chances of scalding are greatly reduced.

Overcropping.

Overcropping is the cause of much of the trouble met with by the vinegrower. It weakens the vine by giving it too much to do. The fruit cannot colour properly, and the effect it has on future crops for several seasons is very marked. Weakening a plant by overbearing is much more far-reaching in its effects than many vinegrowers suppose. It has somewhat the same effect as over-defoliating, which may be described as a slow starvation of the plant. To obtain fruit perfect in colour and size should be the aim of every grower, and it is possible to do this every year if the foundation of the plant is well established and careful culture maintained in after-years.

SILVER-BEET.

FEEDING-TESTS AT BELFAST FREEZING-WORKS.

A. MACPHERSON.

AMONGST tests conducted in co-operation with the Department by the Canterbury Frozen Meat Company at its Belfast works last season was one to demonstrate the possibilities of silver-beet as a feed for sheep. The report of the works-manager, Mr. Hopkins, already published in the *Journal*, shows that the crop was greedily eaten by the sheep, which thrived well upon it. The feeding-off results are now available. These show that the carrying-capacity was at the rate of 828 sheep for seventy days. Following are the results:—

First feeding-off, March: The quarter-acre carried 85 sheep for ten days. The sheep were turned in on the 12th March, and were taken off on the 22nd March. Thus 1 acre would carry 243 sheep for fourteen days. On the 12th March the first stripping of leaves was made. It indicated a yield of 51·72 tons per acre.

Second feeding-off, July: The quarter-acre carried 50 fat lambs for fifteen days. The lambs were turned in on the 30th June, 1912, and were taken off on the 13th July. Thus 1 acre would carry 214 lambs for fourteen days. The second stripping of leaves was made on the 30th June. It indicated a yield of 48·22 tons per acre.

Third feeding-off, September: The quarter-acre carried 50 sheep for twelve days. The sheep were turned in on the 2nd September, and were taken off on the 13th September. Thus the 1 acre would carry 171 sheep for fourteen days. The third stripping of leaves was made on the 2nd September. It indicated a yield of 30 tons per acre.

Fourth feeding-off, November: The quarter-acre carried 50 sheep for seven days. The sheep were turned in on the 2nd November, and were taken off on the 9th November. Thus the 1 acre would carry 100 sheep for fourteen days. The fourth stripping of leaves was made on the 2nd November. It indicated a yield of 27 tons per acre.

Fifth feeding-off, December: The quarter-acre carried 50 sheep for seven days. The sheep were turned in on the 24th December, and were taken off on the 31st December. Thus the 1 acre would carry 100 sheep for fourteen days. The fifth stripping of leaves was made on the 5th December. It indicated a yield of 26·86 tons per acre.

LUCERNE ON PUMICE SOIL.

THE photograph on the accompanying page illustrates the growth of lucerne on typical poor pumice country at the experimental plots of the Department at Lichfield, on the Rotorua line. The history of these plots was given in the *Journal* of last December. The larger sample illustrated shows the growth made between the 16th December and the 25th January of this season, or forty days. The lucerne was really ready for cutting in twenty-one days. The plot had been previously cut on the 16th December, and the lucerne made into hay. The smaller growth was from a plot sown on the 16th November, 1912, and the plants illustrated show two months' growth from seeding.

RESIN AND SODA.

SUMMER SPRAY FOR WOOLLY APHIS.

J. A. CAMPBELL.

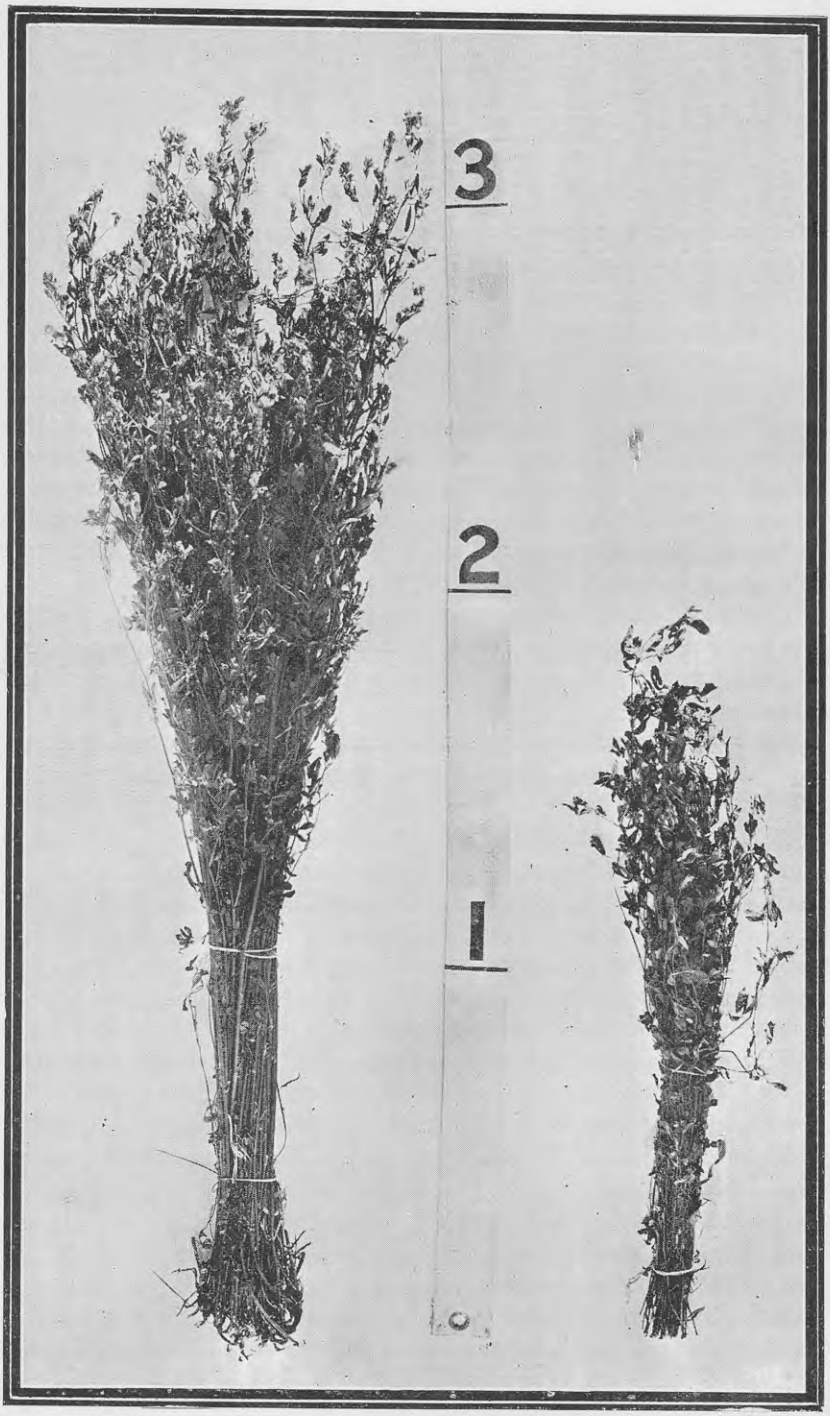
IF left unchecked, the effects of a bad attack of woolly aphis during the summer are only too well known, causing as it does the destruction, or at least retarding the development, of the buds on the new growths and fruiting-wood of the tree; but when thoroughly checked during January or February the damage is considerably lessened.

The following spray, made of resin and soda, will do this very effectually, and, although not a new spray, it is one that, were it better known, I feel sure would be more generally used at this season.

Proportions: 5 lb. washing-soda, 5 lb. resin, and 40 gallons of water.

Preparation: Boil 2 gallons of water in a vessel of more than twice that capacity. In this dissolve 5 lb. of soda, then add 5 lb. of resin, and boil until the resin is dissolved, stirring well. As the mixture very readily foams over, it is necessary to have some cold water at hand to add from time to time, to prevent this. Continue to boil until all foaming ceases. Make up to 40 gallons. If used early in the summer this spray is apt to scorch, but it can be safely used from January onward.

The Japanese forage plant, polygonum, has been tried on all classes of stock at Ruakura Farm of Instruction, but in every case the animals refused to eat it. The experience was similar with the young shoots of helianthi.



Lucerne grown on Pumice Soil.

CEREALS AT RUAKURA.

A. W. Green.

As stated in previous reports, barley and rye are cereals which admirably suit the soil and climate of the Waikato. They succeed where oats fail, and, by choosing a suitable strain, no difficulty should be experienced in obtaining a good crop. Neither of them are affected to any extent by rust, and they thrive under the most variable conditions. The old Chevalier, a standard variety, has this season given an excellent crop. It may be outclassed in weight by Maltster when threshing is done, but for a clean, even crop it is hard to beat. The two Swedish barleys, Primus and Henchen, are not as good as expected. Primus is by far the better of the two, but has not yielded equal to the crops produced by either Chevalier or Maltster. The Swedish types were also more affected by smut.

Excelsior barley, a six-rowed variety, yielded better than either Cape or Six-rowed Winter. The area sown was small, on account of a limited amount of seed, so that it will take another season to test its real value.

With rye, Emerald yields longer and heavier heads than ordinary rye-corn. The average height of the former is 6 ft., and the straw is of a superior quality.

Wheats have given better results this season, the plots clearly demonstrating what varieties will succeed in these soils and environment. The crop of Solid Straw Tuscan fills first place, followed by White and Red Straw Tuscan. Marshall's No. 3 also holds a high place. Amongst the bearded wheats, Rieti takes the lead, and some selections made from this variety this season give promise of greatly improving the yield of the variety.

Wherever possible, selections were made from successful varieties. Velvet, Pearl, and Grenadier were varieties which failed to give a crop worth harvesting.

The plots of oats did not give such good results as those of other cereals. *Helminthosporium granimum* attacked them badly early in the season, and later on rust appeared. The Swedish oats took rust far worse this year than last season, and prove unsuitable for this district. Black Bell is the best variety amongst them. This also led last year. Although twenty-five varieties of oats were under trial in the Ruakura Farm of Instruction plots, there were only two which could be relied on to yield payable crops — namely, Ruakura Rust-resisting and Algerian. Hative de Mesday is the best of the new oats, but it takes rust badly, and is rather weak in the straw.

CALIFORNIAN-THISTLE SEED.

THE QUESTION OF GERMINATION.

A. H. COCKAYNE.

QUITE a general impression exists among farmers, more particularly in the South Island, that the seed of Californian thistle will not germinate, especially that found in imported lines of agricultural seeds, notably alsyke. Recently . Degegen, of the Buda-Pesth Seed-control Station, sent me Californian thistle seed taken from a European grass-seed sample, to ascertain if they would germinate on arrival in New Zealand. The seed was put to germinate, and 25 per cent. sprouted within twenty-one days. This definitely shows that the presence of Californian thistle in imported seed is a distinct menace. With regard to the seed of the New Zealand Californian thistle, this germinates quite freely under the ordinary methods employed for the determination of the vitality of seeds. It is significant that the impression that Californian-thistle seed will not germinate in New Zealand invariably prevails in districts where the weed is most prevalent. Is it that the wish is father to the thought ?

MANURING: THE IMPORTANCE OF APPLYING ARTIFICIALS BELOW THE SEEDS.

THE obvious fact that artificial manures are more effective when placed below the seed than when applied on the surface of the soil is being demonstrated at Ruakura Farm of Instruction at the present time in connection with several forage-crop experiments. The effect is most striking with a crop of peas and millet where the manure was applied by means of an ordinary grain-drill below the seed and at the same time, the growth (dense and vigorous) is excellent, being fully three times the weight of the crop grown where the manure was broadcasted on the surface and the seed afterwards drilled in. Not only this, but only half the manure was used where it was drilled in below the seed. In an experimental mangel crop the great advantage of drilling in the manure is also strikingly demonstrated.

Splendid crops of red clover are to be seen throughout the pumice country this season—in the Lichfield, Putaruru, Okoroire, and Rotorua districts. Large well-saved stacks of the valuable red-clover hay are to be seen in many places.

REGISTRATION OF MILKING SHORTHORNS.

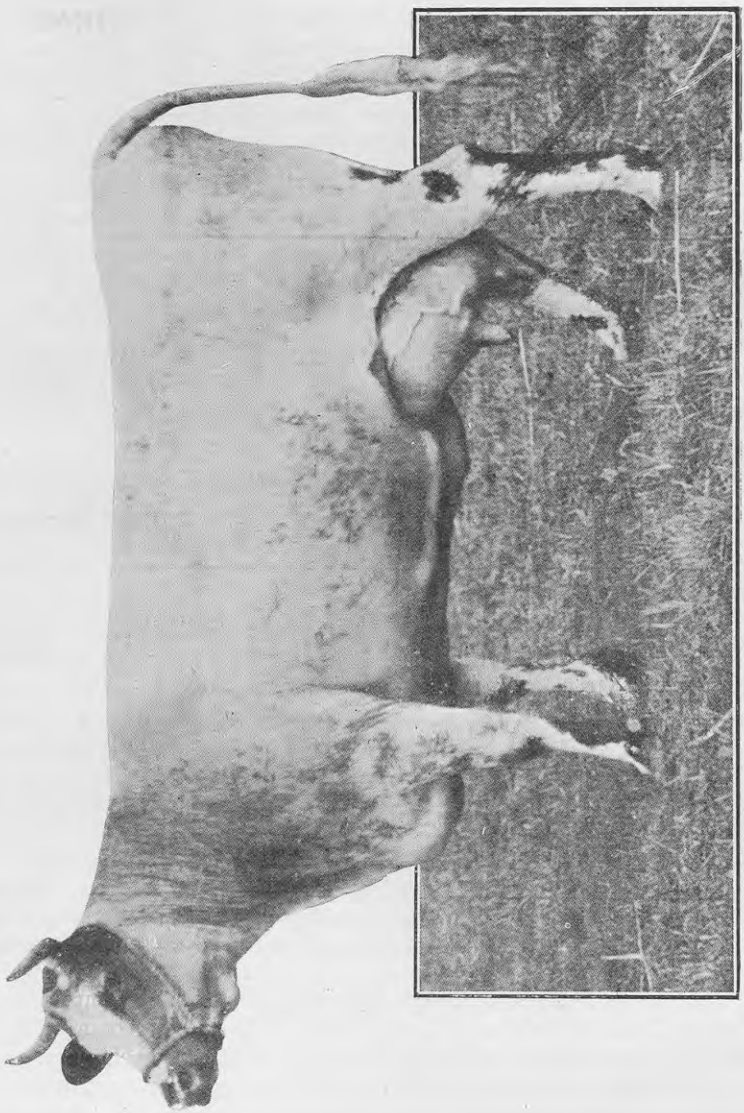
E. Clifton.

The capacity of the Shorthorn cow for the milking type is so well known that it may well be asked, Why is there no breeders' society and its herd-book of these cattle?

The far-reaching effect of the Shorthorn Breeders' Society of Great Britain is well known, and its herd-book is the pioneer of stock registers. It may be claimed that the New Zealand Society of Breeders of Shorthorns is sufficient; but this society and its herd-book are concerned chiefly in the registration of stock of pure descent: it must also be accepted that this is more in the interests of the grazier than of the dairy-farmer.

It must appeal to the lover of the Shorthorn—it remains in the memory of many of us—that in the earlier days of the colony the Shorthorn cow, big enough for a bullock team, was a deep milker; and she may still be found on station and on farm. Can there not then be formed a society for the encouragement of the breeding and for the registration of such cattle? In Great Britain itself, in Australia, and in America, the milking Shorthorn breeders' associations with their herd-books are in being. Our country is not usually a laggard in societies, associations, and unions. Does not this offer a useful field for another society? There is good warrant for the recognition of the value of the Shorthorn on the dairy farm. In New Zealand are many herds of cows of great milk-producing capacity that are to all intents and purposes true Shorthorns. They may be described as unregistered. It is the owners of these cattle who should associate their interests and register their stock. This would increase the value of such herds; the stock would be known. It would also obviate the difficulty, well known to breeders of this type of cattle, when a bull is wanted of knowing where to find it.

A well-known dairy-farmer whose herd is Shorthorn was quite recently asked, "Where can a bull of a milking family of this breed be purchased?" The reply was, "I do not know; you must do as I have to do: When I replace a bull I take my chance." Surely this should be altered. A society of breeders of this type of Shorthorns should be formed.



The Non-pedigree Shorthorn Dairy Cow Dot.

Having probably the most remarkable show-yard record in England of any animal of her type.

The admission of stock to the register would depend on the production of a defined quantity of milk, and the conformance of the individual to the Shorthorn type. At present the herd-book of this breed is a valuable guide to the grazier; there the descent of stock famous in the show-yard can be traced, and the selection of sires and cows for the production of stock for the fattening-paddock can well be made; but there is no guide to the cow or the bull for the dairy farm. It is the utility cow that is in demand, and there are farmers who believe this to be in the stock of the Shorthorn type.

It is suggested that the dairy-farmers who may approve of the proposal to form a milking Shorthorn breeders' society should move in the direction of forming a society on the lines of the Ayrshire, or Holstein, or Jersey societies. The next large gathering of farmers will be at the winter shows of Dunedin and Manawatu. Possibly some one interested will there propose and arrange to form a society of breeders of milking Shorthorns.

In making this proposal it is not intended to recommend or disparage any breed of dairy stock, still less is it intended to enter upon the topic of dual or special-purpose cows: it is that there are many who prefer to breed the Shorthorn, and registration, under the auspices of a society, would materially assist such dairy-farmers.

International Agricultural Exhibition at Ghent in 1913. — The International Agricultural Exhibition which is to be opened at Ghent on the 26th April, 1913, promises to make an unusually strong appeal to every one interested in agriculture and country life generally. A very large undertaking in connection with the Exhibition is to be an "ideal village." From an English point of view the dairies will probably be the most interesting part of the display. There will be one in each of two farms of the village, and also a co-operative dairy on a larger scale fitted with the very latest machinery and according to the most recent ideas. The farms will also be stocked with animals and machinery, while a series of competitions in shoeing and the repair of farm implements will be held at the blacksmith's shop of the village. Horse and cattle shows and ploughing-competitions will also be held during the run of the Exhibition. Beside the actual village buildings, a number of halls for the display of agricultural machinery have been built. The Ghent Exhibition as a whole covers, roughly, 250 acres (about 50 acres more than the Brussels Exhibition), and will be the most important one since the Paris Exhibition of 1900. The English pavilion will be practically filled with a machinery exhibit. The twentieth International Congress on Agriculture will be held at the Exhibition from the 8th to the 13th June, under the patronage of the King of Belgium.—*The Journal of the British Board of Agriculture.*

CHEESE.

EXAMINATION FOR CONTENT OF MOISTURE AND FAT.

(Concluded.)

W. E. GWILLIM.

THE data given in the three lists* of cheese examined should make the matter almost self-explanatory, and, as the work of examination is proceeding with the season, discussion at this stage may be limited to a few features.

The chief characteristic which distinguishes Cheddar cheese from other varieties of "hard" or pressed cheese is a certain firmness, closeness, and mellowness of body accompanied by a particular flavour, derived principally from a small amount of the sugar of milk converted into lactic acid. This certain amount of acid is essential to every Cheddar cheese, and when it is present the cheese is described as "normal for acid." A well-made cheese, normal for acid, made from pure and sound whole milk of clean flavour, requires only proper curing to develop the requisite flavour and mellowness of body.

In the making of cheese under normal conditions the whole of the fat, casein, and other cheesemaking solids of the milk, less a small and nearly uniform percentage which is mechanically and unavoidably lost, go almost automatically into the resultant cheese, therefore one of the chief aims of the cheese-maker in his work of making cheese of the quality in demand is directed to controlling the content of acid and moisture.

The information in the lists of examinations will help to demonstrate to a certain extent how successful or otherwise the various cheese-makers concerned have been in their efforts to efficiently produce good cheese from the raw material supplied to them.

For a cheese to be of good body and texture and just what the market requires does not necessarily mean that the two chief constituents which give to cheese a rich and mellow quality—viz., fat and moisture—must always be present in the same ratio. The ratios vary. Sometimes the percentage of fat exceeds that of the moisture, sometimes the reverse, and, again, the percentages may be about even. This feature is peculiar to Cheddar cheese, and has been so ever since

* See last month's *Journal* for Lists A and B.

Cheddar cheese has been made and reports on quality and analysis for constituents recorded. These variations still obtain. Three instances may be noted in the present examinations, viz.,—

(1.) Factory 9 in list A: 37·7 per cent. moisture, 33·2 per cent. fat.
(2.) „ 76 „ B: 33·6 „ 36·8 „
(3.) „ 85 „ B: 36·0 „ 36·0 „

The body and texture of these cheese left very little to be desired.

In this connection it is worth remarking that the first of the three is nearly 1 per cent. above the average for moisture-content, and a shade below the average fat-content of the average of the sixty cheese in the list in which it is included.

In list A the average moisture-content is 36·85 per cent., and in 95 per cent. of the cheese the moisture is between 35 and 38 per cent The average fat-content is 33·64 per cent., and in 75 per cent. of the cheese the range is between 32 and 35 per cent.

In list B the average moisture-content is 36·25 per cent., and in 83 per cent. of the cheese the range is between 35 and 38 per cent. The average fat-content is 33·78 per cent., and in 81 per cent. of the cheese the range is between 32 and 35 per cent.

In list C the average moisture-content is 36·06 per cent., and in 66 per cent. of the cheese the range is between 35 and 38 per cent. The average fat-content is 33·73, and in 75 per cent. of the cheese the range is between 32 and 35 per cent.

The cheese in this list are of indifferent make, and 27 per cent. were graded second-grade on account of defects in body and texture. A comparison of the summary of these cheese with the summaries of the others is not of much value, as the cheese do not represent an average of the quality of cheese exported. The first grades are of a quality which is not appreciated very highly, and the second grades are such as the market would be the better for being without. It may, however, be noted that the average moisture-content is lower than in the other summaries, and fat-content is about the same. There is a wider range in the moisture-content. In one instance the moisture is over 39 per cent. and the body and texture was soft, sticky, and acid cut. This cheese is worth less commercially than a well-made cheese; also, it is probable that the extra loss of cheesemaking solids which took place in the making would not be counterbalanced in weight by the presence of the extra amount of moisture over that in an average cheese.

With regard to the variations in the fat and moisture content of all the cheese examined, it may be mentioned that the cheese were not

of exactly the same age, and if they had been the variations would have been within narrower limits.

It will be noted that some cheese are remarked on as "green" or "on green side." It is to be regretted that cheese which are still in a more or less curdy condition are forwarded for shipment. When in this condition the cheese have still to lose a certain amount of moisture, and, although the shipper may be credited with more weight than if the cheese were in a proper condition for shipment, the receiver will get less weight of cheese than he is honestly entitled to and a class of cheese which he will have to hold until the greenness disappears. The practice of shipping green cheese is reprehensible, and one which is easiest to find out. Fortunately for the good of our reputation the practice is indulged in by only a small minority of the shippers.

With regard to the value of a knowledge of the component parts of the cheese at the time of grading, it is not apparent from the results of these examinations that the knowledge would be of any practical value to the grader. A cheese is judged according to its merits as a cheese. The component parts are necessarily within narrow limits. Just what the ratio of these different parts is depends largely on the skill of the maker, the care of the cheese from the time of making to the time of judging, and, in a less degree, on the age of the cheese and the ratio of the cheesemaking solids in the milk from which it was made.

A further factor, and perhaps one as valuable as all the others put together, and one that exerts a dominating influence at all stages in the making and at all times in the life of the cheese, is, in the first place, the condition of the milk in respect to its freedom or otherwise from impurities and undesirable flavours. A good cheese, well made and well cared for, contains all the available cheesemaking solids of the whole milk, and combined with this matter is that percentage of moisture necessary to its perfection. This percentage of moisture is no specific or arbitrary amount, and never has been and probably never will be. In the sixty well-made cheese examined in list A the average moisture-content was 36·85 per cent., and the content ranged in individual cheese from 35·0 to 38·2 per cent.

LIST C.

Particulars of forty-one samples of cheese examined for content of moisture and fat, ex lots from twenty-one factories graded at grading-ports as stated, and shipped by various Home-going steamers which sailed 17th October to 24th December, 1912, inclusive. Cheese scoring 27 points and over for body and texture are first grade; below 27 points are second grade.

No. for Factory Brand.	Moisture.	Fat.	Casein and other Solids.	Notes at Time of Sampling.		
				Age, Days old.	Body and Texture.	
					Points for.	Remarks on.
Tested to 17th October, 1912.						
Graded at Wellington.						
	Per Cent.	Per Cent.	Per Cent.			
89	32·3	34·0	33·7	..	27	Too firm, harsh, close.
89	33·8	34·8	31·4	..	27	Too firm, harsh, close.
89	33·6	33·6	32·8	..	27	Too firm, harsh, close.
Tested to 1st November, 1912.						
Graded at Wellington.						
75	37·2	34·8	28·0	..	27½	Little pasty.
56	34·8	36·8	28·4	..	26½	Harsh, sweet, pinholey.
90	35·6	32·8	31·6	..	26	Acid cut.
Tested to 16th November, 1912.						
Graded at Wellington.						
2	38·1	33·6	28·3	..	27	Pasty, loose.
91	36·0	33·6	30·4	..	27	Sweet holes, smooth.
91	34·6	34·0	31·4	..	27	Dry, acidy.
92	37·2	33·2	29·6	..	26½	Green, weak, acidy.
93	36·0	34·4	29·6	..	27	Green, harsh.
94	37·0	34·4	28·6	..	27	Pasty.
Tested to 28th November, 1912.						
Graded at Wellington.						
2	37·7	32·4	29·9	..	27	Pasty, loose.
95	36·0	34·0	30·0	..	27½	Sweet, on firm side, close.
96	35·2	34·4	30·4	..	27½	Little stiff and open.
51	39·5	32·4	28·1	..	26	Acid cut, soft, sticky.
97	38·0	32·8	29·2	29	26	Acid cut, soft, sticky.
49	37·4	31·2	31·4	..	27	Sweet holes, smooth.
89	32·4	36·0	31·6	35	26½	Stiff, dry.
Graded at Patea.						
98	37·5	34·0	28·5	29	26	Green, harsh, acid cut.
Tested to 11th December, 1912.						
Graded at Wellington.						
2	38·0	32·0	30·0	15	27	Weak, loose.
2	37·6	32·0	30·4	17	27	Weak, loose.
2	39·0	31·8	29·2	16	27	Weak, loose.
94	35·8	34·0	30·2	21	27	Weak, little sweet.
99	35·6	32·0	32·4	17	27	Dry, mealy.
99	34·8	32·8	32·4	24	27	Dry, mealy.
100	33·6	34·4	32·0	24	27	Dry, too firm.
92	35·4	34·6	30·0	..	26	Acid cut, dry, greasy.
92	35·8	34·0	30·2	..	26	Acid cut, dry, greasy.
Graded at Patea.						
70	37·9	30·8	31·3	25	26	Acid cut, soft, sticky.

No. for Factory Brand.	Moisture.	Fat.	Casein and other Solids.	Notes at Time of Sampling.		
				Age, Days old.	Body and Texture.	
					Points for.	Remarks on.
			Graded at Lyttelton.			
	Per Cent.	Per Cent.	Per Cent.			
101	33·2	34·8	32·0	..	27	Too firm, dry, close.
			TESTED TO 27TH DECEMBER, 1912.			
			Graded at Wellington.			
1	37·4	31·2	31·4	12	26	Green, harsh, greasy.
2	38·0	33·2	28·8	24	27	Weak, loose.
13	37·8	31·2	31·0	26	27	Weak, loose.
94	32·8	34·4	32·8	16	27	Green, mealy.
94	33·6	32·4	34·0	12	27	Green, dry.
94	35·2	34·4	30·4	11	27	Green, mealy.
94	35·3	33·6	31·1	10	27	Green, mealy.
94	36·0	34·4	29·6	10	27	Green, mealy.
			Graded at New Plymouth.			
102	38·0	34·0	28·0	26	27	Weak, sticky.
85	37·8	33·6	28·6	23	27	Weak, sticky.
Average	36·06	33·73	30·21	..	..	

SUMMARY OF PERCENTAGES.

LIST A.

Moisture-content.

Highest.		Lowest.		Average.
38·2	..	35·0	..	36·85

Range.		No. of Samples.		Per Cent.
34·0 to 35	..	1	..	1·67
35·1 to 36	..	11	..	18·33
36·1 to 37	..	25	..	41·66
37·1 to 38	..	21	..	35·00
Over 38		2	..	3·34
		60		100·00

Fat-content.

Highest.		Lowest.		Average.
36·8	..	31·2	..	33·64

Range.		No. of Samples.		Per Cent.
31·0 to 32	..	6	..	10·00
32·1 to 33	..	12	..	20·00
33·1 to 34	..	27	..	45·00
34·1 to 35	..	6	..	10·00
35·1 to 36	..	8	..	13·33
Over 36	..	1	..	1·67
		60		100·00

List B.

Moisture-content.

Highest.		Lowest.		Average.
38·8	..	33·4	..	36·25

Range.		No. of Samples.		Per Cent.
33·0 to 34	..	2	..	1·90
34·1 to 35	..	12	..	11·43
35·1 to 36	..	30	..	28·57
36·1 to 37	..	36	..	34·29
37·1 to 38	..	21	..	20·00
Over 38	..	4	..	3·81
		105		100·00

Fat-content.

Highest.		Lowest.		Average.
36·8	..	30·4	..	33·78

Range.		No. of Samples.		Per Cent.
30·0 to 31	..	2	..	1·90
31·1 to 32	..	3	..	2·86
32·1 to 33	..	21	..	20·00
33·1 to 34	..	42	..	40·00
34·1 to 35	..	22	..	20·95
35·1 to 36	..	14	..	13·34
Over 36	..	1	..	0·95
		105		100·00

List C.

Moisture-content.

Highest.		Lowest.		Average.
39·5	..	32·3	..	36·06

Range.		No. of Samples.		Per Cent.
32·0 to 33	..	3	..	7·32
33·1 to 34	..	5	..	12·19
34·1 to 35	..	3	..	7·32
35·1 to 36	..	12	..	29·27
36·1 to 37	..	1	..	2·44
37·1 to 38	..	14	..	34·15
38·1 to 39	..	2	..	4·87
Over 39	..	1	..	2·44
		41		100·00

Fat-content.

Highest.		Lowest.		Average.
36·8	..	30·8	..	33·73

Range.		No. of Samples.		Per Cent.
30·0 to 31	..	1	..	2·44
31·1 to 32	..	7	..	17·07
32·1 to 33	..	6	..	14·63
33·1 to 34	..	14	..	34·15
34·1 to 35	..	11	..	26·83
35·1 to 36	..	1	..	2·44
Over 36	..	1	..	2·44
		41		100·00

FRIESIAN MILKING-CATTLE.

J. LIGGINS, Tokomaru.

IT is difficult to one who has visited the home of the Friesian cattle, and has studied the breed in its native habitat, to understand why the owners of the famous black-and-whites in this country and their breed association should describe these cattle as Holstein-Friesians. Apparently without due consideration we have followed the lead of American breeders in this respect. While the Americans may have imported from Holstein—now a province of Germany but formerly a portion of Denmark—the names given in American pedigrees lead one to believe that the foundation cattle were really imported from Friesland, the northern portion of Holland, in the vicinity of the Zuyder Zee. For instance, we have Colantha, Johanna, Pietertje, and other Dutch names too numerous to mention here. The English Holstein Cattle Association probably did import their cattle from Holstein, an impression borne out by the absence of pedigrees in their herd-book, which in no case gives any ancestry beyond the dam and sire; whereas if the stock had been purchased in Friesland they would have been able to furnish extended pedigrees, for the Frieslanders are most careful in preserving the pedigrees of their cattle. Our nomenclature is the more surprising when it is remembered that the foundation animals of the oldest herd of black-and-whites in New Zealand were imported from the vicinity of Leeuwarden, North Friesland. It is true that since then many American animals have been imported, but at the time of the inception of the New Zealand Holstein-Friesian Association it is fairly safe to say that the Grigg cattle predominated in New Zealand; and even now the fine herd at Weraroa Experimental Farm possesses many of the large, roomy, beautiful types of the original Grigg cattle. Indeed, from my personal observations in Friesland, the type of Domino is the true type of the Frieslander of the present day. In saying this I have no desire to depreciate American importations as a whole; still, there have been importations from America that would have been improved if, in addition to milking characteristics and milking records, they had demonstrated better care on the breeder's part in obtaining a larger type of cow. With proper care we certainly can attain in time the desired type with our present stock. Of course, the simplest way to this end would be the importation of stock from Friesland. Unfortunately, at the present day the necessary quarantine restrictions prevent this. It

One of the Best Types of Friesian Cows.
Friesland photograph.

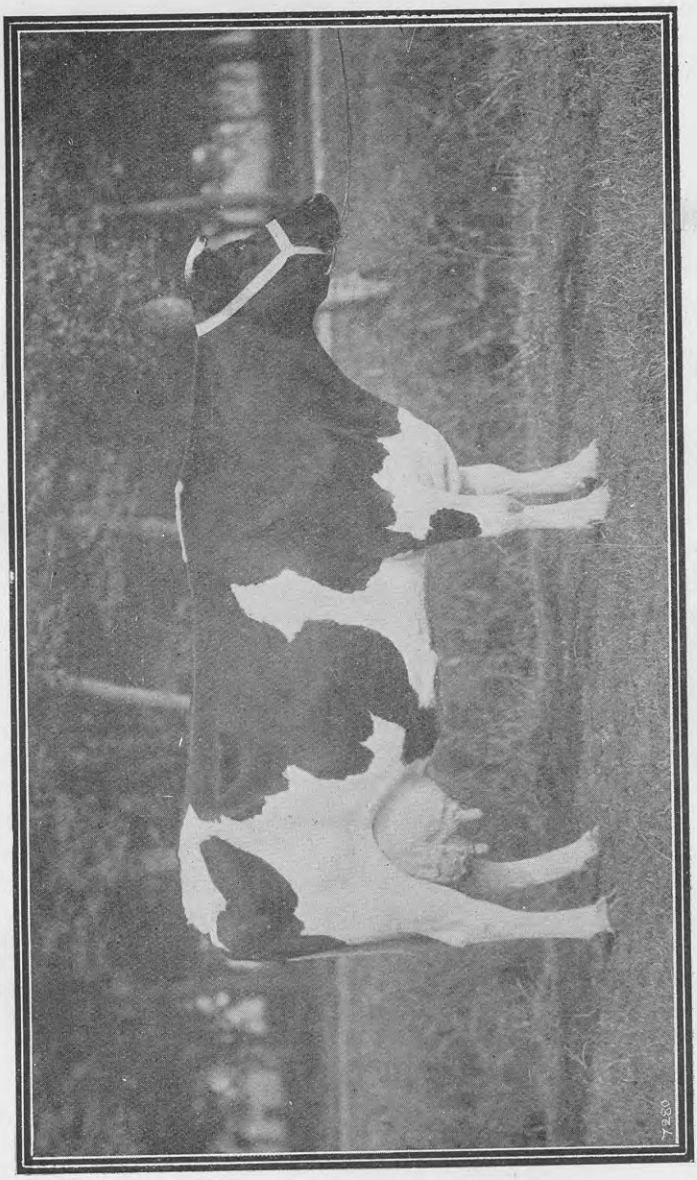
is sincerely to be hoped, however, that it will be possible in the near future to secure the stock we so much desire.

It is not generally known in this part of the world that the Friesian breed has a great antiquity. It possesses a history dating well back two thousand years, and is directly descended from the cattle owned by the Friesians and Batavians, the earliest record of which is dated three hundred years before Christ, the Roman Tacitus mentioning the cattle of the Friesians. Since that time the stock has been kept absolutely pure. Living up to the present day under the same roof as that of the homestead, the cattle are most docile. It is no uncommon sight to see them being quietly milked in the open, and to see them removed from one pasture to another by means of small boats. Large open drains separate the fields, and the cattle are never known to cross on their own account. It is the manner in which they have been handled for two thousand years that has produced the docile and valuable animal of the present day. The good qualities of the breed have been developed in many distant parts of the world to which they have been exported. It is evident, however, that their best characteristics are maintained to a higher degree in the country of their origin. The conditions under which the cattle are there bred warrant this assertion. Grazing as they do on the richest low-lying pastures of the world, they develop large frames and a capacity for heavy milk-production, while their ancient lineage enables them to transmit their good qualities to their offspring. Their prepotency is great—so great, indeed, that cross-breeds exhibit the black and white colour for generations.

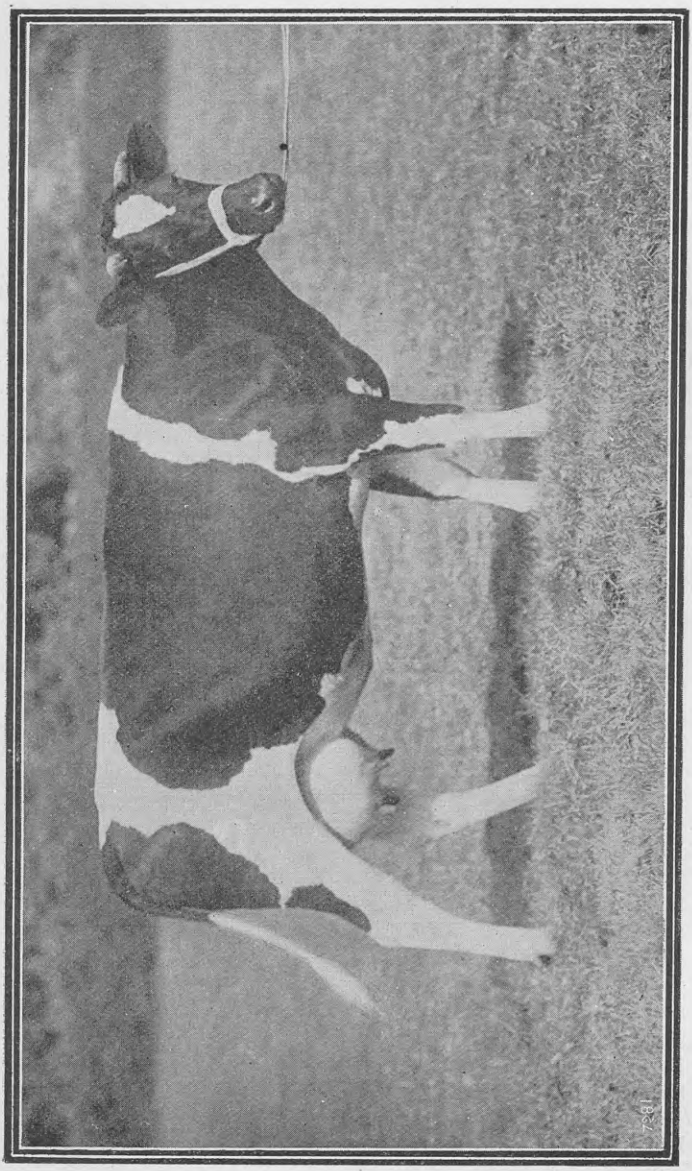
In a class of seven in a dairy-cattle-judging competition at the recent Horowhenua Show, cadets from the Weraroa Experimental Farm occupied the first, second, and third positions.

During the last six months of 1912 the British Government spent in compensation in consequence of foot-and-mouth disease in England and Wales a sum approximating £52,000.

Mr. J. T. Shepherd, Manager of the Waerenga Experimental Farm, who possesses the power of water-divination, has recently investigated Central Otago country in this connection. He has found that over the greater part of Central Otago there are strong indications in many localities of the presence of underground water. In more than one place huge volumes of subterranean water were located.



KONINGIN, A GRAND OLD FRIESIAN COW.
Friesland photograph.



An Attractive Friesian Heifer.
Friesland photograph.

QUALIFIED VETERINARY SURGEONS.

NEW ZEALAND LIST.

For the guidance of stockowners and for general information it is proposed to publish in the *Journal*, at six-monthly intervals, a list of qualified veterinary surgeons known to be residing in New Zealand. Following is the first list.

In the event of the name of any properly qualified veterinarian being omitted, it is requested that he communicate with the Editor, giving particulars of his qualification, in order that the necessary steps may be taken for the inclusion of his name in the next published list.

Ashe, G. G., M.R.C.V.S., Timaru.
* Barnes, A. W., M.R.C.V.S., Hastings.
Begg, W. P., M.R.C.V.S., Ashburton.
* Blair, W. D., M.R.C.V.S., Dunedin.
* Blake, T. A., M.R.C.V.S., Tokomaru Bay.
Brodie, A. M., M.R.C.V.S., Hastings.
* Broom, George, M.R.C.V.S., Waitara.
* Burton, S., M.R.C.V.S., Gisborne.
Charlton, J. R., M.R.C.V.S., Christchurch.
* Clayton, J. G., M.R.C.V.S., Wellington.
Cockroft, J. E., M.R.C.V.S., Palmerston North.
* Collins, W. T., M.R.C.V.S., Hamilton.
Crossley, F., M.R.C.V.S., Wellington.
* Cunningham, T., M.R.C.V.S., Oamaru.
Danskin, J., M.R.C.V.S., Balclutha.
Edgar, P. M., M.R.C.V.S., Wanganui.
Edwards, W. W. H., M.R.C.V.S., Christchurch.
* Elphick, E. E., M.R.C.V.S., Christchurch.
* Finch, R., M.R.C.V.S., D.V.S.M., Auckland.
Glover, F., M.R.C.V.S., Hamilton.
Hamilton, A., M.R.C.V.S., Musselburg, Dunedin.
* Hickman, A. J., M.R.C.V.S., Auckland.
* Howard, E. C., M.R.C.V.S., Wellington.
* Johnson, A. A., M.R.C.V.S., Christchurch.
* Kerrigan, J., M.R.C.V.S., Wallaceville.
Lilico, T. G., M.R.C.V.S., Christchurch.
* Lyons, J., M.R.C.V.S., Auckland.
McLeod, J., M.R.C.V.S., Christchurch.
Machattie, D. H., M.R.C.V.S., Leeston, Canterbury.
Marquis, N., M.R.C.V.S., Waimate, South Canterbury.
Martin, H. E., M.R.C.V.S., Gore.

* Members of the Live Stock and Meat Division, Department of Agriculture, Industries, and Commerce.

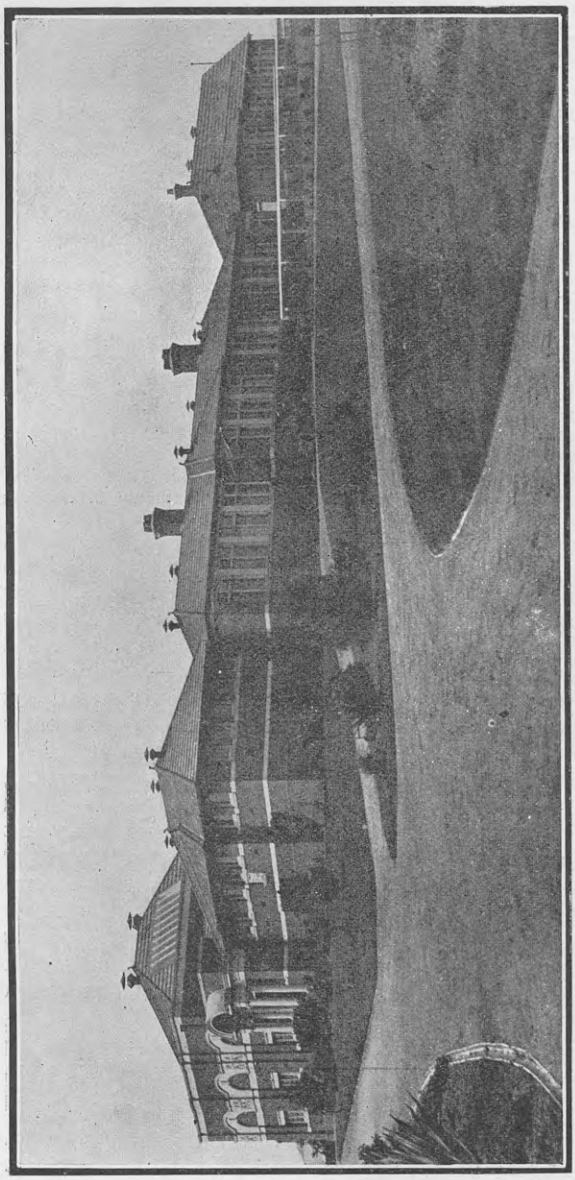
Miller, W. J., M.R.C.V.S., Invercargill.
Neale, C. R., M.R.C.V.S., Hawera.
* Paterson, A. M., M.R.C.V.S., Timaru.
* Primmer, J. H., M.R.C.V.S., Palmerston North.
Quinnell, W. C., M.R.C.V.S., Wellington.
Rait, D. H., M.R.C.V.S., Palmerston North.
* Reakes, C. J., D.V.Sc., M.R.C.V.S., Wellington.
* Reid, H. A., F.R.C.V.S., D.V.H., Wellington.
Robertson, F. C., M.R.C.V.S., Ashburton.
Robertson, F., M.R.C.V.S., Oamaru.
Simpson, C. S., M.R.C.V.S., Parnell, Auckland.
* Snowball, W. D., M.R.C.V.S., Dunedin.
* Spilman, D., M.R.C.V.S., Wellington.
* Stafford, J., M.R.C.V.S., Christchurch.
Taylor, A., M.A., M.R.C.V.S., Lincoln, Canterbury.
* Taylor, W. G., M.R.C.V.S., Wellington.
* Waugh, G. N., M.R.C.V.S., Invercargill.
* Wood, R. B., M.R.C.V.S., Auckland.
* Young, A. R., M.R.C.V.S., Wellington.
* Kyle, H. S. S., G.M.V.C. (Melbourne), Christchurch.
* Marsack, H. L., V.S. (Ontario), Auckland.
Ring, W. C., V.M.D. (Penn., U.S.A.), Ellerslie.

* Members of the Live Stock and Meat Division, Department of Agriculture, Industries, and Commerce.

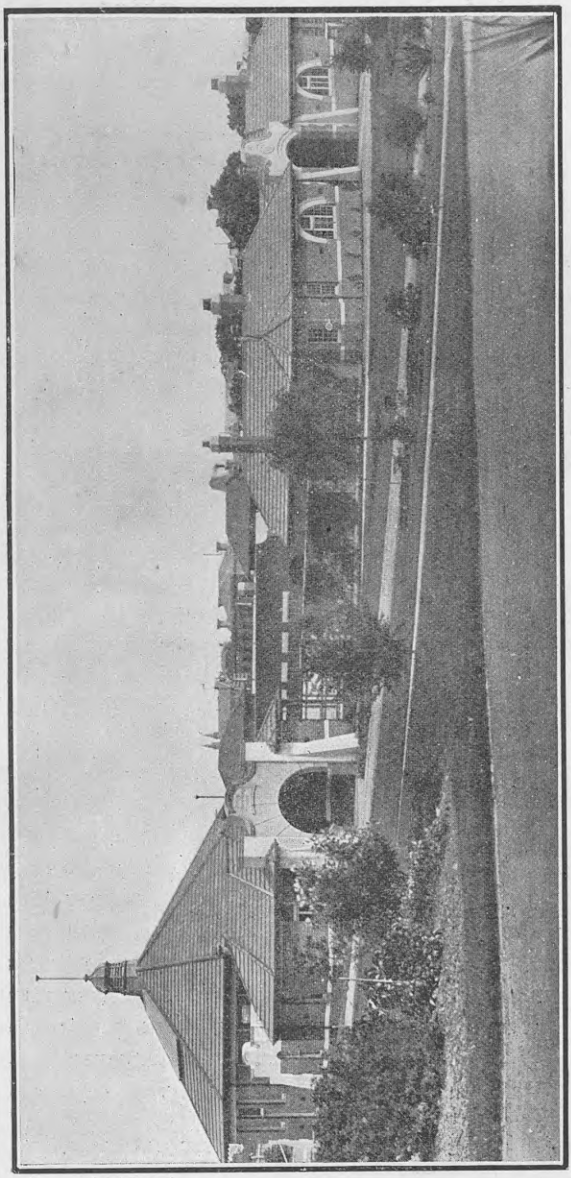
Casein.—The business of casein-manufacture is claiming increased attention in this country. The Midhirst Co-operative Dairy Company has installed—under the supervision of Mr. J. Pedersen, who investigated casein-manufacture in Europe for the Department—a thoroughly up-to-date precipitating plant, while the Bunnythorpe Co-operative Dairying Company has established several precipitating-stations. A number of North Taranaki dairy companies have now under consideration the question of initiating the business on an extensive co-operative scale. Individual dairy companies in other parts of the Dominion are also making full inquiries into the subject. The companies which have lately taken up the business are having the green curd dried and packed at the recently erected drying-factory of the New Zealand Casein Company at Aramoho. The quality of the casein being manufactured is of a highly satisfactory character, and should have the effect of establishing a good name for the New Zealand product from the very outset of the industry. The casein is officially graded prior to export, and each package is then provided with a special Government seal indicative of its quality.

There are 226 South Island farmers co-operating with the Department in the conduct of field experiments this season. Altogether 3,739 experiments will be conducted on southern farms.

From the 12th May to the 31st December of last year 315 letters from farmers were received at the Ruakura Farm of Instruction, asking for information in regard to lucerne.



MELBOURNE UNIVERSITY VETERINARY SCHOOL—ANATOMICAL AND PATHOLOGICAL DEPARTMENTS.



Melbourne University Veterinary School—Operating Theatre and Hospital.

THE HEMP INDUSTRY.

W. H. FERRIS.

IMPROVED QUALITY.

THE quality of the hemp graded last month was a decided improvement on that of the previous month. Not only was the strength of the fibre better, but the colour was greatly improved. This is in great part due to the milling of better leaf and to the improved weather-conditions for bleaching. The work of milling is being maintained at a good standard, both the stripping and scutching exhibiting careful manipulation, though here and there poor work has been in evidence. Some millers, it is stated, have not been able to turn out the quality of fibre they desired, owing to the difficulty of securing competent labour, due no doubt to the unusual extension in operations this season and the consequent necessity to employ untrained men.

STRIPPER-SLIPS AND TOW.

The preparation of stripper-slips for export is showing a remarkable increase. The necessity of preventing flax-refuse polluting streams is largely responsible for the development taking place. This has forced millers to adopt proper means of saving the residual material. A system coming rapidly into vogue is the use of an automatic elevator, to lift the waste from the drains, in order to wash it expeditiously and with as little labour as possible.

Now that stripper-slips are being graded, no doubt the quality will be improved, and thus probably make the slips more valuable to the manufacturer abroad. Little or no profit is made out of this commodity at present, except in the case of mills which have a large output.

The quality of the tow coming forward is distinctly unsatisfactory. In only a few cases is it as clean as it should be. Failure to free this by-product from dust and rubbish is the dominant weakness. This is to be regretted, as the use of tow is extending among manufacturers, and deterioration in quality will naturally check this tendency. The effect of this may not be immediately apparent, however, as the demand at present is treading on the heels of the supply.

TO MAKE GRADING UNIFORM.

The graders at the different ports are being temporarily transferred. This will enable each man to come into close touch with the work of the other officials, and, by thus encouraging the conception of a common standard, maintain that uniformity in the work of official classification of hemp which is so much to be desired.

THE APIARY.

NOTES FOR MARCH.

F. A. Jacobsen.

The words " live and learn " apply more forcibly to bee-culture than to perhaps anything else. Lessons can always be learnt each successive season by the observant man, and thus may be avoided those little mistakes which are a drain upon profits, while an efficient system of bee-management will be thereby evolved. Not the least important lesson to be taken from this season's experience is the necessity of providing stores in view of a possible unfavourable season. Many beekeepers will be now convinced that it is a wise and assuredly a safe policy to make ample provision against possible starvation. Losses have been suffered in this way not once but many times, thus condemning the weak system of leaving but a minimum amount of stores in the hives instead of the maximum. Half-starved colonies will never winter well, but will exhibit weakness in the spring, and will then demand special feeding to stimulate brood-rearing. On the other hand, by leaving a few extra pounds of honey in a hive the strength of the colony is assured at the critical period, providing, of course, it went into winter quarters with a good population of bees. Weak stocks for honey-producing are practically useless. From 20 lb. to 30 lb. of sealed stores is necessary to be left in the hive for winter consumption by the bees, certainly not less than the former amount.

Weak Stocks.

At the close of the honey season, and when extracting is finished, all weak stocks should be united, and if any be found very weak three should be put together, or the weakest united with a fairly strong colony. This may be done by putting one hive on top of the other with a sheet of newspaper between, when in the course of a few days the bees will have eaten through this and mingled with one another without any fighting. It is preferable to kill the worst queen before uniting, otherwise there would ensue a battle royal, and the most useful queen may be killed or injured.

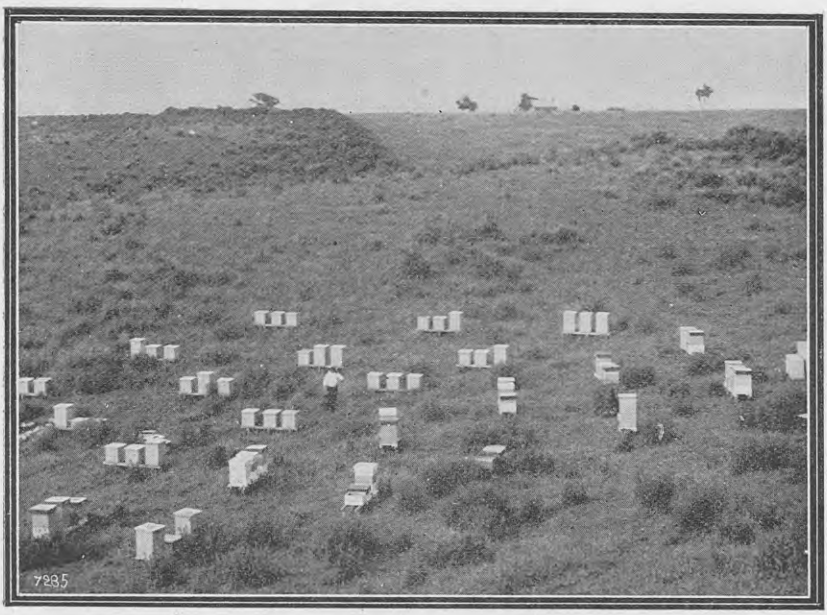
Small Entrances.

The latest bottom boards to a hive have both a large and a small entrance. The large one is for summer use and is $\frac{7}{8}$ in. in height, and

runs the full width of the hive. By reversing the bottom board the smaller size is produced, which is only $\frac{3}{8}$ in. high, but which also runs the full width of the hive. This entrance is in most cases too large, and should be reduced by tacking on to it a strip of perforated zinc the whole width of the front, this being provided with two or three holes, each just large enough for one bee to pass through at a time. This assists in preventing robbing, and at the same time keeps out mice that would otherwise enter the hives and build their nests there. This precaution is most necessary where mice are numerous and when the beekeeper does not want his hive-mats chewed to pieces.

WINTER QUARTERS.

In very cold countries, such as Canada, the apiarist has to provide a substantial protection from snow-drifts and cold winds. A long



TARANAKI OUT APIARY ON CLOVER AND THISTLE DOWNS.

house fitted up with ventilators and bee-flights is generally used for this purpose, although not always. The hives are carried into this and remain there until the snows melt. Others use double-walled hives with straw packing or shavings between the two walls, or they have large cases that fit over two or three hives at a time.

I have used double-walled hives for wintering purposes in New Zealand, but find that the expense is quite unwarranted, as anything of the kind is unnecessary in this country.

Winter Treatment.

The practice of feeding sugar syrup to bees in the spring to stimulate brood-rearing is not done nearly so much as formerly, but preference is given to the system of leaving in the autumn enough bulk stores to last the colony right through to the honey-flow. The reason of spring stimulative feeding was to make the colony rear early a large force of young bees to gather the harvest, but just when the flow was to be expected was a difficult matter of determination. Consequently when this was done too early more harm than good resulted from over-stimulation: more eggs were laid than the bees could look after and keep warm, while robbing was encouraged. One of the main drawbacks is that swarming may be brought on prematurely. The system of leaving enough stores in the autumn to last right through, or of feeding in the spring, depends somewhat on the beekeeper and his locality. Many can doubtless practise spring feeding to advantage, especially

Some of the Hives being used in the Foul-brood Experiments.

when dividing is intended for increase; but as a rule the best plan is to leave about 25 lb. of sealed stores to last the bees until they can gather more supplies for themselves. This method is especially recommended to beginners.

Foul-brood Experiment.

The four Apiary Instructors are at present experimenting with foundation manufactured from foul-broody combs, with the object of discovering if it is possible to transmit "bacillus larvæ" by means of comb foundation, and so set at rest numerous doubts on this point. The experiment is an important one, and may affect the apiarist who models his own wax to suit his requirements. The system of using steam in comb-foundation making is not adopted to any extent in this country, and on this account the experiments in question will be doubly valuable. They will prove whether foundation manufactured from foul-broody combs with the least possible amount of heat will transmit the disease to healthy colonies. The results of the experiments will be published in due course.

POLLEN.

L. Bowman.

All observing beekeepers who take a pride and interest in their apiaries have seen the busy little toilers coming home laden with small pellets of a paste-like substance attached to their legs. This substance botanists call pollen. The question arises, where do bees get pollen? The keen beekeeper's attention is arrested by a bee working, say, on a dandelion. She is very busy, and is practically covered all over with a bright-yellow dust. For a moment she stops delving into the heart of the flower to clean herself, and as we stand almost breathless, afraid to disturb her, watching every movement, we see she is packing the pollen into little baskets called the corbicula, which nature has provided for the purpose.

Having ascertained that pollen comes from flowers, we pull a bloom to investigate it a little more minutely. In doing this some of the pollen settles on one's fingers. By the use of a small magnifying-glass we discover that the flower is composed of a number of smaller flowers, called florets, so arranged as to make a complete and beautiful whole. Turning our attention to an individual floret we notice again it is composed of more parts, each having a function to perform. The anthers, being the male portion, contain small pouches or sacs which, when matured and ripe, burst open, shedding pollen-grains, or the fertilizing dust. As the bee works from flower to flower, conveying pollen on the fine hairs of her body, she comes in contact with the pistil, or female organ, the end of which will be found to be sticky, the pollen-grains being held there by this substance. The tiny grains begin to grow down the tube of the pistil until they reach the micropyle of the ovum, there shedding the favilla. As soon as this takes place inoculation is completed. Flowers then begin to drop their petals, and the plant devotes its energies to the development of fruit in the shape of seeds.

The microscope is again brought into use for the purpose of examining the pollen-grains further, and for ordinary observation purposes we generally use a 1/6 lens. Having made a collection of pollen from several different flowers and mounted them, we find, on looking at them through the microscope, that they are truly wonderful, varying in size, shape, and colour.

So far we have regarded pollen from a botanical point, but the question arises, what use do our bees put it to? In order to answer this we proceed to the hive. On close observation we notice, even with the naked eye, that pollen varies very much in colour. Here we see a worker bee just alighting on the board at the entrance of the hive, carrying pellets of bright yellow. Just a little further on we see another with blue pellets, and close at hand one with cream pellets, next to her another with orange, brown, green, and so on.

Amongst many of the earlier beekeepers who were not so well acquainted with matters concerning the hive this pollen was supposed to be material which bees gathered to make wax for comb-building. In those days, when skeps, boxes, and suchlike receptacles were used as a domicile for bees, there was really little hope of finding out what bees really did with the pollen, such hives being a veritable closed book. With, however, the vast improvements made in the methods of keeping bees, in properly constructed hives with movable frames, the closed book has been unsealed, thus affording a wonderful amount of food for thought.

As we withdraw a frame from the modern hive we admire the beauty and regularity of those fragile and marvellously constructed six-sided cells. On closer observation we see larvæ in all stages of development, and find that the pollen which the bees have brought in from the fields has been deposited in quite a large number of the cells, stored for future use, and kept moist by the addition of a little honey. When in this condition it is often spoken of by many beekeepers as bee-bread. Pollen is a nitrogenous food used by the adult bees, as well as the nurses, who use large quantities to rear larvæ.

It is a well-established fact that a dearth of pollen-bearing flora in spring retards brood-rearing considerably. Whenever this is noticed the wideawake beekeeper usually supplies this want by placing pea-meal flour or rye-meal in small boxes in a sheltered, sunny place.

Pollen which has been damaged by early frosts often proves injurious to bees, disarranging the digestive system and often terminating with dysentery. Pollen-grains in honey will give it a cloudy appearance. Pollen in honey is also liable to cause fermentation.

Pollen-grains, infinitesimal though they seem, are the mighty atoms that the world is dependent upon, and without their aid no creature could exist.

ORCHARD WORK FOR MARCH.

W. A. Boucher.

The majority of fruitgrowers rightly consider that clean cultivation of orchard lands during the spring and summer months is desirable. Yet if this system is continued for a number of years the result in time will be a deficiency in humus. This will bring about a soil-condition which is more or less injurious to the trees, and tends to increase the difficulty of maintaining satisfactory cultivation. Especially is this so in the case of clay soils which, as the humus disappears, will have an increased tendency to run together after heavy rainfall, and to dry out again rapidly under the influence of sun and wind. Therefore it becomes essential that the humus should be periodically renewed. This is most satisfactorily accomplished by sowing a clover crop to be ploughed in in spring or early summer.

For preference, clover, rape, or mustard should be selected, as the orchard trees will then benefit considerably, not only by the humus, but also by the nitrogen which such crops will renew in the soil. In order to secure the best results, whatever crop is selected should be planted early while the soil is warm, so that good growth may be made before cold weather sets in. If the sowing is deferred until late, little more than the germination of the seed will take place, and the crop will remain in a stagnant condition during the winter months, permitting probably an undesirable growth of weeds. Under such circumstances the clover crop will have made poor headway when the time arrives in the spring for it to be ploughed under. In that case but little will be gained either in humus or nitrogen, probably not sufficient to compensate for the cost of seed and labour.

Insect Pests and Fungus Diseases.

As a general rule, insect pests and fungus diseases require less attention during the month of March than at any other period during the year. Still, there are two troubles that it will always pay the grower to keep under observation.

Codlin-moth.

This pest is usually most troublesome during the early part of the season, but it depends entirely upon locality and weather-conditions

whether late infection may take place or not. Therefore it would be as well for growers, especially in the warmer districts of the Dominion, to keep a good lookout for the eggs or newly hatched grubs of this pest, and, if necessary, to take measures to protect their crops of late apples or pears from infection.

Leech.

This pest, if the necessary steps have not been taken to keep it under control, will continue to do serious injury to foliage until quite late in the season. The result will be that buds which should be plump and vigorous will show imperfect development, from which affected trees will suffer during the following season. Spraying with arsenate of lead should be continued until no further signs of the pest can be noticed.

GRADING AND PACKING.

The necessity for the careful grading and packing of fruit cannot be too strongly impressed upon growers. Although there has been great improvement in this respect of late years, and many growers realize the value of carefully selecting, grading, and packing their fruit, still it is even now no uncommon thing to come across consignments badly graded and packed, and more or less infected with pests and diseases of various kinds.

This is much to be regretted, as the returns to the consignors can never be satisfactory, while the marketing of inferior qualities must to a greater or less extent affect the selling-value of the better class of fruit.

As an explanation for the rapid extension of the trade to Germany, Government fruit experts state that the market facilities at Hamburg are much superior to London. In the German centre every case is opened for inspection, but at Covent Garden only one case of a line of apples is opened, and as a result deception is easily possible.—*Australasian.*

The spirit of co-operation is spreading among Nelson fruitgrowers. On the Motueka side of the Moutere Hills many of the growers have combined to form what is known as "The Moutere Fruitgrowers, Limited," whilst at Stoke, on the Nelson side of the hills, has been formed "The Stoke Fruit Distributing Company." It is gratifying to know that these properly registered trading companies have as one of their main objectives the bringing of the grower and the consumer into closer touch.

GRAPE-CULTURE.

S. F. ANDERSON.

WORK IN THE COOL VINE-HOUSE FOR MARCH.

ONLY the very late grapes will now be left in the houses. As these are disposed of keep the houses as open as possible, to enable the wood to thoroughly mature. So long as the weather keeps warm there is danger of red spider and thrip attacking the green shoots and leaves.

Where it is intended to plant vines in the coming winter the borders of the new vinery should be prepared by trenching, so that the soil may be well aerated and weathered before planting-time.

The vine-borders of old vine-houses are much benefited by a thorough renovation. This work, however, should not be started till May. The borders can then be trenched over, carefully lifting, pruning where necessary, and relaying the roots; adding fresh soil—well-rotted manure and a dressing of bonedust, about 8 lb. to 30¼ square yards. This renovation of old borders when once started should be promptly carried through, and only done in dry weather. On the other hand, should the soil be very dry the roots may require to be settled in their place by a liberal watering. No check to the vines need be feared where the work is properly and promptly carried out, but a great benefit will be manifest the next fruiting season.

WORK IN THE VINEYARD.

Beyond keeping the vineyard clean no particular work will be required during this month. In the case of outdoor Black Hamburgh vines, should the weather be showery after they begin to colour and the foliage be heavy, a few of the lower leaves of the fruit-bearing shoots may be removed, not for the purpose of permitting the sun to get at them, but to allow the wind to dry up the moisture quickly. These lower leaves have performed their functions for the season, and no harm can come from their being taken away. This applies to vines being grown on the double Guyot method on espalier fences.

The chief trouble at this time is the birds. This applies to the outdoor-grown table-grapes, Black Hamburgh and others. Where the area is not large and the market for them good, it is best to cover them in with the small-meshed wire netting. This is done by stretching an ordinary fencing-wire along the surface of the ground 15 in. from the espalier fence on each side, and fastening it firmly to pegs put in

about every 10 ft. Use the 3-ft.-wide netting. One edge of this is fastened to the wire along the ground on each side of the vine-fence and the other two edges brought up against the vines, forming a sort of tent. The ends, and where the top edges of the netting come against vines, must be securely closed, otherwise the birds will get in. The first cost of this is heavy, but, handling the netting with care, it is almost everlasting, as it can be rolled up and put away after use each season.

IN THE CELLAR.

Where winemaking is carried on, if not already done, all cellar machinery must be carefully overhauled and seen to be in perfect working-order. The walls of fermenting-house should be whitewashed with newly slacked lime. If the floor is of earth, this should be swept to a hard surface and then well dusted with freshly slacked lime. All woodwork, such as vat and cask stands and benches, should be scrubbed clean. While this work is going on, which requires a general shifting of things, the hoops of vats and casks can be driven on and their thorough cleaning attended to.

MAKING SMALL QUANTITIES OF WINE.

S. F. ANDERSON.

IF the quantity of grapes to be dealt with is not large—say, up to 500 lb.—the appliances for making the wine are very simple. Every 16 lb. to 17 lb. of grapes yields a gallon of juice or, as it is generally called, "must." Therefore 500 lb. of grapes will make from 30 to 35 gallons of wine.

To ferment this quantity an ordinary wine or spirit hogshead with the head taken out and stood on end will serve very well. Its capacity should be 60 gallons, as the cap of skins and the rising by fermentation takes up a much greater space than that required for the must. The hogshead should be placed on a stand of some kind to allow of a bucket being put under the tap in the bottom of the hogshead.

It is most likely the grapes will not contain more than 19 per cent. of saccharine, so that to make a good-keeping dry (not sweet) wine it will be necessary to add 1 lb. of the best sugar to every gallon of the must. When fermentation takes place this sugar, together with the saccharine contained in the grape, naturally is converted into alcohol, which keeps the wine.

If you desire a sweet wine the sugar must be increased to 3 lb. to the gallon.

Utensils required. — One freshly emptied spirit or wine hogshead, 60 gallons; one freshly emptied spirit quarter-cask, about 35 gallons; one half-inch wire sieve; one wooden bucket or large enamel jug for dipping and carrying; one good-sized tap (1 in.) put in bottom of hogshead to draw off the wine when fermentation is completed.

To make the Wine. — See that the grapes are perfectly ripe; if inclining to shrivel, so much the better. The success of wine depends on the perfect ripeness and condition of the grapes. Place a couple of battens across the top of the open hogshead to rest the sieve on. Then rub the grapes through the sieve, leaving the stems behind. The object of passing them through the sieve is to break the grape and keep back the stems. When all the grapes have been rubbed through add the sugar.

Fermentation starts immediately unless the weather is very cold. As soon as fermentation sets in strong you will find the grape-skins floating on the top like a cap. This cap must be frequently broken up and pushed down. The top of the hogshead should be kept covered with a piece of close calico and a loose hoop to drop over and keep it in its place.

Adding sugar to the must prolongs the fermentation considerably, so that this may go on for some weeks. When it has ceased the wine should be drawn off by tap at the bottom of the hogshead and put into the fresh whisky quarter-cask and filled to the top or bung-hole, but not bunged up until all fermentation has ceased. A small bag of sand is a good thing to put over the bung-hole, as it permits the carbonic-acid gas to escape and prevents the air getting to the wine.

The wine is now made, and only wants racking off, when thoroughly settled and clear, into another cask of the same size. It should be kept for two or more years before using. In the meantime the cask must be kept full. Any air-space may cause some defects in the wine. When it is considered sufficiently matured it should be bottled right off.

The following hints should be observed: Do not let the must or the wine come in contact with iron any more than can be helped. The rubbing of the grapes through the sieve must be completed in one day. If the grapes are weighed as picked it will be easy to calculate the number of gallons that can be expected. All utensils must be very clean. The casks, if freshly emptied of spirit, need not be further cleansed. The wine should be kept in a cool place and not subjected to great changes of temperature. A bunch of dry twigs (dead tea-tree serves very well) tied over the tap inside the cask will assist to prevent the tap choking up with the lees. Some means will be required to press the skins. A false perforated bottom to the hogshead which would permit the wine to go through is the best I can suggest. The skins could then be tramped upon after the wine has been drawn off.

THE FARM GARDEN.

W. H. TAYLOR.

VEGETABLE-CULTURE.

Peas.—It is important for the grower for home use to make a wise selection of varieties. In this respect the properties desired are different to those sought by the grower for market. The latter grows large breadths, and ease of gathering is a very important item. For this reason he uses varieties that ripen almost simultaneously—that is to say, the entire crop is fit for pulling in one or two operations. The gatherer is thus saved the time that would be involved in selecting pods if the crop matured by degrees. The necessity for quick gathering is proved by the number of half-filled pods frequently found in market lots, the result partly of the necessity for quick work, and partly of inexperienced gatherers not being able to detect the filled pods quickly enough. In the home garden, however, quickness in gathering is of less importance, and, an almost daily supply being required, it is necessary to select for growing varieties that mature by degrees. But there are also considerations of quality, and what one may term sentimentality. Something very handsome either in the garden or on the table may give satisfaction to the grower or user, though falling short of others in quantity produced. Others, again, may only consider utility, with a fair standard of quality. The following observations may be of value for future guidance. There are three varieties that may be termed "second earlies" now on the market—viz., English Wonder, Daybreak, and Carter's Springtide. There is very little difference between these, the balance being in favour of Springtide, the joints being closer together and the peas slightly larger. They come at the same time if sown together, and last as long, the weight produced being rather in favour of Springtide. This pea, sown on the 2nd August, came into use on the 30th November, and gave a good supply till the 4th January, or about five weeks. Sherwood, sown on the 2nd August, was first gathered on the 14th December, and lasted till the 4th January, or three weeks. Sutton's Dwarf Defiance, sown on the 23rd August, was first gathered on the 23rd December, and lasted on till the 4th, or less than two weeks. This is a very fine table variety. These notes surely prove that for utility Springtide is most valuable. The flavour is very good, though not of the highest grade. It is well known that early crops of peas are the best, but the later behaviour of a variety may be

different. To test this point I have the same variety sown later now coming on, and hope to report on the experiment later. At present it appears that for utility purposes this and similar varieties are of the greatest value. First-early varieties, by which is meant varieties that take the shortest time to come into use, have not been tried in proper sequence this season. The reason for this it is not necessary to relate, and I will not go back to other years. A comparison, however, is afforded by the pea Richard Seddon, sown on the 14th August and gathered on the 14th December, lasting till the 30th December. Note that this took as long as Springtide to mature, and lasted half the time, or less. A promising first-early—Impudence—is being grown for seed. Four seeds were sent me last year, and seed from these is now maturing. A further crop, sown on the 10th October, was ready for use on the 23rd December. Further observations will be reported on in future issues.

When these notes appear all provision for winter should be made or arranged for except in a few cases.

Turnip-seed may still be sown in small quantity. It is too early yet to sow for winter use.

Leeks may be planted up to the middle of March, but it should be understood that only those planted before this time will attain a large size. Good size is very essential in leeks. Few plants make so many roots or take so much out of the soil as these do. The method of planting has been described before, but will bear repeating, as there are still many who adhere to the old wasteful way of planting in trenches. The plot should be first marked out in lines 15 in. apart. Then hoe a deep drill along each mark, as though intended for beans or peas. Now take a dibber and make a hole its full depth. Put in a plant as far as it will reach; now lift it a few inches to bring the roots, which will be doubled up by insertion in the hole, into a proper position; thrust the dibber into the soil about 3 in. from the hole, and lever the handle over toward the plant. This will fill the hole full of soil and at the same time make it firm about the plant. The plants require to be large, so that at least 8 in. will be below the surface. Needless to say, the soil should be deep and well worked, otherwise the leeks could not be planted, nor would it be fit to grow them.

Endive may be sown now for winter use in the same way as lettuce.

Silver-beet should be sown at once. Sow in drills 15 in. apart, and thin to 12 in. in the rows. The best varieties I have grown are Lucullus and Sutton's seakale beet. The soil should be deep and rich.

Sow *spinach* before the end of this month, remembering that growth will be made during winter. Choose a well-drained plot, and, if it can be managed, let it be a plot that was well manured for a previous crop rather than dig in strong manure now, as this would tend to make the soil cold in winter by holding water. The soil will be fairly rich—if it has been well manured recently, so as to ensure sufficient humus—and a dressing of bonemeal will be sufficient now. The plants should be thinned to 9 in. or 10 in. apart at an early stage.

Tomato-plants require constant attention in respect to keeping away waste growth and tying to their supports. In the matter of tying there is a right and a wrong way to do it. The wrong way leads frequently to chafing against stakes, or cutting through the stem; the right way prevents both evils. The raphia may be passed first round the stake or wire, or round the stem of the plant: sometimes one way comes handiest, sometimes the other. Supposing it goes first round the stake, you put the strand round the back of the stake—that is, the side farthest from yourself and the plant or stem to be tied, the two ends being towards you; cross these, transferring the end in your left hand to your right, and *vice versa;* now bring the two ends round the stem and tie at the back—that is to say, the outer side. It will be found that the tying-material now forms a figure 8; the strands cross between stake and plant, which are thus kept apart. Moreover, there is some room for play under the influence of wind—a great safeguard. The plants are then much more secure from damage than if tied tight and immovable. This is the proper tie for all kinds of plants, and is particularly useful for securing such brittle subjects as chrysanthemums.

Winter Rhubarb.—In the last issue the sowing of seed of winter rhubarb was advised. If seed was put in it should now be up and making plants. Thin out so that no two plants stand together, and leave a space of 12 in. between the plants. This space will not allow for full development, but is sufficient at first. The first lot of stalks should be available for use in about twelve weeks from sowing. That is my experience. After a few weeks the plants will want more room. Each other one may be then either lifted and planted elsewhere or cut out and destroyed. In the meantime they will have given some stalks for use. This class of rhubarb may be regarded as of very special value in a country garden, as it supplies fruit for pies or stewing all the year round. The term "winter" is somewhat of a misnomer; it would be more properly described if called "All-the-year-round" or "Evergreen." It is quite distinct from the ordinary type, which is dormant in winter. No systematic experiments have to my knowledge yet been made in its cultivation, but it is easily seen that the proper

system will be—seed-saving from selected plants, to work up a good strain, and renewal every few years by seedlings rather than by dividing plants. There is a wide field for selection, as plants differ greatly in size of stalk and colour. It is very little use attempting to grow rhubarb of any sort in any but rich ground. It seems impossible to feed it too much. A soil very rich in humus is an absolute necessity to complete success. Stable or farmyard manure is the best of all, because it supplies humus as well as other requirements. Humus provides a good working medium for the roots, and retains moisture in summer. Here, being unable to obtain that form of manure, leaves cut off are returned to the soil as far as possible, and sheep-droppings are collected, soaked in a tub of water, and then poured on between the plants—a tiresome process where water has to be carried some distance, but it must be done or failure will result. Bonemeal is given in winter.

Waste vegetable matter of various kinds, always inseparable from vegetable gardening, such as cabbage-leaves, tops cut from turnips when bunched up—in fact, all such stuff—has a value in the economy of the garden if properly used. It is a good plan to have a plot of ground from which a crop has been cleared dug by degrees and all such stuff dug into it. It returns a certain amount of humus, lacking which soil becomes unworkable and infertile. This waste material if left on the surface withers away in a useless manner. Perishable weeds should be also dug in. Weeds with perennial roots like couch and sorrel, and other garden refuse, such as soft hedge-clippings, should be put in a heap and occasionally sprinkled with lime to destroy fungus spores. This makes in time good vegetable mould valuable for digging in.

Small Fruit.

There are many inquirers about the cultivation of *Cape gooseberries*. This is a fruit that undoubtedly deserves more extensive cultivation. It is an excellent pie fruit, second to none as a preserve, and bottles well. The plant is a biennial—that is to say, it lives two years; but, unlike most biennial plants, it flowers and fruits twice if the plants are raised at the proper time. The time to sow the seed is from mid March to early April. The plant is injured by frost, therefore it requires shelter of some kind. If the seed is sown in a box the seedlings should be pricked off into other boxes, and kept in these till danger of spring frosts is passed. It is important to secure strong plants for putting out, so that considerable-sized bushes are obtained by early autumn after planting; otherwise they are late coming into fruit, and bear but few fruit the first season. For that reason plants raised in spring are of little value. The manner of planting may differ according to circumstances. Some plant against a fence and tie the plants roughly

to it. They are as well, or better, served by planting in an open space. Put three plants in a triangle, each plant 6 in. or 8 in. apart, and the clumps 5 ft. apart. The purpose of planting three plants in a clump is that by interlacing with each other they will afford mutual support against wind. Fruiting commences about March, and continues throughout the winter unless stopped by frost. If frosts are experienced the tops will be killed. Leave these alone. By no means cut them off, or the entire plant may be killed. Early in summer, or late in spring perhaps, new shoots will spring from the bottom. Now cut away the dead tops. The following autumn should see the best crop of fruit, for it begins to ripen earlier, and so has a longer season. After that the plants die.

Strawberries.—There are a number of ways of growing these plants. The market grower looks for the largest quantity of fairly good fruit with a minimum of labour, and frequently adopts what is known as the matted-row system, or some variation of it. For home use fine fruit is the first consideration, the amount of labour required for a small patch not being considerable. Single rows with plants well apart is the plan that is the best for the purpose. At the present time much treading may have made the ground hard. If so, break it up, not by breaking it up deeply, but by surface cultivation. At the same time remove surplus runners—that is, all that are not required for planting. It appears that the almost universal custom with market growers is not to allow the plants to bear the first season after planting. This plan would scarcely satisfy the owner of a private garden, nor is it necessary or the best plan. Probably the grower of acres is unable to give proper attention to securing good runners in sufficient quantity. So he has to devote the first year to growing his plants. My own aim when growing strawberries was to get my best fruit the first season, and plenty of it; and I was not disappointed. The way to proceed is to cause the earliest runners to root, and not allow them to extend further. This has been advised in former numbers of the *Journal*. As soon after this issue as the ground gets moist with rain, and the waning days secure cooler conditions, these runners should be lifted and planted in a nurse bed of good soil. Plant in rows, leaving room for a hoe between, and 6 in. apart in the rows. Ground for a new bed should be got ready early in autumn. Work in a good lot of rich stable manure. Dig the ground well, but do not break the surface soil up too fine. The surface now thrown up should be the surface for planting on. The soil should not again be deeply dug, though it may be advisable to point it over. The object in view is to get the soil well aerated, and allow weed-seeds to grow so that they may be destroyed. This supplies the reason for not changing the surface, as new soil turned up would bring weed-seeds with it. My own practice

favours spring planting. Autumn planting, in my opinion, should never be adopted except in the case of light soil. I always found it best to keep the surface moving until spring. Then there was no danger of the soil souring about the plants. The plants were put out in August in rows 2 ft. apart, and 15 in. from plant to plant. The plants were lifted with a fork, each with a good ball of earth.

Raspberries.—Those who can manage to give a good dressing of stable manure at this time will be wise in doing so. Perfecting the canes is of more importance than anything, and a dressing of fertilizer can be given in winter. Keep the alleys free of weeds and suckers.

Gooseberries.—These also will benefit by a dressing of manure. Where spraying for leaf-spot has been neglected it would be wise to do it even now, though harm may have already resulted from the neglect. Our own bushes were sprayed as soon as the fruit was off. The result is perfectly sound foliage throughout, though some of the bushes were slightly affected before spraying.

Flower-culture.

Carnations that were layered as advised will shortly require attention. Rooting is usually accomplished in five or six weeks, sometimes less. They should be well rooted before being taken off. A little careful examination will show if they are rooted. If they are, they may be at once removed from the plant. Some think—I did myself—that it is best to cut through the connecting-link with the plant, and then leave the layers for a few days before taking them up; but I do not think there is any necessity for it, or advantage. There is no difference of opinion among carnation-fanciers about the best time for planting. All agree that it is well to keep the plants in a nurse bed till spring. August is the time to put them out into their permanent quarters. The reason is the same as given for planting strawberries in spring: it affords opportunities for working the soil up to the last moment, thus securing a well-sweetened soil free from weeds.

Planting *bulbs* should receive attention. All those that flower in spring may be planted now. Narcissi should be planted as soon as possible. The following are spring-flowering species: Gladioli of the Colvilleii family. The following are the best: Albus (the Bride)—the original Bride is white with carmine marks in the centre; this is the best of all the family, and is still extant, but is known by doubtful names, most commonly Pink Bride, Cupid, Insignis, Favourite, Ramosus. Ixias: these are all good. The variety *longiflora* deserves special mention because it is different to any of the others, and I think it is a pity it is not accredited with its old name—*Morphixia paniculata*. This is a flower certain to please, being very suitable for table-decoration. Babiana, Tritonia, Lachenalia, Scilla—wood-hyacinth: the white and flesh-coloured

varieties are best. *Brodiaea coccinea* is a very attractive little flower not often grown as it should be. Chionadoxa has beautiful blue flowers. *Chlidanthus fragrans* has very handsome yellow flowers of good size. A variety is catalogued as *Fragrans major*. This is wrong and very misleading. It is a totally distinct plant of different habit. It is *Hemrocallis major*, and, though a good thing, is inclined to be rather aggressive owing to its strong stooling habit. It is well worth having where there is plenty of room. Once planted it will look after itself. The crocus, hyacinth, and tulip are so well known as to require nothing beyond a reminder to plant now, though a hint about pot culture may be acceptable. The difficulty frequently experienced is to get the flower-head to throw up boldly. The reason is that top growth is always inclined to get ahead of root-development, resulting in stunted heads. When the bulbs are planted in the open ground this difficulty is not met, but in pots the crown of the bulb is of necessity too near the light. The proper thing to do after potting is to lay the pots on their side with the bottom ends against a wall. Then cover them up with a heap of coal-ashes or sand. Coal-ashes are best. Leave them for about six weeks. Then examine and bring out to light any that are pushing out growth. *Lachenalia tricolor* and *Nelsoni* are bright, easily cultivated plants. *Milla* or *Tritelia uniflora* are showy little bulbs. Some object to them because of an oniony smell. Ranunculus are very beautiful, though not so uniformly successful as most bulbs. They will not do in a soil that alters its character under the changing influence of wet and dry. It must be permanently friable and non-binding. Then they will succeed. Sparaxis varieties are all worth while.

Preparations should be made for raising *biennials*. They may be sown at any time from now up to the beginning of April. Most of this class of plant will fail to flower next season unless the plants are raised in autumn. Others will flower, but at a much later period. Antirrhinums are of this nature. Sow them in autumn for early summer flowers, and in spring for autumn flowers. *Gypsophila paniculata*, a much-sought-for plant, will flower next season if sown in autumn. This plant should be grown on in small pots. It is very hard to establish if the roots are broken. Canterbury bells; East Lothian, Brompton, and Intermediate stocks; dianthus, columbines, gaillardias, *Coreopsis grandiflora*, and various other perennials, as well as biennials, should be also sown, such as sweet-williams, and carnations of all races.

The call for better farming means, first of all, right reasoning and a study of economic production; it means more and better farm equipment; fewer acres to the man, scientifically cultivated; greater variety of crops, heavier yields per acre, and more and better live-stock.

THE POULTRY INDUSTRY.

F. C. Brown.

MARCH MATTERS.

The inauguration of the winter-egg season is at hand—the time when the maximum returns are to be obtained by those who have bred and managed their pullets to the best advantage. Because guaranteed fresh eggs are worth big money in winter it is not to be supposed that all plants then carry profitable stock. The winter layer costs, on the whole, more to produce and maintain than a bird bred in its natural season, and unless the winter-egg pullets are all bred to the right time and brought to lay just when their eggs are needed most the production of winter eggs is seldom a really profitable undertaking. With pullets going into a moult just on the dear-egg season, and many not laying as strongly as they should, through absence of proper quarters or weakness in management, it would pay some poultrymen better to hatch a little later in the season—October and November, thus taking no risk of the pullets going into a premature moult—and depend more on eggs laid in the cheaper season, which, if the price be too low, can be held over in a preservative and sold at a good figure later on. It must be remembered that the very dear season is being more and more curtailed, and it therefore becomes increasingly imperative that the pullet intended for winter-egg production should be handled with the greatest care, so that she can be depended upon to lay just when required.

It is to be feared too many fail to attach due importance to the cost of production. If the early-hatched pullet is to pay her way, she must be encouraged to give every egg she can, provided, of course, she is not unduly forced in this connection. In the first place, she must be brought naturally to maturity, and must not be subjected to many changes in environment if her first laying season is to proceed without check. I have lately seen owners with pullets which should come to their laying season about March changing them from run to run, with the object of retarding their laying till the dear-egg season sets in. This is a good policy where the birds being bred are coming too rapidly to maturity and promise to commence their laying season before they are sufficiently well developed to enable them to lay a decent-sized egg and to last out a profitable season. Where, however, the birds are sufficiently matured—having been bred in July or August—and are ready

for a good laying season, they should not be interfered with in any way; though, of course, it is not necessary to force them at this stage by feeding a full meat ration. In any case they will probably go into a moult before winter, but, if they are of the heavy-laying type, the moult should only be a light one, and this will certainly not lead to lessened production in the dear season to the same extent as will any artificial postponement of the laying season.

The man who will be successful in having his birds laying just when he wants them to is he who really knows the strain he is working with. Some strains mature at, say, four and a half months old, while others will not mature till they are six months of age. Being acquainted with the average age at which his particular strain will mature enables the breeder to hatch at the right time and carefully bring his birds to lay just when they are in fit condition. Unfortunately, too many poultrymen have such a mixture of strains in their flocks that they have no means of knowing when to expect them to begin business. One of the curses of the poultry industry at the present time is the craze for early maturity and the mad striving after yield, regardless of the size of eggs laid. Modern utility-poultry breeders have good reason to congratulate themselves on the perfection of the laying-machine into which they have converted certain races of domestic poultry, but there is always a limit to man's interference with nature. We have a striking demonstration of this in the deterioration in the size of eggs resulting from phenomenal yield. It is only natural to expect the bird forced (by selection) to early maturity—built on fine, small lines—to lay small eggs; but we have birds which are of good desirable size and coming to full maturity before their laying season the eggs from which are most disappointing.

THE POULTRY GOLD-MINE.

A correspondent sends me a page advertisement from an American magazine which contains the statement that £300 has been made from sixty hens in ten months on a city lot 40 ft. square, and asks, "Could you advise me as to the value of this statement? It appears too much like a royal road to the poultry business."

I have repeatedly been called upon to disillusion many who have been misled by similar overdrawn statements into taking up poultry-keeping as a means of livelihood. The American boomster says nothing of the settings and birds he sold at fancy prices, which were almost entirely responsible for the return he advertises. I have insistently declared that poultry-keeping as a business is only successful under exceptional circumstances, the chief of which is that the man in charge has a combination of necessary characters found in few individuals. Experi-

ence, enthusiasm, business capacity, passion for detail, and a love of neatness and cleanliness, are qualities which must be possessed in greater or lesser degree; and combined with these there must be the necessary capital behind the venture, while the site of the plant must be suitable, and the location must be near a good market. The business of keeping poultry on a large and extensive scale is indeed so exacting that it cannot be expected it will succeed except with a small minority. Where the great bulk of the poultry are being kept to-day is where they will be kept in the future—on the farm, as a side line. Realizing this, it is the desire of the Department to raise the standard of farm poultry, to bring about a keener appreciation of the possibilities in poultry products on the part of the farmer as a mere adjunct to his general farming operations, not so much on the sheep-farm or cattle-run, but on the small farm where the successful production of the minor products bulks large in the year's revenue. Many a farmer's wife or daughter has paid for the groceries and has been provided with a little pocket-money from the poultry, even though these may be a nondescript collection and housed and managed in a rough-and-ready manner. Instead of having to feed the birds out near the stable or cow-shed and hunt along the hedges for the eggs, how much more pleasant it would be, and decidedly more profitable, were the birds kept in comfortable quarters and managed as they should be. Of course, range for young stock is always desirable, and a free run for the hens for an hour or two in the afternoon is an advantage. If poultry-keeping were studied by the girls on the farm, and only young and high-type layers of a general-purpose breed kept, and then only sufficient to be handled with advantage, what pleasurable and satisfactory work it could be made! Viewed as it should be, as a properly conducted side line on the small farm or the suburban holding, poultry-keeping becomes an important wealth-creating medium. At the present time there are probably more people producing eggs and poultry in the Dominion than are the people engaged in producing any other commodity. Hardly a farm is without its few fowls, while the majority of suburban and country residents have their little flocks. The individual production is small, but the aggregate is great; in fact, the total wealth produced by medium of the hen would be found to be greater than that of any of our smaller industries could an accurate census be obtained. It is safe to assume that the great majority of the people keeping poultry find it profitable to do so, especially in these days when so many facilities are afforded for the securing of really profitable layers. Indeed, the most gratifying feature of the industry at the present time is the improved character of farm poultry from an egg-producing point of view, while a desirable tendency is observable on the part of the farmer to keep general-purpose breeds of the laying type. What is

most to be desired now is an improvement in the methods of keeping birds on the farm, together with a more sane method of marketing. Poultry would then be a much more profitable side-line than it has ever been in the past.

Even with the improved standing of utility-poultry keeping in New Zealand of late years, some people ridicule the fact that poultry can be made really profitable stock. They are certainly right so far as the stock they fancy are concerned. To enthuse over Brahmas, Cochins, and Langshans, as well as the extreme fancy types of some other breeds, proves that they regard poultry mainly as a monstrosity for the exhibition of extraordinary form or the display of fine feathers. A well-known retired southern Langshan-fancier admitted to me the other day that his pullets did not commence to lay till they were twelve to thirteen months old. This was a result of continual checking of the laying-propensity in order to secure extreme size for the show-pen. Of course, such stock are unprofitable to any one but the fancier. The best argument that can be produced to prove the increasing popularity of poultry-keeping, now that the utility characters of poultry are being developed, is that according to the last census the number of birds in the Dominion increased by over half a million above the number returned at the previous census.

DISEASE.

When a bird is moulting she is just in the condition to contract disease, especially such a disease as tuberculosis. It is imperative, therefore, that the birds at this time should be in as good a condition of health as possible. Naturally they are not as robust as when they commenced to lay, but their blood should be in good order and their surroundings should be as sanitary as possible. A plentiful provision of green food, clean water, and grit are also important, while a plain nourishing diet should be supplied. If birds which it is desired to breed from (the highest-type layers of the flock) are found to be affected with tuberculosis—and it is often the case that the heaviest layer is the first bird to contract disease—no sentiment should be allowed to enter into the matter: they should be killed. Drastic methods of suppression are most necessary, and no time should be lost in thoroughly cleaning up the plant and removing all sources of infection, chief amongst which is the droppings of affected birds.

The most serious cases of tuberculosis I have come across have been where the birds have been housed in badly constructed and ill-ventilated quarters.

The symptoms of tuberculosis are many, but it is only the man of experience who can detect them. To the novice a wasted appearance

is perhaps the plainest sign. Then the breast-bone stands out sharply from the body, and the neck is devoid of flesh. The comb presents an unhealthy appearance. Diarrhœa accompanies the disease, and the excreta are of an unnatural colour. The bird generally limps in the right leg during the later stages of the disease. When opening up a tuberculous bird the liver is found to be greatly enlarged by reason of the presence of tubercle nodules scattered throughout the mass. Sometimes the terms " spotted liver " and " going light " have been used to designate the condition of a bird whose liver presents this appearance. It is, however, tuberculosis and nothing else. Of course, for this there is absolutely no cure.

The Late Chicken.

A mistake in brooding made by too many poultrymen is to entirely disregard climatic influences. They maintain the same conditions in the brooder in warm summer weather as in a cold period in early spring. On the other hand, there have been instances in my experience where the opposite mistake has been made, the breeder arguing that with warmer weather the chickens can do with less heat, with the result that in the early morning or during a sudden cold spell the chickens are insufficiently protected. Successful brooding demands constant observation and attention. While the heat should not be reduced except when there is no risk of a chill, so the heat should be reduced when it is naturally present.

Many losses in brooder chickens have taken place this season. In the majority of cases the mortality was due to the old trouble of overcrowding. Probably the greatest weakness in artificial brooding is allowing chickens to huddle, this being induced either by overcrowding, poor ventilation, excessive heat, or insufficient warmth. Huddling means sweating, and sweating is the great cause of brooder mortality. Its effect is manifested in several ways. The sweated condition, which generally induces chill, brings on a weakened state which is often manifested by bowel trouble and a general lowering of the vitality. Another effect of overcrowding too common this season is a weakened condition of the limbs, the visible signs of which are swellings in the joints, with a gangrenous condition supervening, the swelling first making its appearance in the hock-joint and then travelling to the wing. In a few days the neck and head swell, and then death is not far off. In all these cases arising from improper brooder-management nothing can be done for the chickens badly affected. Those in the early stages may be saved and the trouble prevented from attacking the sound chicks by providing the right conditions — the desired temperature (90° and less according to age) and giving ample space for the chickens to spread out while obtaining the necessary heat, together

with adequate ventilation. Good feeding is necessary for chickens, but it is not nearly such a vital consideration as provision of the desired brooding-temperature and proper ventilation. Be guided by the old hen.

GREEN FEED.

At this time of the year—indeed, at all times—an adequate provision of green feed for poultry is imperative. It not only keeps the birds in good health, but it replaces to a material extent more costly foods. There should be no lack of it on the farm except in dry spells, which should be provided against. Watercress is excellent. The best of all green feed, however, is lucerne, and there is no reason why the vast majority of those who keep poultry should not have this in continual supply. There are few soils in the Dominion where it cannot be grown. The chief requirement in establishing lucerne is a thoroughly clean seed-bed and applying lime to the soil. In the poultry section at Ruakura Farm of Instruction lucerne is thriving, and is providing all the green food necessary for the flocks.

THINGS TO BE REMEMBERED.

Do not waste the poultry manure. It is a highly valuable fertilizer.

Do not allow the males to run with the layers except in the breeding season.

All surplus cockerels four and a half months old and over should now have been marketed.

The table cockerel is only truly profitable when marketed before the second lot of feathers commence to develop.

A pinch of sulphur in the mash is beneficial when the fowls are moulting.

Do not adopt every new idea. Test it before applying it in general practice.

Overcrowding is one of the worst and most frequent mistakes made by poultrymen.

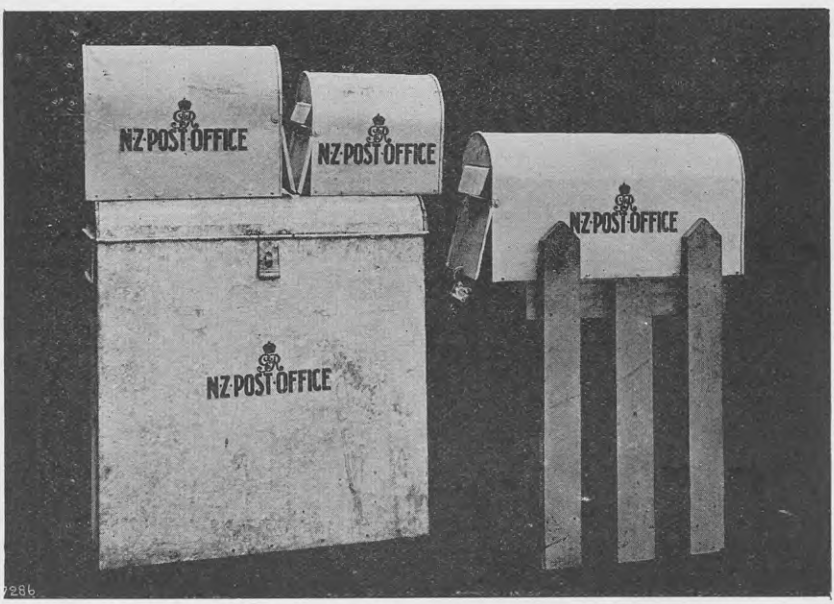
Good management, of which economy is an essential detail, is imperative to the best results.

Roup may be almost invariably traced to dampness or undue exposure to wet and cold weather, lice and want of cleanliness being contributing causes.

In laying out a plant the principal point to consider is economy in labour. Locate the buildings in such a way that the birds can be attended to and the buildings cleaned with as little loss of time as possible.

RURAL DAILY MAIL DELIVERY.

The forward movement by the Post and Telegraph Department to provide the New Zealand farmer with a daily mail delivery is being fully appreciated. The first supply of 500 of the special Canadian boxes, secured for the purpose at a cost of 15s. each, was rapidly exhausted, and another 500 boxes, to arrive at the end of this month, are practically all disposed of. Cheaper locally made boxes are being furnished, and the demand for these is greater than the contractor can keep pace with. These simple galvanized-iron boxes are provided with no means, as are the Canadian boxes, to indicate whether there is mail-matter to



Private Postal Boxes for Rural Mail Routes.

collect or whether anything has been left by the mailman. A substitute has been devised by some farmers in the shape of a small flag, hoisted when the box has to be cleared.

The cheaper boxes are here illustrated. While the cost of the Canadian box is 15s., the three smaller ones shown, Nos. 1, 2, and 3, are sold at 5s., 7s., and 9s. respectively. The large one, sold at £1 1s., is a community box, for erection at the junction of the mail route and a side road on which several farmers live, or it is useful in the case of a large holding where the mail-matter is of a bulky nature. Padlocks, with three keys, are provided for 3s. 9d. for all classes of boxes.

CO-OPERATIVE EXPERIMENT RECORD.

TURNIPS, YELLOW AND WHITE FLESHED.

SOUTH ISLAND.

1911–12.

A. MACPHERSON.

KAIKOURA DISTRICT.

Manurial and Variety Tests, conducted by J. A. Coup, Kaikoura Suburban.

THE land selected was a clayey loam, uniform in character, and was in English grass for about eleven years prior to being ploughed up for the tests in November, 1911, when it was ploughed 6 in. deep. It was afterwards disc-harrowed three times, tine-harrowed twice, and rolled once at the beginning of December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 1¼ cwt. superphosphate per acre was applied. The seeds and fertilizers were sown on the flat in rows 14 in. apart on 16th December, 1911. The roots were pulled and weighed on 25th May, 1912. Results :—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	22·30	2·94	Gain, 12·70
2	Superphosphate, 3 cwt. ..	0 14 3	26·34	4·16	,, 16·74
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	25·60	3·95	,, 16·00
4	No manure	..	9·60	1·85	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	19·44	3·19	Gain, 9·84
6	No. 5 mixture, 1½ cwt... ..	0 8 11	20·70	2·56	,, 11·10
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	19·19	2·43	,, 9·59
8	Albatross guano, 2 cwt. ..	0 10 0	14·90	2·01	,, 5·30

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	18·18	2·40
2	,, Purple-top Scotch	11·86	1·39
3	,, Inche's Bronze-top	12·38	1·26
4	,, Old Meldrum	11·52	1·01
5	,, Stobo, Blue	15·91	1·77
6	Challenge—Waite's Eclipse	19·19	2·52
7	,, Dale's Hybrid	19·95	2·64
8	Sutton's All the Year Round	9·09	0·50
9	,, Centenary	25·00	1·26
10	,, Early Sheepfold	16·67	0·75
11	,, Favourite Purple-top	25·00	2·02
12	,, Perfection Green-top	24·75	1·09
13	,, Romney Marsh	31·06	1·09

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—*continued.*	Tons.	Tons.
14	Montgomery's Aberdeen Green-top Yellow	14·65	1·51
15	„ Aberdeen Purple-top Yellow	18·94	2·27
16	„ Fosterton Hybrid	22·48	2·52
17	„ Green-top Yellow Tankard	22·98	3·03
18	Nimmo and Blair's Challenger	13·89	1·90
	White-fleshed—		
19	Garton's Hardy Green Globe	39·40	4·29
20	Sutton's Red Paragon	14·90	1·64
21	„ Early Six Weeks	31·57	2·14
22	„ Purple-top Mammoth	25·25	1·77
23	„ Pomeranian White Globe	19·95	1·90
24	„ Imperial Green Globe	18·94	1·26
25	Montgomery's White Stone	28·79	2·78
26	„ Devonshire Greystone	30·80	3·02
27	„ Lincolnshire Red Globe	25·25	4·16

Inspector Goodall reports: The land was in excellent tilth to receive the seed. The sowing was completed under favourable conditions. The young plants suffered considerably from attack of the turnip flea-beetle (*Haltica nemorum*), consequently the plants were rather thin in places. At time of harvesting the crop all varieties were slightly affected with turnip phoma rot (*Phoma napo-brassica*).

RANGIORA DISTRICT.

Variety Test, conducted at Rangiora Boys' High School by the Agricultural Class in charge of Mr. S. A. Clark, B.A., Assistant Master.

The tests were carried out on the school experimental area, the soil being a rich loam. Prior to the experiment the land had been for a number of years in grass. It was ploughed up in May, 1911, and dug over the following September and well cultivated. The soil in the area selected was uniform in character. The seeds were sown on the flat in rows on 19th October, 1911. No manures were applied. The roots were pulled and weighed the second week in April, 1912. Results:—

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	17·21	3·90
2	„ Purple-top Scotch	18·26	3·81
3	„ Inche's Bronze-top	14·43	3·59
4	„ Old Meldrum	10·44	2·86
5	„ Stobo, Blue	16·49	3·97
6	Challenge—Waite's Eclipse	21·10	3·55
7	„ Dale's Hybrid	16·80	3·73
8	Sutton's All the Year Round	17·21	2·95
9	„ Centenary	21·25	2·42
10	„ Early Sheepfold	28·22	2·94
11	„ Favourite Purple-top	24·69	3·66
12	„ Perfection Green-top	18·86	2·25
13	„ Romney Marsh	25·81	2·62
14	Nimmo and Blair's Challenger	11·27	1·87
	White-fleshed—		
15	Garton's Hardy Green Globe	17·25	4·13
16	Sutton's Early Six Weeks	16·51	3·85
17	„ Purple-top Mammoth	19·62	4·64
18	„ Pomeranian White Globe	18·25	3·27
19	Montgomery's White Stone	18·92	4·05
20	„ Lincolnshire Red Globe	18·40	3·66

LINCOLN DISTRICT.

Manurial and Variety Tests, conducted by D. Gillanders, Darfield.

The land selected was uniform in character, and was a rich loam on a clayey subsoil. It had been in English grass from 1906 to 1909, in wheat 1910, and manured with 1 cwt. superphosphate to the acre. For the present experiment it was ploughed in July, 1911; grubbed and tine-harrowed several times in October; ploughed in December, 1911; and tine-harrowed and rolled twice in January, 1912. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 74 lb. Japanese superphosphate and 37 lb. bone manure per acre was applied. The seeds and fertilizers were sown on the flat in drills on 12th January, 1912; drills 14 in. apart. The roots were pulled and weighed on the following dates: Manurial test, 10th July, 1912; variety test, 6th August, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, ¾ cwt. ..	0 3 7	9·15	0·96	Gain, 2·57
2	Superphosphate, 1½ cwt. ..	0 7 2	12·85	1·70	„ 6·27
3	Superphosphate, 1 cwt.; bone-dust, 42 lb.	0 7 0	18·00	3·05	„ 11·42
4	No manure	..	6·58	1·44	..
5	Same as No. 3 mixture; sulphate of potash, 14 lb.	0 8 10	14·62	1·21	Gain, 8·04
6	No. 5 mixture, ¾ cwt... ..	0 4 6	14·78	2·25	„ 8·20
7	Same as No. 6 mixture; salt, 7 lb.	0 4 7	14·78	1·21	„ 8·20
8	Albatross guano, 1 cwt. ..	0 5 0	14·46	1·70	„ 7·88

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	16·66	2·27
2	„ Purple-top Scotch	11·36	1·51
3	„ Inche's Bronze-top	9·09	2·27
4	„ Old Meldrum	9·84	1·51
5	„ Stobo, Blue	9·84	1·51
6	Challenge—Waite's Eclipse	10·60	1·51
7	„ Dale's Hybrid	13·63	1·51
8	Sutton's All the Year Round	9·09	0·75
9	„ Centenary	12·88	0·75
10	„ Early Sheepfold	16·66	0·75
11	„ Favourite Purple-top	28·79	1·51
12	„ Perfection Green-top	18·18	0·75
13	„ Romney Marsh	16·66	0·75
14	Montgomery's Aberdeen Green-top Yellow	18·18	0·75
15	„ Fosterton Hybrid	25·76	1·51
16	„ Green-top Yellow Tankard	25·76	1·51
17	Nimmo and Blair's Challenger	9·84	0·75
	White-fleshed—		
18	Garton's Hardy Green Globe	42·42	2·27
19	Sutton's Red Paragon	10·60	1·51
20	„ Purple-top Mammoth	37·88	2·27
21	„ Pomeranian White Globe	38·64	1·51
22	„ Imperial Green Globe	21·21	1·51
23	Montgomery's White Stone	39·30	1·51
24	„ Devonshire Greystone	21·98	1·51
25	„ Lincolnshire Red Globe	39·30	2·27

Inspector Scott reports: Owing to the excessive rains of December of last year, the turnips in these tests were not sown as early as had been intended. Even at date of sowing the soil was scarcely in a free enough state. In a measure this somewhat adverse condition of soil operated against the crop right throughout the season. In some of the varieties the germination was very poor, in others very fair. In the yellow-fleshed varieties it was early apparent that Sutton's Favourite Purple-top would be the heaviest yielder. Montgomery's Fosterton Hybrid and Green-top Yellow Tankard were the next best. The latter variety grows well out of the ground, and ought to prove a suitable one to use when grass is to be sown with the turnips. Garton's Hardy Green Globe, which stood out conspicuously as the best of the white-fleshed varieties, is a firm-fleshed turnip. The two next best were Montgomery's White Stone and Lincolnshire Red Globe. Of these two the latter is the firmer turnip. Sutton's Pomeranian White Globe and Purple-top Mammoth both yielded fairly well, but both proved to be spongy in the centre.

Fairlie District.

Manurial and Variety Tests, conducted by W. J. Geddings, Fairlie.

The land selected was a sandy loam on a shingly subsoil, and had been in grass prior to being ploughed up for this experiment on 1st August, 1911. It was disc-harrowed and grubbed in August, and tine-harrowed and Cambridge-rolled in November, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. superphosphate per acre was applied. The seeds and fertilizers were sown in raised drills on 20th November, 1911; drills 26 in. apart. The roots were pulled and weighed on 30th June, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	15·42	1·42	Gain, 3·77
2	Superphosphate, 3 cwt. ..	0 14 3	16·77	2·23	,, 5·12
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	21·18	2·64	,, 9·53
4	No manure	..	11·65	0·81	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	23·29	2·85	Gain, 11·64
6	No. 5 mixture, 1½ cwt... ..	0 8 11	15·70	2·44	,, 4·05
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	19·33	1·78	,, 7·68
8	Albatross guano, 2 cwt. ..	0 10 0	19·58	1·62	,, 7·93

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons
1	Garton's Green-top Scotch	18·77	1·30
2	,, Purple-top Scotch	20·81	1·85
3	,, Inche's Bronze-top	15·91	1·63
4	,, Old Meldrum	12·65	2·45
5	,, Stobo, Blue	11·01	1·63
6	Challenge—Waite's Eclipse	13·87	0·81
7	,, Dale's Hybrid	12·24	0·40
8	Sutton's All the Year Round	17·09	2·04
9	,, Centenary	17·54	0·81
10	,, Early Sheepfold	24·89	1·63
11	,, Favourite Purple-top	21·22	0·40
12	,, Perfection Green-top	20·44	0·40
13	,, Romney Marsh	27·29	1·21

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—*continued.*	Tons.	Tons.
14	Montgomery's Aberdeen Green-top Yellow	14·28	0·81
15	,, Aberdeen Purple-top Yellow	15·50	2·45
16	,, Fosterton Hybrid	16·32	2·04
17	,, Green-top Yellow Tankard	19·99	2·45
18	Nimmo and Blair's Challenger..	14·28	0·81
	White-fleshed—		
19	Garton's Hardy Green Globe	22·85	2·04
20	Sutton's Red Paragon	24·89	2·45
21	,, Early Six Weeks	17·09	1·63
22	,, Purple-top Mammoth	18·77	1·21
23	,, Pomeranian White Globe	16·76	1·63
24	,, Imperial Green Globe	16·32	0·46
25	Montgomery's White Stone	20·81	0·81
26	,, Devonshire Greystone	22·03	1·63
27	,, Lincolnshire Red Globe	26·11	2·04

Inspector Manning reports: The experiments were initiated under favourable conditions, the land being in perfect order. The grub did some damage to the plants in their early growth. The weather was unfavourable from 1st January to date of harvesting, being too cold and wet. The crop was free from fungoid disease.

WAIMATE DISTRICT.

Manurial and Variety Test, conducted by G. Reynolds, Willowbridge.

The land selected was a sandy loam on a clay subsoil. It was in grass three years prior to 1910 when ploughed and crop of turnips taken. For present experiment it was skim-ploughed and tine-harrowed in October, 1911; rolled, ploughed 6 in. deep, tine-harrowed, disc-harrowed, tine-harrowed, rolled, and again tine-harrowed several times and thrown into raised drills during the first half of November, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 1 cwt. superphosphate per acre was applied. The seeds and fertilizers were sown in raised drills on 15th November, 1911; drills 28 in. apart. The roots were pulled and weighed on 30th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	16·42	2·32	Gain, 6·42
2	Superphosphate, 3 cwt. ..	0 14 3	19·82	3·21	,, 9·82
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	17·67	2·85	,, 7·67
4	No manure	..	10·00	1·42	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	16·60	2·14	Gain, 6·60
6	No. 5 mixture, 1½ cwt. ..	0 8 11	18·57	2·32	,, 8·57
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	15·00	2·32	,, 5·00
8	Albatross guano, 2 cwt. ..	0 10 0	19·97	2·32	,, 9·97

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	13·39	1·67
2	,, Purple-top Scotch	18·21	2·67
3	,, Inche's Bronze-top	11·07	1·42
4	,, Old Meldrum	11·96	1·78
5	,, Stobo, Blue	13·75	1·96
6	Challenge—Waite's Eclipse	16·42	1·78
7	,, Dale's Hybrid	12·85	2·32
8	Sutton's All the Year Round	17·67	1·67
9	,, Centenary	18·39	1·25
10	,, Early Sheepfold	19·10	1·25
11	,, Favourite Purple-top	16·11	2·14
12	,, Perfection Green-top	15·89	1·42
13	,, Romney Marsh	14·65	1·42
14	Montgomery's Aberdeen Green-top Yellow	8·39	1·42
15	,, Aberdeen Purple-top Yellow	15·89	2·14
16	,, Fosterton Hybrid	15·00	2·32
17	,, Green-top Yellow Tankard	17·85	2·85
18	Nimmo and Blair's Challenger	9·46	1·60
	White-fleshed—		
19	Garton's Hardy Green Globe	25·11	2·67
20	Sutton's Red Paragon	25·35	2·50
21	,, Early Six Weeks	21·42	1·96
22	,, Purple-top Mammoth	27·50	3·57
23	,, Pomeranian White Globe	27·14	3·21
24	,, Imperial Green Globe	23·03	1·96
25	Montgomery's White Stone	27·50	2·85
26	,, Devonshire Greystone	27·14	3·21
27	,, Lincolnshire Red Globe	24·28	3·03

Inspector Macdonald reports: The season during growth was particularly wet. In the manurial as well as the variety tests all roots had a healthy appearance.

OAMARU DISTRICT.

Variety Test, conducted by John Mahoney, Whitstone, Oamaru.

The land selected was a rich loam with clay and sand subsoil, and was in grass for years prior to being broken up for the present experiment. The land was ploughed and disc-harrowed twice in July, 1911; ploughed, tine-harrowed three times, and cultivated twice in August; and tine-harrowed in December, 1911. The seeds were sown in raised drills on 9th December, 1911; drills 26 in. apart. No manures were applied. The roots were pulled and weighed on 23rd May, 1912. Results:—

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	29·16	3·24
2	,, Purple-top Scotch	34·72	3·24
3	,, Inche's Bronze-top	33·34	3·24
4	,, Old Meldrum	19·98	2·70
5	,, Stobo, Blue	32·41	2·77
6	Challenge—Waite's Eclipse	19·98	2·70
7	,, Dale's Hybrid	31·02	2·77

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—*continued.*	Tons.	Tons.
8	Sutton's All the Year Round	37·04	4·63
9	,, Centenary	21·76	4·63
10	,, Early Sheepfold	21·76	4·63
11	,, Favourite Purple-top	37·04	4·63
12	,, Perfection Green-top	42·13	4·63
13	,, Romney Marsh	34·26	3·24
14	Montgomery's Aberdeen Green-top Yellow	29·16	3·24
15	,, Aberdeen Purple-top Yellow	49·54	4·63
16	,, Fosterton Hybrid	40·74	4·63
17	,, Green-top Yellow Tankard	40·28	4·63
18	Nimmo and Blair's Challenger..	40·28	4·63
	White-fleshed—		
19	Garton's Hardy Green Globe	46·30	4·63
20	Sutton's Red Paragon	47·22	4·63
21	,, Early Six Weeks	41·67	4·63
22	,, Purple-top Mammoth..	49·54	4·63
23	,, Pomeranian White Globe	50·93	3·24
24	,, Imperial Green Globe	51·85	4·63
25	Montgomery's White Stone	51·85	4·63
26	,, Devonshire Greystone	54·17	4·63
27	,, Lincolnshire Red Globe	47·22	4·63

Inspector Taylor reports: Nos. 5, 14, 17, were rather deeply rooted. No. 15, a splendid sound turnip. No. 18, a very hardy and sound turnip. No. 19, very large and sound.

Manurial and Variety Tests, conducted at Waitaki Boys' High School, Oamaru.

The tests were carried out on the school experimental area, the soil being light, of rather poor quality, on a clay subsoil. It was in grass for some years prior to 1910, when it was ploughed up and a crop of potatoes taken. For present experiment it was ploughed in August, 1911, and disced and tine-harrowed several times in September, and grubbed and hoed by pupils of the agricultural class in October, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test no manures were applied. The seeds and fertilizers were sown in raised drills on 6th November, 1911; drills 26 in. apart. The roots were pulled and weighed on 14th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	11·61	1·89	Gain, 4·59
2	Superphosphate, 3 cwt. ..	0 14 3	12·83	2·16	,, 5·81
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	12·42	2·16	,, 5·40
4	No manure ..		7·02	1·21	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	9·45	1·62	Gain, 2·43
6	No. 5 mixture, 1½ cwt... ..	0 8 11	9·59	1·62	,, 2·57
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	9·31	1·75	,, 2·29
8	Albatross guano, 2 cwt. ..	0 10 0	10·80	1·62	,, 3·78

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	10·26	2·16
2	,, Purple-top Scotch	9·18	2·16
3	,, Inche's Bronze-top	10·80	2·70
4	,, Old Meldrum	8·10	2·70
5	,, Stobo, Blue	13·50	2·70
6	Challenge—Waite's Eclipse	14·58	2·70
7	,, Dale's Hybrid	10·26	2·16
8	Sutton's All the Year Round	14·58	2·70
9	,, Centenary	15·12	1·08
10	,, Early Sheepfold	17·28	2·16
11	,, Favourite Purple-top	12·42	2·70
12	,, Perfection Green-top	14·04	1·62
13	,, Romney Marsh	11·90	1·62
14	Montgomery's Aberdeen Green-top Yellow	14·58	1·62
15	,, Aberdeen Purple-top Yellow	12·96	2·16
16	,, Fosterton Hybrid	11·90	2·70
17	,, Green-top Yellow Tankard	12·42	2·16
18	Nimmo and Blair's Challenger	8·10	1·62
	White-fleshed—		
19	Garton's Hardy Green Globe	19·44	2·70
20	Sutton's Red Paragon	17·28	1·62
21	,, Early Six Weeks	16·20	1·08
22	,, Purple-top Mammoth	17·28	2·16
23	,, Pomeranian White Globe	16·74	1·08
24	,, Imperial Green Globe	17·28	2·16
25	Montgomery's White Stone	14·58	2·70
26	,, Devonshire Greystone	16·20	2·70
27	,, Lincolnshire Red	18·36	3·24

Inspector Taylor reports: The sowing of the plots was carried out under favourable conditions. The diamond-back moth (*Plutella cruciferarum*) attacked the leaves during the months of March and April, but not to any extent.

PALMERSTON DISTRICT.

Manurial and Variety Tests, conducted by A. D. Gillies, Hampden.

The land selected was a clayey loam on a gravelly subsoil, and was in oats in 1910. For the present experiment it was cultivated in March, 1911; ploughed 9 in. deep in May; tine-harrowed twice in September; cultivated twice, tine-harrowed twice in October; and thrown into raised drills on 17th December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. Argyle guano per acre was applied. In the manurial test the seed and fertilizers were sown in raised drills on 8th November, 1911, and in the variety test the seeds and fertilizers were sown in raised drills on 18th November, 1911; drills 28 in. apart. The roots were pulled and weighed on 17th June, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	9·42	1·57	Gain, 4·19
2	Superphosphate, 3 cwt. ..	0 14 3	16·48	2·61	,, 11·25
3	Superphosphate, 2 cwt.; bone-dust ¾ cwt.	0 14 0	15·17	2·61	,, 9·94
4	No manure	..	5·23	2·09	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	12·57	2·61	Gain, 7·34
6	No. 5 mixture, 1½ cwt. ..	0 8 11	15·43	2·88	,, 10·20
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	16·48	2·09	,, 11·25
8	Albatross guano, 2 cwt. ..	0 10 0	13·60	2·61	,, 8·37

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	7·85	2·09
2	,, Purple-top Scotch	2·61	1·04
3	,, Inche's Bronze-top	8·38	1·57
4	,, Old Meldrum	8·64	1·83
5	,, Stobo, Blue	8·38	2·09
6	Challenge—Waite's Eclipse	14·14	2·35
7	,, Dale's Hybrid	6·80	1·57
8	Sutton's All the Year Round	27·20	2·88
9	,, Centenary	9·16	1·04
10	,, Early Sheepfold	14·14	1·30
11	,, Favourite Purple-top	9·94	1·57
12	,, Perfection Green-top	11·26	1·57
13	,, Romney Marsh	8·38	1·30
14	Montgomery's Aberdeen Green-top Yellow	4·19	1·30
15	,, Aberdeen Purple-top Yellow	10·20	2·09
16	,, Fosterton Hybrid	15·19	1·57
17	,, Green-top Yellow Tankard	12·57	2·61
18	Nimmo and Blair's Challenger	9·42	1·57
	White-fleshed—		
19	Garton's Hardy Green Globe	25·64	2·61
20	Sutton's Red Paragon	25·64	1·83
21	,, Early Six Weeks	26·16	2·09
22	,, Purple-top Mammoth	41·86	2·61
23	,, Pomeranian White Globe	28·25	2·35
24	,, Imperial Green Globe	29·30	2·09
25	Montgomery's White Stone	34·00	2·61
26	,, Devonshire Greystone	30·35	2·09
27	,, Lincolnshire Red Globe	27·73	2·61

Inspector Dalgliesh reports: The continued wet and cold weather seriously affected the root crops. In the yellow-fleshed variety test the roots were small but very sound. Plot 8, Sutton's All the Year Round, stood out very prominently on its own, the difference in appearance being very noticeable.

Variety Test, conducted by John Douglas's Trustees, Mount Royal, Palmerston.

The land selected was a clayey loam with gravelly subsoil. It was in old English grass from 1906 to 1909; skim-ploughed in January, 1910, and put in oats, August, 1910; again sown in oats, March, 1911, and fed off with sheep in October 1911. It was ploughed for this experiment 28th December, 1911, disced three times, tine-harrowed three times, and Cambridge-rolled in November, 1911. 2½ cwt. Criterion turnip-manure was applied per acre. The seeds were sown on 1st December, 1911. The roots were pulled and weighed on 28th May, 1912. Results:—

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	9·52	3·26
2	,, Purple-top Scotch	14·42	4·62
3	,, Inche's Bronze-top	10·06	3·26
4	,, Old Meldrum	21·49	3·53
5	,, Stobo, Blue	12·78	3·80
6	Challenge—Waite's Eclipse	16·32	4·08
7	,, Dale's Hybrid	16·33	4·08
8	Sutton's All the Year Round	8·71	2·17
9	,, Centenary	12·24	1·63
10	,, Early Sheepfold	18·49	2·44
11	,, Favourite Purple-top	10·88	1·90
12	,, Perfection Green-top	10·34	1·63
13	,, Romney Marsh	12·24	1·90
14	Montgomery's Aberdeen Green-top Yellow	9·25	2·44
15	,, Aberdeen Purple-top Yellow	10·06	2·44
16	,, Fosterton Hybrid	15·77	3·53
17	,, Green-top Yellow Tankard	15·77	4·62
18	Nimmo and Blair's Challenger	7·07	1·63
	White-fleshed—		
19	Garton's Hardy Green Globe	22·58	3·26
20	Sutton's Red Paragon	25·02	2·99
21	,, Early Six Weeks	22·58	2·44
22	,, Purple-top Mammoth	30·47	3·53
23	,, Pomeranian White Globe	19·58	2·72
24	,, Imperial Green Globe	19·58	2·99
25	Montgomery's White Stone	17·68	2·72
26	,, Devonshire Greystone	16·32	2·72
27	,, Lincolnshire Red Globe	16·86	2·99

Inspector Dalgliesh reports: The weather-conditions were adverse to good growth. Bulbs were small.

Manurial and Variety Tests, conducted by A. Murray, Dunback.

The land selected was a clayey loam with a clay subsoil. It was in grass in 1906 and 1907; broken up and put in turnips in 1908; in wheat 1909; sown in oats and grass 1910; grass-grub rendered the grass useless. It was ploughed for this experiment 6 in. deep on 8th August, 1911; cultivated twice, tine-harrowed four times, and rolled, 10th November, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. Rockland manure per acre was applied. The seed and fertilizers were sown in raised drills on

14th November, 1911; drills 26 in. apart. The roots were pulled and weighed on 24th June, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	18·69	2·61	Gain, 8·97
2	Superphosphate, 3 cwt. ..	0 14 3	22·81	2·80	,, 13·09
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	22·25	2·80	,, 12·53
4	No manure	..	9·72	1·68	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	19·07	2·61	Gain, 9·35
6	No. 5 mixture, 1½ cwt. ..	0 8 11	19·63	3·00	,, 9·91
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	20·93	2·61	,, 11·21
8	Albatross guano, 2 cwt. ..	0 10 0	14·95	1·86	,, 5·23

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	22·31	3·53
2	,, Purple-top Scotch	20·40	2·99
3	,, Inche's Bronze-top	13·60	2·72
4	,, Old Meldrum	13·05	2·72
5	,, Stobo, Blue	16·59	3·81
6	Challenge—Waite's Eclipse	15·23	3·26
7	,, Dale's Hybrid	14·69	2·17
8	Sutton's All the Year Round	14·69	1·63
9	,, Centenary	14·69	1·63
10	,, Early Sheepfold	14·69	3·26
11	,, Favourite Purple-top	18·50	4·35
12	,, Perfection Green-top	19·86	3·53
13	,, Romney Marsh	18·50	3·26
14	Montgomery's Aberdeen Green-top Yellow	11·42	2·72
15	,, Aberdeen Purple-top Yellow	19·04	2·99
16	,, Fosterton Hybrid	20·13	3·26
17	,, Green-top Yellow Tankard	20·13	5·44
18	Nimmo and Blair's Challenger	10·88	1·63
	White-fleshed—		
19	Garton's Hardy Green Globe	19.04	3·26
20	Sutton's Red Paragon	18·50	2·17
21	,, Early Six Weeks	22·85	3·80
22	,, Purple-top Mammoth	24·76	3·26
23	,, Pomeranian White Globe	19·58	3·53
24	,, Imperial Green Globe	25·57	3·80
25	Montgomery's White Stone	14·69	2·99
26	,, Devonshire Greystone	29·38	4·08
27	,, Lincolnshire Red Globe	22·30	4·08

Inspector Dalgliesh reports: In both tests the experiment was very unsatisfactory. Although a good braird, the fly or grub played havoc, with the result that there were many blanks. The wet weather greatly retarded growth, and it was impossible to give proper attention to cleaning.

Manurial and Variety Tests, conducted by Matthew Dalgliesh, Puketahu, Palmerston.

The land selected was marly, with a clay subsoil. It was in grass in 1906, 1907, and 1908; broken up in 1909 and a crop of wheat taken off; in turnips in 1910. It was ploughed 5 in. deep on 21st September, 1911; disced three times and rolled,

23rd September; tine-harrowed, disced twice, tine-harrowed twice, and rolled once in October, and thrown into raised drills on 11th November, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 3 cwt. National Mortgage and Agency Company's special turnip-manure was applied. The seeds and fertilizers were sown in raised drills on 13th November, 1911; drills 28 in. apart. The roots were pulled and weighed on 2nd July, 1912. Results :—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	29·80	4·55	Gain, 2·02
2	Superphosphate, 3 cwt. ..	0 14 3	31·82	3·28	,, 4·04
3	Superphosphate, 3 cwt.; bone-dust, ¾ cwt.	0 14 0	32·32	3·79	,, 4·54
4	No manure	..	27·78	2·78	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	28·79	3·54	Gain, 1·01
6	No. 5 mixture, 1½ cwt... ..	0 8 11	30·81	4·55	,, 3·03
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	33·34	5·05	,, 5·56
8	Albatross guano, 2 cwt. ..	0 10 0	28·79	4·55	,, 1·01

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	16·42	4·04
2	,, Purple-top Scotch	18·94	3·54
3	,, Inche's Bronze-top	18·69	4·54
4	,, Old Meldrum	14·65	4·04
5	,, Stobo, Blue	13·63	3·03
6	Challenge—Waite's Eclipse	15·65	2·50
7	,, Dale's Hybrid	18·43	3·03
8	Sutton's All the Year Round	19·44	3·54
9	,, Centenary	19·44	2·90
10	,, Early Sheepfold	19·70	2·78
11	,, Favourite Purple-top	21·21	2·58
12	,, Perfection Green-top	17·80	2·02
13	,, Romney Marsh	19·19	2·27
14	Montgomery's Aberdeen Green-top Yellow	21·47	3·54
15	,, Aberdeen Purple-top Yellow	28·28	3·91
16	,, Fosterton Hybrid	29·29	3·28
17	,, Green-top Yellow Tankard	28·28	6·56
18	Nimmo and Blair's Challenger..	21·33	3·28
	White-fleshed—		
19	Garton's Hardy Green Globe	33·34	6·82
20	Sutton's Red Paragon	30·30	7·82
21	,, Early Six Weeks	29·29	6·56
22	,, Purple-top Mammoth..	27·27	6·31
23	,, Pomeranian White Globe	24·75	6·31
24	,, Imperial Green Globe	26·01	5·81
25	Montgomery's White Stone	31·06	6·82
26	,, Devonshire Greystone	24·24	6·56
27	,, Lincolnshire Red Globe	26·77	6·31

Inspector Dalgliesh reports: The land was not as clean as it should be for the experiment, and the wet season prevented the necessary intercultivation being given during the growth of the crop to keep the weeds in check.

MOSGIEL DISTRICT.

Manurial and Variety Tests, conducted by Charles Forsyth, Table Hill, Mosgiel.

The land selected was a light loam with clay subsoil, and was situated sixteen miles from the sea-coast. It was in English grass in 1908; in turnips 1909; in oats 1910; in turnips 1911. For this experiment it was ploughed 6 in. deep on 1st June, 1911; double-disced, tine-harrowed, and double-disced in October, 1911; double-disced on 26th November, 1911; disced and tine-harrowed on 5th January, 1912. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. Surprise Island guano and ¾ cwt. bonedust per acre were applied. The seeds and fertilizers were sown in raised drills on 9th January, 1912; drills 26 in. apart. The roots were pulled and weighed on 23rd July, 1912. Results :—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	25·63	6·00	Gain, 22·36
2	Superphosphate, 3 cwt. ..	0 14 3	22·91	6·54	,, 19·64
3	Superphosphate, 2 cwt.; bonedust, ¾ cwt.	0 14 0	18·54	4·36	,, 15·27
4	No manure	..	3·27	5·45	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	26·18	4·36	Gain, 22·91
6	No. 5 mixture, 1½ cwt... ..	0 8 11	39·27	7·63	,, 36·00
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	58·91	9·80	,, 55·64
8	Albatross guano, 2 cwt. ..	0 10 0	56·73	10·91	,, 53·46

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	14·72	2·72
2	,, Purple-top Scotch	12·54	2·72
3	,, Inche's Bronze-top	14·18	3·27
4	,, Old Meldrum	14·72	3·81
5	,, Stobo, Blue	19·09	3·27
6	Challenge—Waite's Eclipse	16·36	3·81
7	,, Dale's Hybrid	20·18	3·81
8	Sutton's All the Year Round	14·18	2·72
9	,, Centenary	10·91	1·63
10	,, Early Sheepfold	8·72	1·09
11	,, Favourite Purple-top	18·00	3·27
12	,, Perfection Green-top	13·63	3·27
13	,, Romney Marsh	27·27	4·36
14	Montgomery's Aberdeen Green-top Yellow	18·54	3·81
15	,, Aberdeen Purple-top Yellow	25·63	4·36
16	,, Fosterton Hybrid	9·27	2·72
17	,, Green-top Yellow Tankard	22·91	4·36
18	Nimmo and Blair's Challenger	12·00	4·90
	White-fleshed—		
19	Garton's Hardy Green Globe	19·09	3·27
20	Sutton's Red Paragon	13·63	3·29
21	,, Early Six Weeks	18·00	2·72
22	,, Purple-top Mammoth..	30·00	4·36
23	,, Pomeranian White Globe	23·45	3·81
24	,, Imperial Green Globe	23·45	2·18
25	Montgomery's White Stone	24·00	3·27
26	,, Devonshire Greystone	23·45	3·27
27	,, Lincolnshire Red Globe	20·18	3·81

Inspector McLeod reports: Owing to the wet weather the turnips were not sown until 9th January, 1912, being rather too late a date for the district. Heavy rain set in after being sown, causing a stoppage of the growth. The grub did considerable damage to plants in the manurial plots and also among the variety plots. The land was well worked and in good condition to receive the seed, but owing to the unfavourable weather experienced and the ravages of the grub the yield was under the normal.

Balclutha District.

Variety Test, conducted by Joseph Mosley, Inch-Clutha, Stirling.

The land selected for the experiment was a sandy loam, and was in grass in 1906, in turnips 1907–8, in wheat 1909, and in oats 1910. It was ploughed for this experiment on 8th February, 1911; cultivated and tine-harrowed on 8th February; disced, ploughed on 4th April; ploughed 6 in. on 10th July and 9th September; cultivated and tine-harrowed on 9th September; ploughed on 10th October; tine-harrowed on 12th October and 28th December, 1911. In the test 2 cwt. Challenge manure per acre was applied. The seeds and fertilizers were sown in raised drills on 29th December, 1911; drills 26 in. apart. The roots were pulled and weighed on 20th June, 1912. Results:—

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	31·01	12·78
2	,, Purple-top Scotch	26·52	11·42
3	,, Inche's Bronze-top	19·86	8·16
4	,, Old Meldrum	22·30	9·25
5	,, Stobo, Blue	27·13	10·88
6	Challenge—Waite's Eclipse	28·02	11·15
7	,, Dale's Hybrid	28·83	8·51
8	Sutton's All the Year Round	33·73	5·30
9	,, Centenary	44·61	11·42
10	,, Early Sheepfold	29·51	6·80
11	,, Favourite Purple-top	33·46	10·61
12	,, Perfection Green-top	26·25	5·44
13	,, Romney Marsh	37·68	10·88
14	Montgomery's Aberdeen Green-top Yellow	22·71	9·25
15	,, Aberdeen Purple-top Yellow	28·70	11·97
16	,, Fosterton Hybrid	31·42	10·88
17	,, Green-top Yellow Tankard	31·01	15·77
18	Nimmo and Blair's Challenger	21·62	8·97
	White-fleshed—		
19	Garton's Hardy Green Globe	36·45	12·24
20	Sutton's Red Paragon	34·27	10·61
21	,, Early Six Weeks	42·84	10·61
22	,, Purple-top Mammoth	32·64	5·98
23	,, Pomeranian White Globe	41·08	13·87
24	,, Imperial Green Globe	41·62	8·43
25	Montgomery's White Stone	42·98	13·05
26	,, Devonshire Greystone	33·59	10·33
27	,, Lincolnshire Red Globe	29·11	11·97

Manurial and Variety Tests, conducted by Adam Houliston, Kakapuaka.

The land selected was a clayey loam, and was in lea for six years previously to being ploughed up on 4th April, 1911. It was double-disced on 16th October, and grubbed on 20th October, 1911; tine-harrowed on 9th November, and Cambridge-rolled on 18th November, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2½ cwt. per acre of Surprise Island guano was applied. The seeds and fertilizers were sown in raised drills

on 23rd November, 1911; drills 26 in. apart. The roots were pulled and weighed on 18th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	26·25	3·26	Gain, 10·47
2	Superphosphate, 3 cwt. ..	0 14 3	22·85	2·33	„ 7·07
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	26·12	2·72	„ 10·34
4	No manure	..	15·78	1·76	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	25·71	2·17	Gain, 9·93
6	No. 5 mixture, 1½ cwt... ..	0 8 11	22·72	2·04	„ 6·94
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	19·45	1·90	„ 3·67
8	Albatross guano, 2 cwt. ..	0 10 0	20·67	1·90	„ 4·89

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	20·67	3·12
2	„ Purple-top Scotch	20·54	2·85
3	„ Inche's Bronze-top	20·94	2·85
4	„ Old Meldrum	17·68	1·36
5	„ Stobo, Blue	19·31	3·12
6	Challenge—Waite's Eclipse	18·09	2·58
7	„ Dale's Hybrid	23·73	2·44
8	Sutton's All the Year Round	21·35	3·06
9	„ Centenary	21·49	2·10
10	„ Early Sheepfold	20·40	1·97
11	„ Favourite Purple-top	23·46	2·44
12	„ Perfection Green-top	20·26	1·90
13	„ Romney Marsh	19·45	1·90
14	Montgomery's Aberdeen Green-top Yellow	12·92	2·24
15	„ Aberdeen Purple-top Yellow	22·24	3·33
16	„ Fosterton Hybrid	21·62	2·31
17	„ Green-top Yellow Tankard	20·54	3·26
18	Nimmo and Blair's Challenger	14·41	1·63
	White-fleshed—		
19	Garton's Hardy Green Globe	27·47	2·58
20	Sutton's Red Paragon	21·22	1·90
21	„ Early Six Weeks	18·02	1·70
22	„ Purple-top Mammoth..	31·83	2·72
23	„ Pomeranian White Globe	24·75	2·44
24	„ Imperial Green Globe	28·43	1·97
25	Montgomery's White Stone	21·22	2·10
26	„ Devonshire Greystone	21·76	2·17
27	„ Lincolnshire Red Globe	21·76	2·31

Manurial and Variety Tests, conducted by James Hyslop, Greenfield.

The land selected for the experiment was shingly, and was in oats in 1910, prior to which it had been in lea for six years. It was ploughed for this experiment on 20th June, 1911, 4 in. deep; tine-harrowed on 2nd November; disc-ploughed on 6th December; tine-harrowed and grubbed on 7th December, 1911. In the manurial

test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 1½ cwt. Challenge and ½ cwt. turnip-starter was applied per acre. The seeds and fertilizers were sown in raised drills on 27th December, 1911; drills 26 in. apart. The roots were pulled and weighed on 28th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	10·61	2·99	Gain, 3·54
2	Superphosphate, 3 cwt. ..	0 14 3	16·32	2·72	„ 9·25
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	18·50	2·99	„ 11·43
4	No manure	..	7·07	1·36	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	13·33	2·72	Gain, 6·26
6	No. 5 mixture, 1½ cwt... ..	0 8 11	14·96	3·26	„ 7·89
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	14·69	2·99	„ 7·52
8	Albatross guano, 2 cwt. ..	0 10 0	15·50	1·90	„ 8·43

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	10·33	2·99
2	„ Purple-top Scotch	16·05	4·08
3	„ Inche's Bronze-top	12·51	3·26
4	„ Old Meldrum	14·41	3·53
5	„ Stobo, Blue	14·14	4·62
6	Challenge—Waite's Eclipse	13·05	3·80
7	„ Dale's Hybrid	13·05	5·16
8	Sutton's All the Year Round	11·69	2·44
9	„ Centenary	15·23	3·53
10	„ Early Sheepfold	17·68	3·53
11	„ Favourite Purple-top	17·95	4·62
12	„ Perfection Green-top	19·86	3·53
13	„ Romney Marsh	25·02	5·44
14	Montgomery's Aberdeen Green-top Yellow	17·13	4·62
15	„ Aberdeen Purple-top Yellow	7·88	2·99
16	„ Fosterton Hybrid	15·23	3·80
17	„ Green-top Yellow Tankard	17·13	6·25
18	Nimmo and Blair's Challenger	16·86	4·89
	White-fleshed—		
19	Garton's Hardy Green Globe	25·84	5·98
20	Sutton's Red Paragon	19·86	2·06
21	„ Early Six Weeks	22·58	3·53
22	„ Purple-top Mammoth..	36·45	7·07
23	„ Pomeranian White Globe	13·60	3·53
24	„ Imperial Green Globe	21·22	3·53
25	Montgomery's White Stone	27·20	5·16
26	„ Devonshire Greystone	19·86	4·89
27	„ Lincolnshire Red Globe	28·56	8·43

Manurial and Variety Tests, conducted by Jasper Clark, Lovell's Flat.

The land selected for the experiment was a clayey loam, and was in lea 1906–8 in wheat 1909, in oats 1910. It was ploughed for this experiment 7 in. deep on 4th

April, 1911; double-disced and double-grubbed in October; tine-harrowed and Cambridge-rolled on 18th November, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 1½ cwt. Kempthorne Prosser's special turnip-manure and 1½ cwt. basic slag per acre was applied. The seeds and fertilizers were sown in raised drills on 20th December, 1911; drills 26 in. apart. The roots were pulled and weighed on 30th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	32·10	3·80	Gain, 23·40
2	Superphosphate, 3 cwt. ..	0 14 3	32·37	2·85	,, 23·67
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	30·74	2·85	,, 22·04
4	No manure	..	8·70	1·36	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	30·74	2·99	Gain, 22·04
6	No. 5 mixture, 1½ cwt. ..	0 8 11	22·31	2·44	,, 13·61
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	22·31	2·44	,, 13·61
8	Albatross guano, 2 cwt. ..	0 10 0	27·20	2·85	,, 18·50

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	25·57	8·16
2	,, Purple-top Scotch	23·66	6·52
3	,, Inche's Bronze-top	23·12	7·61
4	,, Old Meldrum	24·48	5·71
5	,, Stobo, Blue	30·74	8·16
6	Challenge—Waite's Eclipse	25·02	4·62
7	,, Dale's Hybrid	25·02	8·16
8	Sutton's All the Year Round	26·38	6·80
9	,, Centenary	30·74	6·25
10	,, Early Sheepfold	21·49	2·99
11	,, Favourite Purple-top	31·83	5·16
12	,, Perfection Green-top	20·94	2·99
13	,, Romney Marsh	31·28	4·08
14	Montgomery's Aberdeen Green-top Yellow	19·58	4·21
15	,, Aberdeen Purple-top Yellow	19·86	5·16
16	,, Fosterton Hybrid	22·03	5·30
17	,, Green-top Yellow Tankard	25·30	8·70
18	Nimmo and Blair's Challenger	18·22	5·71
	White-fleshed—		
19	Garton's Hardy Green Globe	39·99	7·61
20	Sutton's Red Paragon	32·10	4·62
21	,, Early Six Weeks	28·56	4·89
22	,, Purple-top Mammoth	42·16	6·39
23	,, Pomeranian White Globe	36·72	6·39
24	,, Imperial Green Globe	26·66	2·99
25	Montgomery's White Stone	37·00	6·39
26	,, Devonshire Greystone	41·35	8·05
27	,, Lincolnshire Red Globe	38·90	10·88

Manurial and Variety Tests, conducted by Thomas Lowery, Lovell's Flat.

The land selected for the experiment was a clayey loam, and was in turnips in 1906, in wheat 1907, in oats 1908, and in lea 1909–10. It was ploughed 8 in. deep on 12th July, 1911; grubbed on 6th November; tine-harrowed on 7th November; grubbed on 16th November; tine-harrowed on 28th November; and clod-crushed on 16th December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. Surprise Island guano per acre was applied. The seeds and fertilizers were sown in the manurial test on 19th December, and the variety test on 20th December, 1911, in raised drills 26 in. apart. The roots were pulled and weighed on 30th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	16·86	1·63	Gain, 7·07
2	Superphoshpate, 3 cwt. ..	0 14 3	16·59	1·36	,, 6·80
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	16·05	2·17	,, 6·26
4	No manure	..	9·79	1·36	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	17·68	2·17	Gain, 7·89
6	No. 5 mixture, 1½ cwt... ..	0 8 11	17·95	1·90	,, 8·16
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	18·22	1·90	,, 8·43
8	Albatross guano, 2 cwt. ..	0 10 0	15·23	1·90	,, 5·44

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	31·01	11·01
2	,, Purple-top Scotch	32·23	9·79
3	,, Inche's Bronze-top	25·43	9·52
4	,, Old Meldrum	23·94	8·29
5	,, Stobo, Blue..	22·03	8·16
6	Challenge—Waite's Eclipse	28·70	9·79
7	,, Dale's Hybrid	25·98	7·88
8	Sutton's All the Year Round	26·52	4·76
9	,, Centenary	29·92	4·62
10	,, Early Sheepfold	31·55	3·80
11	,, Favourite Purple-top..	25·43	5·44
12	,, Perfection Green-top	23·39	4·35
13	,, Romney Marsh	28·56	4·08
14	Montgomery's Aberdeen Green-top Yellow	15·23	3·26
15	,, Aberdeen Purple-top Yellow	17·13	3·26
16	,, Fosterton Hybrid	19·58	3·80
17	,, Green-top Yellow Tankard	20·54	4·62
18	Nimmo and Blair's Challenger..	17·13	3·80
	White-fleshed—		
19	Garton's Hardy Green Globe	28·02	4·08
20	Sutton's Red Paragon	22·03	2·72
21	,, Early Six Weeks	23·66	2·99
22	,, Purple-top Mammoth	36·45	3·94
23	,, Pomeranian White Globe	22·30	2·72
24	,, Imperial Green Globe	22·98	1·76
25	Montgomery's White Stone	24·89	4·08
26	,, Devonshire Greystone	20·94	2·99
27	,, Lincolnshire Red Globe	23·94	4·21

LAWRENCE DISTRICT.

Manurial and Variety Tests, conducted by J. and W. Smith, Waitanuna West.

The land selected was a sandy loam on a free loamy subsoil, and had been in English grass for six years prior to being ploughed up 6 in. deep on 20th May, 1911, for this experiment. Disc-harrowed four times and tine-harrowed twice on 7th December, 1911, and thrown into ridges with double-mould plough on 11th December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. Perfection manure was applied per acre. The seeds and fertilizers were sown on 11th and 12th December, 1911, in drills 26 in. apart. The roots were pulled and weighed on 27th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	16·86	3·94	Gain, 7·89
2	Superphosphate, 3 cwt. ..	0 14 3	18·36	5·16	„ 9·39
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	21·35	5·57	„ 12·38
4	No manure	..	8·97	2·85	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	24·89	5·30	Gain, 15·92
6	No. 5 mixture, 1½ cwt. ..	0 8 11	18·77	3·87	„ 9·80
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	14·28	3·06	„ 5·31
8	Albatross guano, 2 cwt. ..	0 10 0	14·89	2·51	„ 5·92

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	15·50	5·44
2	„ Purple-top Scotch	19·86	5·44
3	„ Inche's Bronze-top	18·50	5·71
4	„ Old Meldrum	19·86	6·25
5	„ Stobo, Blue	23·66	8·16
6	Challenge—Waite's Eclipse	20·13	5·44
7	„ Dale's Hybrid	22·84	8·43
8	Sutton's All the Year Round	16·05	2·72
9	„ Centenary	25·30	4·89
10	„ Early Sheepfold	23·39	2·72
11	„ Favourite Purple-top	22·30	3·53
12	„ Perfection Green-top	21·22	3·26
13	„ Romney Marsh	28·56	4·08
14	Montgomery's Aberdeen Green-top Yellow	18·22	4·08
15	„ Aberdeen Purple-top Yellow	20·40	4·62
16	„ Fosterton Hybrid	22·84	5·71
17	„ Green-top Yellow Tankard	19·04	5·71
18	Nimmo and Blair's Challenger	19·04	4·08
	White-fleshed—		
19	Garton's Hardy Green Globe	32·91	6·52
20	Sutton's Red Paragon	24·21	4·08
21	„ Early Six Weeks	23·66	2·17
22	„ Purple-top Mammoth	35·09	5·71
23	„ Pomeranian White Globe	26·66	4·35
24	„ Imperial Green Globe	26·38	3·53
25	Montgomery's White Stone	17·68	2·54
26	„ Devonshire Greystone	25·84	4·89
27	„ Lincolnshire Red Globe	29·11	6·25

Inspector Barron reports: The land was in fair order to receive the seed, but required more cultivation for an ideal seed-bed for a root crop. The weather during period of growth was changeable, rain and high winds predominating. Little inter-cultivation could be given the crop owing to land being too wet.

TAPANUI DISTRICT.

Manurial and Variety Tests, conducted by Alexander Ferguson, Kelso.

The land selected was a clayey loam on a clay subsoil, and has been in cultivation for the last thirty-six years. In 1903 was in turnips with 1½ cwt. manure; 1904 in oats; 1905 in oats with 1½ cwt. manure; 1906 in turnips with 2¼ cwt. manure; 1907 in oats; 1908 fallowed; 1909 to 1911 in pasture. Digger-ploughed to 9 in. for this experiment in August, 1911; deeply cultivated with cultivator six times, October to December, 1911; harrowed to fine tilth and rolled immediately before sowing, December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2½ cwt. Challenge special turnip-manure was applied per acre. The seeds and fertilizers were sown on 18th December, 1911, in drills 26 in. apart. The roots were pulled and weighed on 14th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	28·02	5·71	Gain, 3·00
2	Superphosphate, 3 cwt. ..	0 14 3	23·12	5·16	Loss, 1·90
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	29·11	5·98	Gain, 4·09
4	No manure	..	25·02	4·62	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	29·65	5·44	Gain, 4·63
6	No. 5 mixture, 1½ cwt. ..	0 8 11	25·30	4·61	,, 0·28
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	24·21	4·61	Loss, 0·81
8	Albatross guano, 2 cwt. ..	0 10 0	25·57	5·16	Gain, 0·55

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	23·66	5·71
2	,, Purple-top Scotch	23·66	5·44
3	,, Inche's Bronze-top	17·95	3·53
4	,, Old Meldrum	27·20	6·52
5	,, Stobo, Blue	19·86	4·61
6	Challenge—Waite's Eclipse	31·55	6·52
7	,, Dale's Hybrid	27·20	6·25
8	Sutton's All the Year Round	18·77	2·44
9	,, Centenary	30·19	3·80
10	,, Early Sheepfold	23·66	3·26
11	,, Favourite Purple-top	26·65	4·35
12	,, Perfection Green-top	21·49	2·44
13	,, Romney Marsh	24·75	2·99

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—*continued.*	Tons.	Tons.
14	Montgomery's Aberdeen Green-top Yellow	22·03	4·62
15	,, Aberdeen Purple-top Yellow	23·66	5·44
16	,, Fosterton Hybrid	28·29	6·25
17	,, Green-top Yellow Tankard	26·93	6·25
18	Nimmo and Blair's Challenger..	22·85	4·61
	White-fleshed—		
19	Garton's Hardy Green Globe	36·72	5·98
20	Sutton's Red Paragon	21·49	3·80
21	,, Early Six Weeks	24·21	3·26
22	,, Purple-top Mammoth..	35·91	5·98
23	,, Pomeranian White Globe	33·46	5·44
24	,, Imperial Green Globe	31·28	4·08
25	Montgomery's White Stone	27·20	4·61
26	,, Devonshire Greystone	27·47	5·98
27	,, Lincolnshire Red Globe	33·46	8·16

Inspector McCulloch reports: At time of sowing the land was in splendid order, and weather favourable to good braird. As season advanced it became very wet and rather cold to admit of good growth. The whole crop was very healthy and was well cared for during the period of growth.

Manurial and Variety Tests, conducted by A. McIntyre, Kelso.

The land selected for the experiment was a clayey loam with a stiff clay subsoil. It was in grass for seven years prior to being broken up for this experiment in June, 1911, when it was digger-ploughed; disced twice, grubbed once, tine-harrowed four times, and rolled in November, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. Challenge special turnip-manure per acre was applied. The seeds and fertilizers were sown in drills on 11th December, 1911; drills 14 in. apart. The roots were pulled and weighed on 13th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	25·84	6·25	Gain, 15·51
2	Superphosphate, 3 cwt. ..	0 14 3	31·83	5·16	,, 21·50
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	25·84	5·16	,, 15·51
4	No manure	..	10·33	4·89	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	25·30	7·34	Gain, 14·97
6	No. 5 mixture, 1½ cwt. ..	0 8 11	25·30	2·17	,, 14·97
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	21·22	3·98	,, 10·89
8	Albatross guano, 2 cwt. ..	0 10 0	22·30	4·89	,, 11·97

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	9·52	2·72
2	,, Purple-top Scotch	13·05	2·72
3	,, Inche's Bronze-top	9·52	1·90
4	,, Old Meldrum	10·88	2·99
5	,, Stobo, Blue	14·14	2·99
6	Challenge—Waite's Eclipse	13·33	2·44
7	,, Dale's Hybrid	12·24	2·99
8	Sutton's All the Year Round	14·96	2·17
9	,, Centenary	19·58	2·44
10	,, Early Sheepfold	18·21	2·44
11	,, Favourite Purple-top	15·23	2·17
12	,, Perfection Green-top	14·14	1·63
13	,, Romney Marsh	19·31	2·17
14	Montgomery's Aberdeen Green-top Yellow	10·33	1·90
15	,, Aberdeen Purple-top Yellow	12·51	2·99
16	,, Fosterton Hybrid	14·14	2·17
17	,, Green-top Yellow Tankard	12·51	2·99
18	Nimmo and Blair's Challenger	9·25	2·17
	White-fleshed—		
19	Garton's Hardy Green Globe	20·94	2·99
20	Sutton's Red Paragon	18·50	1·90
21	,, Early Six Weeks	16·32	1·35
22	,, Purple-top Mammoth	22·85	2·72
23	,, Pomeranian White Globe	19·86	2·99
24	,, Imperial Green Globe	22·03	2·44
25	Montgomery's White Stone	16·86	2·17
26	,, Devonshire Greystone	15·77	2·17
27	,, Lincolnshire Red Globe	16·05	2·99

Inspector McCulloch reports: Varieties—There was a good seed-bed at time of sowing. These variety tests were sown on land lying directly away from the sun, consequently with the extremely wet season experienced, together with the want of sufficient heat, the yields were no doubt much affected, and growth was consequently slow. Manures—These were sown on land well prepared, with a good north-easterly aspect, and growth was good all the season. Both crops were quite healthy.

Manurial and Variety Tests, conducted by D. Rogers, Tapanui.

The land selected was a clayey loam on a clay subsoil, and was in pasture for three years previous to breaking out of lea for this experiment in June, 1911. It was disced four times in November, 1911; tine-harrowed four times and chain-harrowed once in December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 3 cwt. National Mortgage and Agency Company's Perfect turnip-manure was applied per acre. The seeds and fertilizers were sown in raised drills on 3rd January, 1912; drills 28 in. apart. The roots were pulled and weighed on 27th June, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	32·64	12·24	Gain, 13·60
2	Superphosphate, 3 cwt. ..	0 14 3	23·94	7·61	,, 4·90
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	26·38	7·07	,, 7·34
4	No manure	..	19·04	6·80	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	25·30	7·61	Gain, 6·26
6	No. 5 mixture, 1½ cwt.	0 8 11	17·68	7·88	Loss, 1·36
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	24·48	9·52	Gain, 5·44
8	Albatross guano, 2 cwt. ..	0 10 0	25·57	8·97	,, 6·53

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	16·86	4·62
2	,, Purple-top Scotch	30·74	8·16
3	,, Inche's Bronze-top	20·94	6·52
4	,, Old Meldrum	16·59	2·99
5	,, Stobo, Blue	22·30	4·08
6	Challenge—Waite's Eclipse	25·02	5·71
7	,, Dale's Hybrid	23·39	8·16
8	Sutton's All the Year Round	5·71	1·35
9	,, Centenary	22·58	3·26
10	,, Early Sheepfold	23·39	2·99
11	,, Favourite Purple-top	19·31	3·80
12	,, Perfection Green-top	17·41	2·99
13	,, Romney Marsh	28·29	3·80
14	Montgomery's Aberdeen Green-top Yellow	19·31	4·35
15	,, Aberdeen Purple-top Yellow	26·38	6·25
16	,, Fosterton Hybrid	22·03	5·16
17	,, Green-top Yellow Tankard	23·39	6·52
18	Nimmo and Blair's Challenger	19·31	4·89
	White-fleshed—		
19	Garton's Hardy Green Globe	30·19	4·89
20	Sutton's Red Paragon	16·86	1·90
21	,, Early Six Weeks	22·03	1·63
22	,, Purple-top Mammoth	34·27	4·89
23	,, Pomeranian White Globe	27·20	3·80
24	,, Imperial Green Globe	22·03	2·17
25	Montgomery's White Stone	25·02	2·72
26	,, Devonshire Greystone	28·29	3·80
27	,, Lincolnshire Red Globe	26·11	4·89

Inspector McCulloch reports: All varieties brairded well with the exception of No. 8, which must have been rather thinly sown. The seed-bed at time of sowing was in good tilth. Thorough intercultivation was given during the season. The date of sowing was rather late for the district, as the growing-period was rather too short. However, the land having a nice northerly aspect, a good crop free from disease resulted.

Manurial and Variety Tests, conducted by Robert Kinaston, Roxburgh.

The land selected was a light clay loam on light clay subsoil, and was in grass in 1907, in oats 1908, in mangels and turnips 1909, part in oats and part in potatoes in 1910. It was ploughed for this experiment in December, and harrowed, grubbed, harrowed twice, and rolled in December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. Kempthorne, Prosser, and Co.'s turnip-manure was applied per acre. The seeds and fertilizers were sown in raised drills on 23rd December, 1911; drills 26 in. apart. The roots were pulled and weighed on 24th June, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	19·58	3·53	..
2	Superphosphate, 3 cwt. ..	0 14 3	20·40	3·26	Gain, 0·82
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	23·39	4·35	,, 3·81
4	No manure	..	19·58	4·08	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	24·21	6·25	Gain, 4·63
6	No. 5 mixture, 1½ cwt... ..	0 8 11	23·94	6·80	,, 4·36
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	23·39	5·71	,, 3·81
8	Albatross guano, 2 cwt. ..	0 10 0	25·30	10·06	,, 5·72

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	16·59	4·08
2	,, Purple-top Scotch	13·05	2·72
3	,, Inche's Bronze-top	13·33	2·72
4	,, Old Meldrum	12·51	2·72
5	,, Stobo, Blue..	14·96	3·80
6	Challenge—Waite's Eclipse	18·21	4·08
7	,, Dale's Hybrid	16·32	3·26
8	Sutton's All the Year Round	21·76	3·80
9	,, Centenary	19·58	2·72
10	,, Early Sheepfold	17·13	2·17
11	,, Favourite Purple-top..	15·77	2·72
12	,, Perfection Green-top	16·32	2·72
13	,, Romney Marsh	15·77	2·99
14	Montgomery's Aberdeen Green-top Yellow	12·78	2·99
15	,, Aberdeen Purple-top Yellow	15·23	2·99
16	,, Fosterton Hybrid	14·14	2·99
17	,, Green-top Yellow Tankard	20·94	4·35
18	Nimmo and Blair's Challenger..	12·78	2·44
	White-fleshed—		
19	Garton's Hardy Green Globe	26·65	3·80
20	Sutton's Red Paragon	26·93	3·26
21	,, Early Six Weeks	23·94	3·26
22	,, Purple-top Mammoth	25·57	3·53

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	White-fleshed—*continued.*	Tons.	Tons.
23	Sutton's Pomeranian White Globe	20·67	3·26
24	,, Imperial Green Globe	24·48	2·99
25	Montgomery's White Stone	26·38	4·08
26	,, Devonshire Greystone	31·01	4·35
27	,, Lincolnshire Red Globe	32·92	5·16

Inspector McCulloch reports: Both in the manurial and variety tests there was a good braird. Seasonable weather followed, consequently the crops were good and sound.

Manurial and Variety Tests, conducted by Robert Potts, Crookston.

The land selected was a clayey loam on clay subsoil, and in 1903 was in turnips, in 1904 wheat, in 1905 oats and grass, in 1906 to 1910 in pasture. Ploughed for this experiment on 6th June, 1911, and sown with 4½ cwt. of ground lime per acre, and in the middle of August sown again with 4 cwt. of lime per acre. Disc-harrowed in June; disc-harrowed and clod-crushed in October, 1911; harrowed immediately before sowing in December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. Mataura turnip-fertilizer per acre was applied. The seeds and fertilizers were sown in raised drills on 4th December, 1911; drills 26 in. apart. The roots were pulled and weighed on 17th May, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	23·94	6·80	Gain, 3·27
2	Superphosphate, 3 cwt. ..	0 14 3	28·56	9·79	,, 7·89
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	31·28	8·16	,, 10·61
4	No manure	..	20·67	6·80	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	38·63	10·33	Gain, 17·96
6	No. 5 mixture, 1½ cwt. ..	0 8 11	29·92	7·61	,, 9·27
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	32·64	10·33	,, 11·97
8	Albatross guano, 2 cwt. ..	0 10 0	15·23	5·44	Loss, 5·44

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	31·55	7·61
2	,, Purple-top Scotch	31·55	8·43
3	,, Inche's Bronze-top	23·94	4·61
4	,, Old Meldrum	23·39	5·16
5	,, Stobo, Blue	23·39	5·44
6	Challenge—Waite's Eclipse	31·01	6·25
7	,, Dale's Hybrid	31·28	5·28

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—*continued.*	Tons.	Tons.
8	Sutton's All the Year Round	13·05	2·44
9	,, Centenary	39·90	5·71
10	,, Early Sheepfold	31·01	4·08
11	,, Favourite Purple-top..	26·38	4·35
12	,, Perfection Green-top	26·93	3·80
13	,, Romney Marsh	31·01	3·26
14	Montgomery's Aberdeen Green-top Yellow	20·13	4·35
15	,, Aberdeen Purple-top Yellow	25·84	4·89
16	,, Fosterton Hybrid	28·29	4·89
17	,, Green-top Yellow Tankard	24·21	5·71
18	Nimmo and Blair's Challenger	20·40	4·61
	White-fleshed—		
19	Garton's Hardy Green Globe	38·91	5·16
20	Sutton's Red Paragon	33·19	4·08
21	,, Early Six Weeks	35·91	3·53
22	,, Purple-top Mammoth	39·44	4·89
23	,, Pomeranian White Globe	26·38	4·89
24	,, Imperial Green Globe	27·75	3·80
25	Montgomery's White Stone	34·55	4·89
26	,, Devonshire Greystone	39·44	6·52
27	,, Lincolnshire Red Globe	38·36	5·98

Inspector McCulloch reports: The land was in excellent tilth to receive the seed. In the manurial test the braird was very good. In the variety test it was far too thin, and appeared as if the seeding was not heavy enough. The cold wet weather at time of sowing and brairding no doubt also had an injurious effect. The crop grew well after being established, and was healthy.

Manurial and Variety Tests, conducted by G. M. Love, Moa Flat, Heriot.

The land selected was a clayey loam on clay subsoil, and was in pasture nine years previous to 1906, in turnips 1907, in oats 1908, grass crop 1909, in pasture 1910–11; ploughed out of lea for this experiment in June, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 1¼ cwt. Rockland turnip-manure was applied per acre. The seeds and fertilizers were sown on 6th December, 1911, in drills 26 in. apart. The roots were pulled and weighed on 9th July, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	26·11	6·80	Gain, 3·26
2	Superphosphate, 3 cwt. ..	0 14 3	27·20	5·71	,, 4·35
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	26·93	4·35	,, 4·08
4	No manure	..	22·85	4·61	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	21·76	2·44	Loss, 1·09
6	No. 5 mixture, 1½ cwt. ..	0 8 11	23·66	4·08	Gain, 0·81
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	26·38	4·35	,, 3·53
8	Albatross guano, 2 cwt. ..	0 10 0	14·14	2·44	Loss, 8·71

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	13·60	1·90
2	„ Purple-top Scotch	23·94	2·44
3	„ Inche's Bronze-top	13·33	2·17
4	„ Old Meldrum	9·52	0·80
5	„ Stobo, Blue	9·52	1·36
6	Challenge—Waite's Eclipse	9·27	1·36
7	„ Dale's Hybrid	12·24	2·44
8	Sutton's All the Year Round	11·97	1·36
9	„ Centenary	9·79	0·80
10	„ Early Sheepfold	16·86	1·36
11	„ Favourite Purple-top	8·70	0·80
12	„ Perfection Green-top	20·67	2·17
13	„ Romney Marsh	13·60	1·90
14	Montgomery's Aberdeen Green-top Yellow	11·69	0·80
15	„ Aberdeen Purple-top Yellow	12·24	2·17
16	„ Fosterton Hybrid	17·13	2·99
17	„ Green-top Yellow Tankard	16·32	2·99
18	Nimmo and Blair's Challenger	19·04	3·80
	White-fleshed—		
19	Garton's Hardy Green Globe	30·47	1·90
20	Sutton's Red Paragon	20·13	1·63
21	„ Early Six Weeks	20·94	1·08
22	„ Purple-top Mammoth	30·74	2·99
23	„ Pomeranian White Globe	17·41	1·63
24	„ Imperial Green Globe	33·19	1·08
25	Montgomery's White Stone	28·29	3·26
26	„ Devonshire Greystone	30·74	3·53
27	„ Lincolnshire Red Globe	37·81	4·89

Inspector McCulloch reports: In the manurial test the braird and quality of the turnips was good. In the variety test the braird of plots Nos. 1 to 18 was poor, and the quality in most cases only fair.

Manurial and Variety Tests, conducted by Mark McAuley, Tapanui.

The land selected was a clayey loam on a clay subsoil. In 1906 it was in turnips, in 1907 fallow, in 1908 oats, in 1909–10 grass. Ploughed out of lea for this experiment in July, 1911; disced in July, 1911; disced twice, tine-harrowed, and clod-crushed in December, 1911. In the manurial test the area was divided into seven manurial plots and one unmanured as a test plot. Plots one-tenth acre each. The fertilizers applied were according to a scheme designed by the Chief Agricultural Chemist. The variety of seed sown was Fosterton Hybrid. In the variety test 2 cwt. Mataura turnip-manure was applied per acre. The seeds and fertilizers were sown in raised drills on 19th December, 1911; drills 28 in. apart. The roots were pulled and weighed on 25th June, 1912. Results:—

MANURIAL TEST.

Plot.	Manures per Acre.	Cost per Acre.	Weight of Crop per Acre.		Effect of Manuring.
			Roots.	Tops.	
		£ s. d.	Tons.	Tons.	Tons.
1	Superphosphate, 1½ cwt. ..	0 7 2	12·51	2·72	Gain, 4·08
2	Superphosphate, 3 cwt. ..	0 14 3	15·50	3·53	,, 7·07
3	Superphosphate, 2 cwt.; bone-dust, ¾ cwt.	0 14 0	12·78	2·99	,, 4·35
4	No manure	..	8·43	1·90	..
5	Same as No. 3 mixture; sulphate of potash, 28 lb.	0 17 9	14·96	3·80	Gain, 6·53
6	No. 5 mixture, 1½ cwt... ...	0 8 11	10·88	2·44	,, 2·45
7	Same as No. 6 mixture; salt, 14 lb.	0 9 2	13·33	2·99	,, 4·90
8	Albatross guano, 2 cwt. ..	0 10 0	14·96	3·53	,, 6·53

VARIETY TEST.

Plot.	Variety.	Crop per Acre.	
		Roots.	Tops.
	Yellow-fleshed—	Tons.	Tons.
1	Garton's Green-top Scotch	10·88	1·90
2	,, Purple-top Scotch	11·97	2·17
3	,, Inche's Bronze-top	11·69	1·36
4	,, Old Meldrum	9·52	1·36
5	,, Stobo, Blue	10·33	1·63
6	Challenge—Waite's Eclipse	11·15	1·90
7	,, Dale's Hybrid	12·78	1·63
8	Sutton's All the Year Round	11·69	2·17
9	,, Centenary	13·60	2·44
10	,, Early Sheepfold	10·06	1·90
11	,, Favourite Purple-top	16·05	2·44
12	,, Perfection Green-top	11·69	1·90
13	,, Romney Marsh	15·77	1·90
14	Montgomery's Aberdeen Green-top Yellow	7·34	1·63
15	,, Aberdeen Purple-top Yellow	8·43	2·17
16	,, Fosterton Hybrid	6·52	1·35
17	,, Green-top Yellow Tankard	8·70	2·17
18	Nimmo and Blair's Challenger..	7·34	1·90
	White-fleshed—		
19	Garton's Hardy Green Globe	17·41	2·17
20	Sutton's Red Paragon	16·86	1·63
21	,, Early Six Weeks	20·67	2·44
22	,, Purple-top Mammoth..	17·95	1·35
23	,, Pomeranian White Globe	15·77	1·63
24	,, Imperial Green Globe	20·67	1·90
25	Montgomery's White Stone	18·50	1·35
26	,, Devonshire Greystone	14·41	1·35
27	,, Lincolnshire Red Globe	15·23	2·17

Inspector McCulloch reports: The land was well prepared to receive the seed at time of sowing, but owing to the nature of the soil being rather cold and inclined to be sour, together with the season being wet and cold, the crop made poor growth. Sorrel consequently got away, as the ground could not at any time be cultivated after the crop was sown owing to the moisture retained in the land. There is no doubt that the nature of the season affected the ground, and consequently the yield of the crop. The quality of the turnips on being cut was good in both the manurial and variety tests, and free from disease.

A PLOT OF CHOU MOELLIER.

G. de S. Baylis, photo.]

VICIA VILLOSA, IMPORTED FROM U.S.A GROWN FOR SEED.

SELECTED WHITE BELGIAN CARROTS. GROWN FOR SEED.

NORTH ISLAND.—MARTON PLOTS.

G. DE S. BAYLIS.

These Marton plots have been utilized, in the first place, for the purpose of making such tests as were possible without the employment of much time or labour, or any special treatment in the way of deep cultivation; and, secondly, to harvest and acclimatize a small lot of various seeds recently introduced from other countries by the Department, so as to obviate their reimportation should co-operative experimenters not be successful in securing a good foundation stock from their small trials.

The following is a list of the seeds imported for Marton plots. The initial stocks were tested and grown on Marton plots, and parcels are now procurable on the market, or are obtainable from growers.

Wheats from Australia: Federation, Yandilla King, Comeback, Power's Fife, Tarragon, John Brown.

Wheats from Sweden: Grenadier, Swedish Pearl.

Wheats from Canada: Imperial Amber, Turkey Red, White Fife, Red Fife.

Oats from Sweden: Victory, White Ligowo, Beardless Propsteier.

Oats from England: Triumph.

Barley from Sweden: Hannchen, Swan-neck.

Federation, one of the first wheats introduced, is now largely grown in the Rangitikei, and on many farms has ousted the variety formerly grown—viz., Marshall White. Many of the others are doing very well, and the Canadian, which are the most recent varieties introduced, are highly spoken of by those who grew them last season.

Oats: Both varieties did well in the Wairarapa last season, and all the seed procurable has been resown, there being considerable demand for it.

Barleys: Hannchen is well spoken of, and was being advertised by the trade for the first time this season since its introduction. Swan-neck has proved the better for feeding purposes on the trial plots this season. Unfortunately, the stock of seed has nearly run out. The situation, however, is saved by the fact that a small area will be harvested on Marton plots this season.

CROPS GROWN ON VARIOUS PLOTS DURING SEASONS 1910–11.

Plot.	Crop.	Yield.	Plot.	Crop.	Yield.
		Season 1910–11.			
1	Yandilla King wheat ..	39½ bushels.	17	Algerian oats ..	39 bushels.
1x	John Brown wheat ..	34½ bushels.	18	White Ivory peas ..	19¼ bushels.
2	Red Marvel wheat ..	22 bushels.	19	Oats and peas ..	1 ton 16 cwt. 2 qr. chaff.
3	Solid Straw Tuscan wheat	40 bushels.			
3x	Red Tuscan wheat ..	40 bushels.	20	Maize	..
4	Red Marvel wheat ..	22 bushels.	21	Blue Imperial peas ..	16½ bushels.
5	Pearl wheat	22¾ bushels.	22	Soya beans	..
5x	Hunter's wheat ..	29½ bushels.	23	Early Winter peas ..	24½ bushels.
6	Cape barley	..	23x	Partridge-peas ..	23½ bushels.
7	White Marvel wheat ..	26 bushels.	24	Velvet beans	..
7x	Comeback wheat ..	25 1-10 bushels	25	Tick-beans	..
8	Cape barley	..	26	Cow-peas	..
9	Velvet Ear wheat ..	30½ bushels.	27	Canadian Yellow Flint maize and Blue Prussian peas	1,600 lb. dry forage and 25 bushels peas.
9x	Federation wheat ..	28½ bushels.			
10	Hannchen barley ..	..			
11	Bore wheat	Did not mature.	27x	Virginian Horse-tooth maize and partridge-peas	2,028 lb. dry forage and 19 bushels peas.
11x	Grenadier wheat ..	12½ bushels.			
12	Hannchen barley ..	..			
13	Swedish Pearl ..	4 bushels.			
13x	Beardless Propsteier oats	31 bushels.	28	Early Amber Cane sorghum	10 tons (green).
14	Swan-neck barley ..	..			
15	White Ligowo ..	31 bushels.	29	Maize (variety) ..	..
15x	Victory oats	37 bushels.	30	Millets (variety) ..	..
16	Swan-neck barley ..	..	31	Mixed pasture ..	..
17	Triumph oats.. ..	44 bushels.			

CROPS GROWN ON VARIOUS PLOTS DURING SEASONS 1911–12, 1912–13.

Plot.	Crop.	Yield.	Plot.	Crop.	Yield.
		Season 1911–12.			
1, 1X	Red Fife wheat ..	49¾ bushels.	17, 17X	John Brown wheat ..	43 bushels.
2	Soya beans	..	18	John Brown wheat ..	..
3, 3X	Hannchen barley ..	73¾ bushels.	19	Imperial Amber wheat..	44 bushels.
4	Buda kale	..	20	Grenadier wheat ..	53⅜ bushels.
5, 5X	Buda kale	..	21	Grenadier wheat ..	53⅜ bushels.
6	Curly Luculas beet ..	..	22	Hannchen barley ..	61 4-5 bshls.
7, 7X	Triumph oats.. ..	74½ bushels.	23, 23X	Federation wheat ..	52 bushels.
8	Silver-beet	..	24	Swan-neck barley ..	57 bushels.
9, 9X	White Fife wheat ..	47½ bushels.	25	Turkey Red wheat ..	51 5-6 bshls.
10	Sutton's Silver-beet ..	..	26	Triumph oats.. ..	51 bushels.
11, 11X	Tares, Victory oats, rye-corn, Tick-beans (mixture)	16 tons (green).	27, 27X	Yandilla King wheat ..	46 bushels.
			28	Beardless Propsteier oats	42½ bushels.
			29	Red Tuscan wheat ..	43⅜ bushels.
12	Propsteier oats and tares	17½ tons.	30	Victory oats	55½ bushels.
13, 13X	Triumph oats and tares	15½ tons.	31	Mixed pasture ..	..
14	Velvet and Soya beans	..	..	Helianthi	..
15, 15X	Comeback wheat ..	29¼ bushels.			
16	White Ivory peas (part of south portion inoculated)				
		Season 1912–13.			
1, 1X	Perennialized Italian rye	..	17, 17X	Algerian oats	..
2	Common Italian rye ..	..	18	Algerian oats (computed with plot 17)	..
3, 3X	Western Wolths grass ..	..			
4	Azof barley	..	19	Grenadier wheat ..	..
5, 5X	Mixed pasture ..	..	20	Grenadier wheat ..	..
6	Common rye-corn, followed by Swan-neck barley	..	21	Black Russian barley, followed by John Brown wheat	..
7, 7X	Common rye-corn, followed by White Fife wheat	..	22	Black Russian barley (stands for seed)	..
			23, 23X	White Russian barley, followed by Webb's Black Challenge oats	..
8	Emerald rye-corn, followed by Comeback wheat	..			
			24	White Russian barley (stands for seed)	..
9, 9X	Emerald rye-corn ..	..			
10	Carter's Red Admiral wheat	..	25	Cape barley, followed by American Wonder peas	..
11, 11X	Red Fife wheat ..	..	26	Cape barley (stands for seed)	..
12	Turkey Red wheat ..	..			
13, 13X	Dun oats, ⅝ acre; Burgoyne wheat, ⅜ acre	..	27, 27X	Hannchen barley, followed by Victory oats	..
14	White Ligowo oats ..	..	28	Hannchen barley (stands for seed)	..
15, 15X	Carter's Stand-up wheat, ½ acre; Regerated Abundance oats, ½ acre	..	29	Swan-neck barley ..	..
			30	Black Bountiful oats ..	..
16	Carter's Red Admiral wheat	..	31	Mixed pasture ..	..
			..	Helianthi	..

In addition to testing suitability and nature of varieties, the plots at Marton have mainly been utilized in order to supply the initial stocks to outside experimenters until these are established upon the market.

The seventh Waikato Winter Show will be held at Hamilton from the 3rd to 7th June, inclusive.

The Ruakura Southdown and English Leicester ewes were put to the rams on the 23rd January.

Germany is becoming more and more dependent for food-supplies on foreign suppliers. The butter imports from Denmark within the last decade have risen by nearly 10,000,000 lb.

PASTURES AND CROPS.

JANUARY.

OFFICERS of the Fields and Experimental Farms Division of the Department report as follows on the condition of the pastures and crops during the past month :—

BAY OF ISLANDS.—A severe drought has prevailed here, practically from October, and rain still seems as far away as ever. It has had a disastrous effect upon the crops and pastures of the volcanic soils around the Bay of Islands, and has severely affected the dairying industry. The other three northern counties have been favoured with a few showers occasionally, and in consequence the pastures and crops are much better. The fly has been very troublesome this summer to the flockowners, who have had to resort to shearing their lambs to prevent disastrous results. Turnip crops are badly in want of rain.—*W. J. Dunlop.*

WHANGAREI.—There was practically no rain last month. Pastures are all dried up, and at the present time there is apparently no prospect of the drought breaking. This is the longest period of dry weather in the north for many years. All grain crops are in the stack now, and grass-seeding has commenced.—*A. P. Speedy.*

AUCKLAND.—When the old year departed a strong north-easter blew, which brought threatening weather. New Year's morning opened with dull and cloudy weather, followed by rain which fell at intervals during the day. The air was sultry. The spell of fine weather enjoyed for weeks previously broke, and it seemed as if unfavourable weather was about to set in. The squally weather made things unpleasant, and right up to the 8th it rained heavily on and off. Then it cleared up, and fine days followed, which allowed harvesting operations to proceed apace. Farmers were not slow to take advantage of the fine weather in getting their crops secured, which they did, with few exceptions, in splendid condition. The greater portion is now stacked, and some of the crops that are intended to be kept over are nicely thatched. The majority of the crops of oats, wheat, and barley were fairly heavy. Rye-grass crops were also good, and yields of good clean seed is reported. The pea crops have also been very good, particularly in the Auckland District. The farmers have also paid considerable attention to cultivating and preparing their land for root crops. Turnips, mangels, carrots, and other small crops are beginning to make splendid headway since the late rains set in. The pasture country is also freshened. Stock are still in fair condition. The factories are going well, although the dry weather retarded the milk-supply. The milk test is about the average.—*R. Rowan.*

TE AROHA.—Last month was remarkably dry, there being only two light rainfalls, which freshened the root crops, but not enough to make any decided improvement in pastures. Excellent crops of hay and oats have been harvested. A few plots of spring-sown oats are not yet quite ready. Turnips and rape crops are fair throughout, but a good fall of rain is badly needed to give the crops a fair start. Root crops are practically free of the fly, &c., so far. Potatoes are good generally, and there is no trace of blight to date.—*J. L. Morris.*

HAMILTON.—Beneficial rains at the beginning of the month; hot and dry weather during the remainder, with the exception of a few heavy showers in the last week. Grain crops are being harvested, and are light, owing to the wet spring and late sowing. Root crops are looking remarkably well, and potatoes are very free from blight up to the present.—*J. Kerr.*

KING-COUNTRY.—The weather was favourable for all harvesting operations. Some good crops of hay and oats have been stacked. In some parts of the district root crops could have done with more moisture, but, taken on the whole, turnips and mangels are showing fair growth. The bush-burning has been carried out under satisfactory conditions.—*B. Bayly.*

OHAKUNE.—The month opened with heavy rain on the night of the 1st, and from then on—the 28th and 31st excepted—exceptionally dry and warm weather was experienced. Pastures throughout the district are amply providing for all classes of stock. Owing to the lengthy spell of dry weather, late-sown turnips have not made the same headway as those sown earlier, but on the whole root crops throughout the district present a satisfactory appearance. Cocksfoot is well filled and headed, and should the present favourable conditions for seed-saving continue the produce of a large area should be on the market before the end of February. Exceptionally good bush-burns have been obtained throughout the district, and farmers are at present busy sowing the different seeds thereon. Oat crops are looking remarkably well and are gradually reaching their final stages of maturity.—*P. Barry.*

BAY OF PLENTY.—Some heavy rain fell early in the month, which was badly needed. Pastures and maize crops have since come along wonderfully, but still maize is much later than usual. Potato crops throughout the district are affected with blight, very few escaping. Harvesting is just completed, and about the average crops of oats have been obtained.—*John Case.*

NEW PLYMOUTH.—The New Year brought a welcome rain, which continued during the first week, followed by a fortnight's fine weather, and then a very changeable week. Most of the hay and ensilage has been made, and the yield is well up to the average. Pastures are looking particularly well. There is an abundance of feed. The root crops as a whole are below the average: many are very patchy. The late-sown turnips promise to be far better than the early. Maize is looking well.—*R. E. Fairfax-Cholmeley.*

STRATFORD.—The fine dry weather of last month was very favourable for hay-making, burning, &c., but it began to affect the pastures, and the milk-supply was on the decrease and turnips at a standstill. During the early part of the month very heavy rain fell, which freshened up all vegetation and saved the late-sown turnips, mangels, &c. During the rest of the month we had fine weather with intervals of good rain. The farmers' winter feed is now well assured.—*Austin F. Wilson.*

MANGAWEKA.—The past month was an exceptionally good one for farmers in this district. Opportunities were given to those who had bush to burn, and good use was made of them. Nice rains fell throughout, dispelling all fears of a drought. Old pastures have browned up considerably, but are still supplying a great quantity of fattening-feed. Potatoes so far are free from blight, and good crops are expected. Cocksfoot looks very prolific this summer, cutting being now in full swing. All stock are in good condition.—*J. A. Melrose.*

POVERTY BAY.—The weather was very hot and dry during January. There is fair feed on the inland hill country, but near the coast pastures are rather short and dried up. Water for stock is short in some localities. There will be good crops of maize, as they got a fair start before the very dry weather set in. Settlers are taking advantage of the dry weather to get fires through the logs and standing dry trees, and a considerable area of bush country has thereby received a good clearing of useless timber that has hampered mustering and other work.—*William Ross.*

WAIROA.—Exceptionally hot weather prevailed throughout the district during the past month, to a great extent parching up the face of the country and thereby withering the pastures, but there still remains an ample sufficiency for all needs. The season's oat crops for this county ought to prove record ones, whilst all root crops grown have thrived well. A few days' good rain at the present time would be greatly appreciated by the majority of farmers in the district. Stock of all classes are doing well.—*T. F. Mullaly.*

WAIPUKURAU.—The weather this month was very dry over the whole of the district, and feed is getting very dry and parched. Rain fell on two days only, and, drying winds following, all the moisture that had fallen has been evaporated, leaving the ground as dry as before.—*H. O. M. Christie.*

PAHIATUA.—Total rainfall for the month, 5·51 in. Rain fell on seventeen days, the heaviest fall being 1·56 in., on the 1st. Corresponding month of last year 1·52 in., rain falling on fifteen days, the heaviest fall being 0·42 in., on the 12th. The rain during the month retarded the harvesting a little; but, on the other hand, the district has derived great benefit from the moisture, as it has given the pastures and root crops a good start. The north-west winds, however, retarded growth on the wind-swept hills.—*T. Bacon.*

NORTH WAIRARAPA.—The past month was very sultry and dry, pastures and all green crops suffering accordingly. In the Eketahuna district there were occasional

showers, which were of great value to stockowners, and there is abundance of feed. Within the vicinity of Masterton the country is dry. On the 27th instant the weather broke, and a fair amount of rain fell, which was wanted. Turnips and rape were suffering before the rain fell, but will now recover. Stock throughout the district are looking well. Harvesting is well advanced. I expect wheat will be good, and oats about the average.—*J. S. Rankin.*

MASTERTON.—During the month of January we had twenty-five days of very hot dry weather, but rain fell on the 27th and 28th, and had a very beneficial effect upon the rape crops, many of which had been languishing for want of nourishment. Farmers took advantage of the fine weather to harvest their crops, and I anticipate a very fair yield of both oats and wheat. Caterpillars made their appearance and did a good deal of damage, oats suffering the most. Algerians appear to resist the ravages of the pest. I also notice the turnip-fly has done considerable damage, and in some cases the turnips have had to be resown. There have been some excellent crops of good clean cocksfoot-seed saved this year, and a lot of really good seed has been allowed to go to waste. There were some very good crops of early potatoes, and the present crops are looking very well. Feed is plentiful throughout the district.—*T. C. Webb.*

WELLINGTON.—The weather during January was generally mild and pleasant, a few days warm steady rains freshening up pastures, which were browning rapidly. All crops of oats, turnips, and maize are also looking well. All classes of stock are in good condition, although in the past few days the milk-supply has declined.—*G. H. Jenkinson.*

BLENHEIM.—The weather during the month was very hot and dry until the 28th, when there was a set-back to winter, snow falling on most of the high country, and the temperature falling to nearly freezing-point that night, changing again yesterday (30th) to summer. Harvesting is nearly finished—a week or two will see the end—and already a quantity of oats has been cut for chaff. Owing to the lateness of the frosts, the yield of peas is below the average; in some cases they were so poor that threshing operations had to cease.—*F. H. Brittain.*

SEDDON.—The weather-conditions for the month of January were very favourable both from harvesting and grazing points of view. Rain fell on five days at intervals, which all pastures sorely needed, and did not interfere with threshing operations. There have been record crops of barley, ranging from 50 to 67 bushels per acre. Most farmers in this district are fortunate in having a considerable amount of rape on hand, enabling them to hold lambs pending settlement of the freezing-works dispute.—*E. T. Sinclair.*

NELSON.—The weather for the month was changeable. Heavy showers of rain fell on several days, which improved the pastures and green, root, and late corn crops. Though the total rainfall for the month was 3 in., more is wanted, the strong hot winds having dried up the country to a certain extent. There is still a fair amount of corn to be harvested, and some of the late crops have not been cut yet.—*Gilbert Ward.*

WESTLAND.—Weather-conditions throughout last month were most unseasonable for the time of the year, and, instead of getting warm summer weather, it was more like winter most of the time. There were nineteen wet days, and the rainfall to date (29th) has been 6·61 in., the maximum fall being on the 20th, when 1·42 in. was recorded. Agricultural pursuits were considerably hampered, and in a good many instances crops which should have been cut are still standing; while in other cases they are spoilt, owing to inability to stack through continual wet weather. This is very unfortunate, as the settler on the West Coast largely depends on his hay for feed for stock through the winter months. There is a coating of snow on the high country, and present appearances point to an early autumn.—*H. J. Walton.*

KAIKOURA.—During the earlier part of last month exceptionally hot and dry weather prevailed, the country thereby becoming too dry for green crops. Rains falling on the 22nd, 28th, and 31st benefited these greatly, and they are now coming on well. Grain crops, generally speaking, are good throughout the district, and are being got together in good condition. Potatoes promise to be a fair crop.—*William S. Goodall.*

ASHBURTON.—Very warm weather was experienced in the early part of the month, 90 degrees of heat being registered. On the 27th a very heavy hailstorm passed over the lower portion of the district, which completely threshed out some of the oat crops. 2·70 in. of rain fell during the month, which will greatly help the turnip and rape crops. —*C. Branigan.*

FAIRLIE.—A very unfavourable month—very dry, windy weather. All crops have suffered. Harvesting has commenced, and is much earlier than was expected; a good many crops have only half filled. It is expected that oats will be scarce. Rain fell during the last week in the month, which did a lot of good to the root crops, but came too late for the grain.—*W. B. Manning.*

TIMARU.—The weather was very unsettled during the month of January, great heat, heavy wind, snow on the hill country, and some heavy rains which were badly wanted. Harvest is in full swing, and a large quantity of grass has been made into hay this season.—*J. C. Huddleston.*

WAIMATE.—The weather during the past month was most changeable, heat and cold, rain, hail, and winds being general. Cereal crops in some localities look well, but, speaking generally, yields are not expected to be up to last season's. Smut and fly are much in evidence, but the chief cause of any shortage in yield may be put down to weather-conditions, which have been anything but suitable for some considerable time for agricultural pursuits. Pastures have held out well, and feed generally is good, particularly on high country. All classes of stock are looking well. Root crops look encouraging, more particularly on areas which have been well cultivated. Co-operative field experiments under supervision of the Department with both oats and wheat look well. More interest is now being taken in these experiments by farmers generally. Clovers have this season grown well, and it is expected that more grass-seed than usual will be harvested. Peas, beans, and rape are doing well.—*F. A. Macdonald.*

KUROW.—The north-west winds that prevailed during last month were very detrimental to growing crops, the hot dry weather having caused cereals to ripen prematurely, and where crops were exposed to the wind considerable loss resulted through shaking. Although the past month was unfavourable for growth, some splendid crops of wheat, barley, and oats are to be seen on the Otekaike Settlement and in the Hakataramea Valley, and the yields give promise of being quite up to the average of last year, providing no further loss is caused by winds, &c. Welcome rain fell on the 20th and 26th, which will greatly benefit root crops, and also help to revive the burnt pastures. Shearing is mostly finished in this district, and sheepowners have had record clips and record prices for their wool. The Waitaki River has been in high flood during the last week, and losses of cattle and horses off the islands are reported.—*G. Reid.*

OAMARU.—The weather last month ran to extremes: a week or so of hot north-west winds—the thermometer registering 84 degrees in the shade—followed by cold southerly gales and rains for the latter part of the month. Harvesting has started, but is not yet general. It is to be expected that the yields of oats and wheat will not reach a very high standard this season. Potatoes are not coming on very well. The district of Kauroo Hill seems to be ahead of the lower country for crops, &c., this season.—*W. F. Flower.*

PALMERSTON SOUTH.—The first half of the month was very dry and warm, the 19th being the hottest day since February, 1909. The outlook was not very promising, harvest coming in too fast, pastures burning up, and turnip crops on the verge of failure for want of rain. During the last fortnight we had a pleasant change, periodically heavy rains freshening up pastures greatly and saving many turnip crops. Crops throughout the district are below the average and not well filled, though better around the coast than inland. Turnip crops are poor, but may be expected to do better after the recent rains. Potatoes are not very promising, and the blight has made its appearance. Total rainfall, 2·81 in.—*C. S. Dalgliesh.*

DUNEDIN.—The weather during January for the first part was warm and dry. During the last week there were good rains, but, unfortunately, the high winds spoiled the effect, and a good deal of grain has been shaken. The pastures are beginning to go off a little. Turnips are backward owing to lateness in sowing. Potatoes are fair, and little or no blight is reported in this district. There was an abundant hay harvest, and on the whole the dairy-farmer has a fair prospect for the autumn and winter.—*J. R. Renton.*

MOSGIEL.—During the month of January the weather was very mixed, with heavy rain-showers and hail, checking the growth considerably. The blight has made its appearance among the potato crops throughout the district. Harvesting has started, but is not yet general. Small birds are playing havoc with early-sown crops.—*H. McLeod.*

STRATH TAIERI.—During the early part of January the weather was very hot, with several days of warm winds which dried up vegetation. The cereal crops are good.

although some of the oats whitened off rather than ripened. The early turnips are promising well, but those late sown are going to be light. Grass is still abundant, and stock of all kinds are in splendid condition.—*W. Scott.*

MANIOTOTO.—From the 20th December up to the 26th January the district was subjected to very dry weather, accompanied by hot winds. This had the effect of drying up the grass and stunting all kinds of crops. Since yesterday (26th) we have had a splendid fall of rain, and it is still coming down, with no appearance of clearing. Stock of all kinds, especially sheep, are in fine condition.—*A. T. N. Simpson.*

CLYDE.—The weather for the month of January was very dry until the latter end, when we were treated to a good shower or two of rain, but not enough to do the district any good as regards the advancement of crops.—*Thomas N. Baxter.*

LAWRENCE.—The weather was extremely hot, with drying winds in the first portion of the month. The effect was to bring the grain crops on too rapidly, therefore they will be mostly light both in straw and yield. Turnips have also suffered with the dry spell. The fly has been very severe in some cases, and also the grub. Stock of all descriptions are looking well. Harvest will be considerably earlier than last year.—*R. Barron.*

BALCLUTHA.—During the month heavy gales prevailed, and much damage was done to crops and fruit. A good downpour of rain is badly needed. Pastures have gone back considerably, but there is still sufficient feed for stock. Harvest will be light this season, as the crops are filling very poorly. Early turnips are looking very well. Potatoes have come on well, but blight has started in places through the district. Some fine crops of rye-grass in the district. The rainfall for the month was 2·60 in., rain falling on fifteen days, the heaviest fall (68 points) being on the 20th. Total rainfall for the year 1912, 25½ in.—*H. A. Munro.*

OWAKA.—The weather for January was dry and warm. Crops of all kinds made good growth. Hay was stacked in first-class condition. Pastures are good, and feed is plentiful everywhere. Potatoes came on extremely well, but, unfortunately, blight has made a slight appearance in some crops. Swedes are most satisfactory, and soft turnips are also looking well.—*Robert McGillivray.*

GORE.—During the past month we experienced some very high winds, causing considerable damage to some of the grass crops, as well as burning up the pastures considerably. Grass harvesting is well advanced, and threshing has started in some places, and the seed should be saved in good order. Grain crops are looking well, and, given good weather, harvesting should start about the middle of the present month. The yields will not on the whole be so heavy as last year. Turnips are looking exceptionally well, and there is promise at present of a plentiful supply of feed during the coming winter.—*B. Grant.*

LUMSDEN.—The weather for January was anything but seasonable. During the first week we experienced nice warm sunny days, and then we had gusty boisterous winds and incessant bitter showers occasionally, accompanied by hail, and towards the end of the month there was very warm weather with hot drying winds which at times increased to a strong gale, causing a deal of damage to the grass crops by shaking out the seed. Oat crops are very short, and the yield will be very light. Turnips are looking remarkably well, a much larger area being sown this season. The strong winds we are getting will cause a small yield in grass-seed in many cases.—*W. S. S. Cantrell.*

INVERCARGILL.—January was a good growing month. The oat crop lengthened considerably, and turnips look well. The grass harvest is perhaps on the light side. Feed is still fairly plentiful, but is going back. This is the season of the year when a stack of ensilage on the farm would be of great value in keeping up the milk-supply. The country at present is looking well. Potatoes never looked better.—*J. R. Whyborn.*

OTAUTAU.—The early part of the month was fine and warm—in fact, almost too dry. After such a long spell of wet weather the ground became hard and caked, but latterly some fine showers came and everything was benefited by them. One particularly fine crop of oats is growing on Ringway, which, I should say, will thresh 100 bushels if not more—so far the best in the district.—*H. F. Dencker.*

QUEENSTOWN.—The weather for the month was very changeable at times—even within the twenty-four hours we experienced the weather suitable for the four periods. A fair amount of rain fell, which in some districts has been the actual salvation of grain crops, &c.; but, generally speaking, pastures, &c., have not benefited to any great extent in consequence of the continual, and in most cases cold, southerly winds following and drying up the moisture within a few hours.—*A. Clarke.*

THE FRUIT CROP.

THE officers of the Orchards, Gardens, and Apiaries Division report as follows regarding the condition of the fruit crop at the end of January:—

WHANGAREI.—Apples, medium crop; lemons, medium; nectarines, light; peaches, heavy to medium; pears, heavy crop; plums (English), light; plums (Japanese), medium; oranges, light to medium; tomatoes, fair crop. Owing to dry spell all fruits are coming off small.—*J. W. Collard.*

AUCKLAND NORTH.—Apples, good average crop; lemons, looking well; peaches, good crop; pears, good crop; plums (English), light to medium crop; plums (Japanese), heavy crop; tomatoes, looking well.—*W. C. Thompson.*

AUCKLAND SOUTH.—Apples, good crop early varieties, light to good of late varieties; nectarines, good crop; peaches, light to good crop; pears, light crop. Plums (English), good crop; plums (Japanese), light to good crop; tomatoes, good crop.—*N. R. Pierce.*

HAMILTON.—Apples, fair average crop; lemons, rather light crop; nectarines, fair average crop; peaches, medium crop of good quality; pears, good average crop; plums (English), light crop, but of good quality; plums (Japanese), crop light and below the average; tomatoes, fair average crop; walnuts, very poor crop.—*T. E. Rodda.*

POVERTY BAY.—Apples, crop little below average; lemons, poor crop; nectarines, average crop; peaches, average crop; pears, heavy crop; plums (English), above average crop; plums (Japanese), average crop only; tomatoes, good crop.—*W. R. L. Williams.*

MANAWATU AND WAIRARAPA.—Apples, medium crop; nectarines, good crop; peaches, average crop; pears, medium crop; plums (both varieties), heavy crop; tomatoes, medium crop.—*George Stratford.*

HASTINGS.—Apples, moderate to light crop; nectarines, heavy crop; peaches, heavy crop; pears, heavy crop; plums (English), heavy crop; plums (Japanese), heavy crop; tomatoes, looking fair; walnuts, very good crop.—*J. A. Campbell.*

WELLINGTON.—Apples, average crop; nectarines, poor crop; peaches, poor crop; pears, average to heavy crop; plums (English and Japanese), heavy crop; tomatoes, average crop.—*T. C. Webb, jun.*

NELSON.—Apples, crop looking well; nectarines, very good crop; peaches, fair crop; pears, medium crop; plums (English), very fair crop; plums (Japanese), not so heavy as usual; tomatoes, crop good; walnuts, large crop.—*J. H. Thorp.*

CHRISTCHURCH.—Apples, good crop; nectarines, light crop; peaches, light crop; pears, fair crop; plums (English), good crop; plums (Japanese), fair crop; tomatoes, good crop; walnuts, poor crop.—*W. J. Courtier.*

TIMARU.—Apples, light crop; peaches, very light crop; pears, good crop; plums (English), fair crop; plums (Japanese), light crop; tomatoes, good crop.—*A. B. Mansfield.*

DUNEDIN.—Apples, crop looking well, good crop; nectarines, fair crop; peaches, very light crop; pears, good crop; plums (English and Japanese), very good crop; tomatoes, crop looking well.—*W. T. Goodwin.*

Victorian fruitgrowers have booked shipping-space in oversea steamers for 421,683 cases of fruit, an amount which, it is expected, will almost equal that of the export from Tasmania, where the crop is said to be exceptionally light. Of the Victorian bookings 140,950 cases are for the German markets,

MARKET CONDITION OF LOCAL FRUIT AND VEGETABLES.

THE Fruit Inspectors of the Orchards and Gardens Division report as follows on the condition of locally grown fruit and vegetables in the shops and auction-rooms, and the market position of these, for the month of January :—

AUCKLAND.—Large quantities of locally grown fruit are coming forward, for which there is a very fair demand, but few consignments are free from disease. Black-spot appears to be very bad, nearly every case opened being more or less affected. Codlin-moth is also very plentiful. Growers of the affected fruit have been notified that further consignments of infected fruit will be condemned or destroyed. The grading and packing is decidedly a great improvement on last month, but there is still a good opening for growers who will pack only the best fruit, and advertise their methods by labelling their cases. Such growers would eventually get top prices for their fruit, as retailers will not pay good prices for indifferently packed fruit such as has been coming forward. The following list gives a fair idea of the ruling prices for the month : Apples (cooking), per bushel, 3s. 6d. to 5s. ; apples (dessert), per bushel, 4s. to 6s. 6d. ; pears, per bushel, 4s. 6d. to 7s. ; Japanese plums, quarter-case, 1s. to 2s. 6d. ; English plums, 2s. 6d. to 4s. ; apricots, quarter-case, 4s. to 4s. 6d. ; peaches, quarter-case, 2s. 6d. to 5s. ; lemons, first quality, case, 12s. 6d. to 16s. ; lemons, second quality, case, 8s. to 10s.—*C. Craigie.*

WELLINGTON.—The markets during the month of January were very heavily supplied with practically every line of seasonable fruit and vegetables. Very heavy supplies of stone-fruits came forward. Peaches are coming forward in large quantities almost daily. Formerly they were arriving in very bad order, due to careless packing, but lately they are arriving in tip-top condition. The principal supplies are from Hastings and Motueka. Prices were very low during the beginning of month, realizing 1s. 6d. per half-case, but at present are selling according to quality at from 4s. to 4s. 9d., prime 3s. to 3s. 9d., inferior 1s. 6d. to 2s. 9d., per half-case. Apricots are plentiful and cheap, some consignments arriving bruised and with leaves, stem, and spurs left on the fruit, showing careless picking. The lots arriving in good order and well packed realized good prices, 4s. 9d. to 5s. 6d., others 1s. 9d. to 3s. 6d., per half-case. Cooking-apples (large green) are in good demand at 5s. to 6s. 6d., others quit at 2s. 6d. to 4s., per bushel case. Several lines of apples which were affected with codlin-moth were destroyed. Nectarines are in good demand, choice lots selling at 4s. 6d. to 5s. 9d. half-case, others 2s. 9d. to 4s. Pears are not in very good demand. It was necessary to destroy several lines on account of their being badly affected with pear-scab, codlin-moth, and scale. Prices for dessert, 2s. 6d. to 3s. 6d. per half-case. Greengages are firm at 4s. 6d. to 6s. 6d. half-case. Plums are plentiful, and the demand lately is keen : Choice Burbanks, 2s. to 3s. ; others, 1s. 4d. to 1s. 9d. ; Blue Diamonds, 2s. 9d. to 3s. 3d. ; Early Rivers, 3s. to 4s., per case. The market is well supplied with tomatoes, and the prices have eased slightly, being 4s. to 4s. 6d. per half-case ; overripe lots quitted at 3s. to 5s. per case. Grapes are in good demand ; some consignments opened up in poor order, due to the long delay in transit from North Auckland. These brought 7d. to 11d. per pound. Local hothouse-grown realized from 1s. to 1s. 5d. per pound. Black currants continue in excellent demand at 6s. 6d. to 8s. 6d. per half-case. The season is almost over. Gooseberries are almost done, and prime ripe offer 6s. to 8s. per half-case. All vegetables are in good demand, and prices vary according to the supply. Vegetable marrows, 5s. to 8s. per sack ; cauliflowers, 5s. to 7s. 6d. per sack, choice 7s. 6d. to 9s. ; carrots, per sack, 6s. to 8s. ; white turnips, 5s. to 6s. 6d. per sack ; swedes, 5s. to 6s. per sack ; parsnips, 6s. to 7s. per sack ; beetroot, 5s. to 6s. 6d. per sack ; lettuce, 1s. 6d. to 2s. 9d. per sack ; French beans, 2d. to 3d. per pound ; broad beans, 2s. 6d. to 3s. 6d. per part sack. Green peas average 8s. to 12s. per sack ; potatoes, 7s. 6d. to 10s. 6d. per cwt. ; onions £8 per ton ; cabbages, 7s. to 9s. per sack.—*T. C. Webb, jun.*

CHRISTCHURCH.—Fair supplies of stone-fruits from Hawke's Bay, Nelson, Teviot, and Auckland were offering in local markets. Local fruits also in fair quantities. A few lots of tomatoes from the Nelson District were also on sale. Vegetables are not so plentiful as last month. A few lots of Australian grapes were landed in inferior condition. Sufficient care did not appear to have been taken in packing, consequently the fruit opened up bruised and not in suitable condition for first-class sale.—*E. A. Reid.*

DUNEDIN.—Peaches, tomatoes, and plums are coming to hand in good quantities. Raspberries, strawberries, apricots, grapes, red and black currants, and gooseberries are just about over, small quantities only coming to hand. Apples and pears are coming forward in small supplies only. During the month warning notices had to be issued for fruit affected with shot-hole fungus and codlin-moth. Fair supplies of the following vegetables are coming to hand in good condition: Potatoes, cabbages, cauliflowers, carrots, lettuce, marrows, turnips, beetroot, rhubarb, beans, and radishes. All shops are well supplied with most varieties of both local and imported fruits, the same being of good quality and condition.—*E. T. Taylor.*

BLUFF.—Locally grown fruit is now arriving in considerable quantities, the majority being grown in Central Otago. During the month fruit arrived from the following districts: Auckland: Burbank plums—A fair quantity in good order. Hawke's Bay: Plums—Good condition and clean. Canterbury: Tomatoes, apples, pears, and raspberries—Good lines of fruit. Otago Central: Apricots, peaches, plums, apples, pears, and grapes—A fair quantity is arriving almost daily, and is in the best of condition and clean. A good many growers are represented, and good prices are obtainable. Southland: Cherries, raspberries, currants, strawberries, and vegetables—The fruit-shops were inspected, and the auctions inspected weekly.—*R. Hutton.*

HONEY-CROP PROSPECTS.

THE Director of the Orchards, Gardens, and Apiaries Division has received the following reports on the honey-crop prospects from the Apiary Instructors:—

AUCKLAND.—Honey prospects decidedly good both in quantity and quality.—*G. V. Westbrooke.*

WELLINGTON.—As anticipated, the recent weather has been exceptionally good for honey-gathering, and has resulted in an average crop being secured. The majority of the honey is, as formerly, of an excellent quality.—*F. A. Jacobsen.*

CHRISTCHURCH.—Beekeepers generally have been very busy extracting honey of choice quality during the last two weeks. The hot weather has burnt up clover-bloom, especially on light lands, and indications point to a falling-off of nectar.—*L. Bowman.*

DUNEDIN.—Weather-conditions are at present against a large honey crop. Extracting is in progress; and the returns show a steady increase over last season. Given fine weather there is yet time to secure good returns, as there is an abundance of clover. Honey sent forward is realizing good prices.—*E. A. Earp.*

OUR TRADE WITH VICTORIA.

THE total value of the imports in Victoria from New Zealand for the quarter ending 31st December, 1912, was £186,671. The principal items were—Animals, living, £1,460 (8 geldings, 1 mare, 158 sheep); fish, fresh, potted, and preserved, £7,541; grain, £24,374 (barley 15,010 centals, oats 46,578, bran and pollard 3,538); bacon and hams, £950; preserved meats, £5,025; potatoes, £8,973 (14,088 cwt.); skins and hides, £8,292 (cattle 4,322, horses 149, sheep 400, rabbits 1,624 lb.); timber, £49,048.

Imports into New Zealand from Victoria—Total for quarter, £159,892. The principal items were—Animals, living, £1,176 (8 cattle, 1 mare, 15 sheep); bark, tanning, £1,092; fruits, dried and preserved, £4,223; fruits, fresh, £3,757; leather, £6,241; manures, £8,815; wine, £4,250; wool, greasy, £2,010.

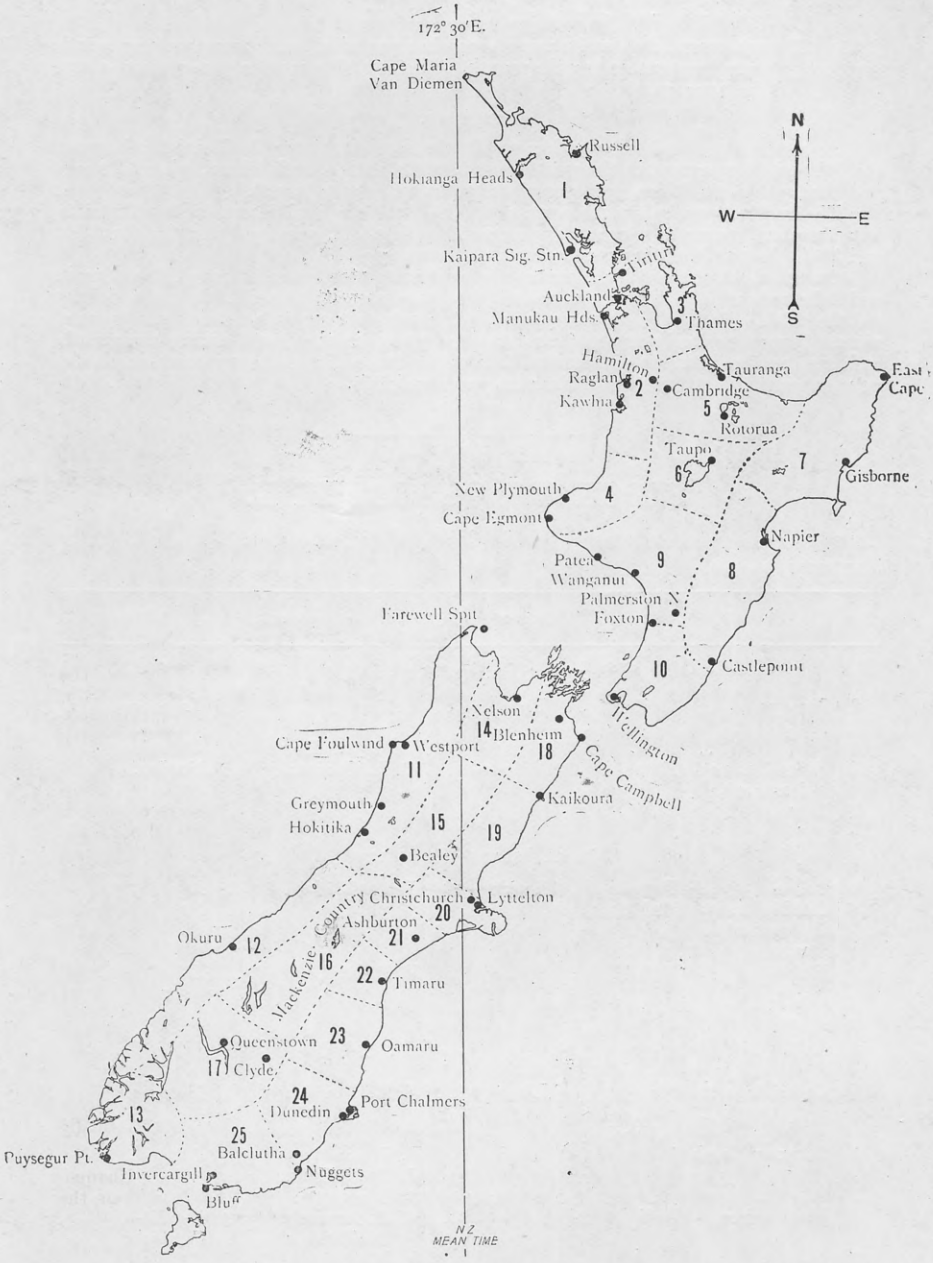
THE WEATHER.

DISTRICT NOTES FOR JANUARY.

D. C. BATES.

Chiefly from Telegraphic Reports.

District.	
1, 3.	High north-east winds and heavy rain fell on the 1st and 5th, but generally the month was unusually dry, with fair and warm weather ruling. An electrical disturbance was experienced in parts on the 28th. The rainfall was considerably below the average of previous years.
2.	The northern portion of this district recorded less than the average rainfall, but in the south the total fall was in excess. Most of the rain fell in the beginning and towards the end of the month. From the 7th to the 25th very little rain fell, and the weather was fair and warm.
4.	Rainfall above the average by from 15 to over 50 per cent., particularly heavy rain falling on the 1st. A severe thunderstorm occurred in parts on the 3rd and again on the 28th. The weather on the whole was fine, precipitation taking place mostly at night.
5.	Inland in this district precipitation was above the mean by about 25 per cent., but along the coast less than the usual amount was recorded. Weather-conditions were similar to that in districts 1 and 3.
6.	The rainfall was slightly in excess of the average of previous years, the greater proportion falling during the first week. The weather was fair and seasonably warm.
7, 8.	Extremely warm weather was experienced, and the rainfall was under the average by about 50 per cent. A cold snap occurred on the 27th and 28th, and on the morning of the latter day a frost was reported at several stations. Snow fell on the mountain-ranges on the 28th. On the 9th and 27th electrical disturbances were experienced.
9, 10.	Both these districts recorded a rainfall in excess of the average, the mean percentage above being about 55. The first and last weeks were unsettled, but warm and dry conditions prevailed, with northerly winds, during the remaining portion of the month. On the 14th and between the 18th and 21st high north-west winds were experienced. The heaviest rainfall occurred on the 6th, 21st, and 27th.
11, 12, 13.	Changeable and showery weather prevailed throughout the month, there being only about nine days on which no rain was recorded to the southward of Westport. Northward, rainy days were not so frequent, although the total fall was usually in excess of the average. The departure from normal greatly varied, but the percentage was generally above by from 10 to over 100 per cent. in the south. From the 18th to the 21st frequent showers of hail were reported.
14.	Very heavy rain fell on the 6th, which brought the total for the month in advance of the average fall by from 15 to 40 per cent. Otherwise there were but few wet days, between the 8th and 26th especially being practically rainless. Fine weather predominated.
15.	A month of strong north-west winds, frequent gales being experienced. Changeable and showery weather prevailed, but the rainfall was less than the average by about 20 per cent.
16	Fair and warm weather prevailed. The rainfall was 20 per cent. below the mean for January.
17	Fair weather predominated, but showers were frequent, causing a total fall for the month in excess of the average by from 15 to 30 per cent.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New Plymouth
Cape Egmont
Napier
Patea
Wanganui
Palmerston N.
Foxton
Farewell Spit
Castlepoint
Nelson
Blenheim
Wellington
Cape Foulwind
Westport
Cape Campbell
Greymouth
Kaikoura
Hokitika
Bealey
Country
Christchurch
Lyttelton
Ashburton
Okuru
Mackenzie
Timaru
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19–24. All the east-coast districts recorded above the average rainfall, the excess ranging from 20 to over 100 per cent. in parts. Some very warm weather was experienced, a far station in Canterbury recording over 90 per cent. in the shade on several occasions. Electrical disturbances occurred in scattered areas on the 9th, 10th, and 27th.

25. Though warm, dull and showery weather prevailed, and strong westerly winds were frequent during the month. The rainfall was nearly everywhere above the average.

SUMMARY.

As a rule warm and fair weather was in the ascendant over the Dominion between the 6th and 21st, except in the west coast districts of the South Island, where showery and changeable conditions were experienced throughout the month.

The rainfall was below the average in the Auckland and Hawke's Bay Districts, but elsewhere, owing to several days of good soaking rain, principally on the 6th, 21st, and 27th, the total for the month exceeded the average.

On the night of the 6th the centre of a cyclonic system passed through Cook Strait, and a disturbance of a similar nature but of greater intensity passed in the same vicinity on the 27th. Both these atmospheric disturbances brought beneficial and general rains. Several westerly areas of low pressure passed in the South during the month, and one, on the 14th, was of unusual intensity; but although heavy north-west gales were experienced at this time little rain accompanied it.

STOCK IN QUARANTINE.

THE following stock was received into quarantine during the month of January :—

No.	Breed.	Sex.	Port of Origin.	Owner or Agent.	Address.
			MOTUIHI ISLAND (AUCKLAND).		
2	Jerseys ..	Heifers ..	London ..	C. Day	Tamahere, Waikato.
6	" ..	" ..	" ..	R. Glynn Lewis ..	Okoroire.
1	Wire-haired fox-terrier	Female ..	" ..	C. L. Thomas ..	Napier.
1	Ditto ..	Male ..	" ..	" ..	"
			QUAIL ISLAND (LYTTELTON).		
1	Collie ..	Female ..	London ..	James Lilico ..	Lochiel.
3	Collie pups (dropped on voyage)	Male ..	" ..	" ..	"
1	Holstein ..	Bull ..	Sydney ..	J. B. Reid ..	Elderslie, Oamaru.
1	" ..	Heifer ..	" ..	" ..	Ditto.
			SOMES ISLAND (WELLINGTON).		
3	Collie dogs ..	Male ..	Liverpool ..	J. R. Corrigan ..	Hawera.
2	" pups ..	Male and female	" ..	" ..	"
9	Romney Marsh	Rams ..	London ..	J. Telford* ..	Clinton.
2	"	" ..	" ..	J. R. McKenzie* ..	"
1	"	" ..	" ..	A. McKay* ..	"
1	Hereford calf	Bull ..	" ..	A. C. Levett* ..	Feilding.
1	"	" ..	" ..	D. McFarlane* ..	Canterbury.
2	"	" ..	" ..	A. Moore† ..	Kai Iwi.

* Messrs. Dalgety and Co., agents. † Messrs. Murray, Roberts, and Co., agents.

ANSWERS TO CORRESPONDENTS.

CORRESPONDENTS are requested, when desiring information through the Journal, in regard to disease in animals and plants, to forward, where possible, affected specimens, in order to facilitate a correct diagnosis of the trouble, and to ensure the best advice. In stating a question the most complete descriptive details should be furnished.

SHELTER.

"SHELTER," Hobson Bay Road, Parnell, writes as follows:—

Will you please inform me through the colums of your *Journal* what you consider the most suitable trees to plant for shelter on the Hauraki Plains?

The Orchards, Gardens, and Apiaries Division replies as follows:—

The following trees are recommended as very suitable for shelter planting in your district: Black-wattle (*Acacia decurrens*); *Pinus muricata*; *Eucalyptus amygdalina*.

FRUITGROWING.

"SUBSCRIBER," Auckland, writes as follows, under date of the 10th December:—

Would the Department, through the next *Journal*, please give me advice on the following questions:—

(1.) I have some two-year-old peach-trees (Royal George and Briggs' Red May), planted last spring, having been pruned right back to the trunk then, leaving three and four well-placed buds to form a good low framework. The trees have made good growth, and the leaders are now from 2½ ft. to 3 ft. long, and have commenced to throw out numerous laterals. I would like to know if it would be advisable to choose one or two of the best-placed laterals on each leader and encourage them, as I believe by doing so a good-shaped tree could be formed quickly. Perhaps it should be understood that the above method of treatment should be adopted when summer pruning.

(2.) What is the best manure, or other treatment, to encourage vigour in young peach or nectarine trees which have had the leaf-curl and appear to be stunted in consequence?

The Orchards, Gardens, and Apiaries Division replies,—

(1.) In young trees such as those you mention three or four good leaders should suffice. All laterals should be summer pruned, and the leaders cut back at the winter pruning.

(2.) A good manure to encourage vigour in young peach or nectarine trees which appear to be stunted would be 12 oz. superphosphate, 8 oz. bonedust, and 2 oz. sulphate of ammonia for each tree.

BORER.

MR. J. G. FINLAY, Wellington, writes,—

On inspecting my fruit-trees last week I noticed an apple-tree with one of its branches withered. An examination showed me that an insect in the form of a borer had entered the branch, and was working its way towards the top. I should be pleased if you could tell me through the *Journal* the name of this insect and the best way of dealing with it?

The Orchards, Gardens, and Apiaries Division replies,—

The insect described by you is probably the borer *Aenoma hirta*. The simplest method of dealing with this pest is to open with the point of a penknife the tunnel made by the pest, cut off and insert the head of a wax match, and then plug the mouth of the tunnel with a little hard soap.

BARLEY AND VETCHES.

MR. JOHN P. LINEHAN, Rongokokako, writes,—

In the December issue of the *Journal* an article on barley and vetches states that 2½ bushels to the acre were sown. Kindly inform me (1) the proportion of vetches to barley, and (2) the cost of vetches-seed, say, in Wellington or other centre, as they are not stocked here.

The Fields and Experimental Farms Division replies,—

(1.) The proportion of vetches to barley: 1½ bushels vetches to 1 bushel barley. (2.) Vetches cost 11s. 6d. per bushel in large quantities, 12s. 6d. per bushel in small quantities.

DODDER.

MR. E. L. PURDIE, Frankton Junction, writes,—

Will you kindly inform me through your *Journal* the best means of eradicating clover dodder? I have a small paddock of cow-grass in which dodder is killing the clover in several patches of two or three yards in diameter. The dodder is now flowering. Do stock spread the pest?

The Fields and Experimental Farms Division replies,—

When dodder is present in small patches each patch should be cut close to the ground before the clover flowers and the cuttings spread over the patch and allowed to dry. When they are dry they should be burnt. This treatment should be done at least twice during the year. If the whole paddock is dodder-infested it is necessary to plough up before the dodder seeds and resow the following spring. Stock are often the means of spreading the pest.

FERTILIZERS.

MR. L. HEDGES, Pahiatua, writes as follows:—

Would you kindly inform me if there is any loss of chemical action with these manures mixed: (1) Lime and basic slag; (2) bonedust and basic slag; and (3) lime and bonedust?

The Agricultural Chemist replies,—

Ammonia is lost when mixtures 2 and 3 are mixed; No. 1 mixture may be made up without any loss.

FERTILIZERS.

"SUBSCRIBER," Cambridge, writes as follows:—

Could you inform me through the *Journal* (1) whether slaked ground lime, or burnt lime, should be used in making basic superphosphate; (2) is basic superphosphate a good top-dressing for medium to light lands when used alone; (3) is the autumn a good time to apply basic superphosphate as a top-dressing?

The Agricultural Chemist replies,—

(1.) Slaked lime. (2.) Yes. (3.) Yes.

NEW ZEALAND FLAX (PHORMIUM TENAX).

MR. F. BULL, Waddington, Canterbury, writes,—

Could you tell me the correct distance from the ground at which native New Zealand flax should be cut? I have about 100 acres of land in flax, and have always allowed the flax-cutters to cut it as they pleased, but have recently been informed that if cut down into the butt of the leaf which contains the gum the growth is thrown back about fifteen months.

The Fields and Experimental Farms Division replies,—

The correct distance to cut New Zealand flax is from 6 in. to 8 in. above the bulb; if cut too close into the bulb the plants "bleed," and the growth is thereby considerably retarded.

WETHER PRODUCING MILK.

MR. P. D. HARGREAVES, Waiwhatawhata, Otorohanga, writes,—

I have at present a crossbred wether running on my property which produces milk exactly similar to a wet ewe. I have never before seen or heard of such a peculiarity, and would be glad if you can account for it, thinking at the same time it might interest some of your readers.

The Live-stock and Meat Division replies,—

This is apparently a very interesting case. In all probability the animal is hermaphrodite. A veterinary officer will examine the animal when in your district.

DIAMOND-BACK MOTH.

T. B. H., Richmond, writes,—

Does the turnip-fly attack chou moellier or thousand-headed kale ?

The Fields and Experimental Farms Division replies,—

The diamond-back moth, which is generally erroneously termed the "turnip-fly," attacks all members of the turnip and cabbage family, including chou moellier and thousand-headed kale. The effects of this moth, however, appear to be less disastrous to the kales than to the turnips and rape.

DRESSING COWS.

MR. HENRY WAKELIN, Kamo, writes as follows:—

In dressing cows for returning to the bull too often (every three weeks), should they be dressed while in season ?

The Live-stock and Meat Division replies,—

No. Wait about two days after œstrum has passed off, then irrigate her. She could then be allowed to go to the bull when next she comes in service.

WARTS ON COWS' TEATS.

MR. R. WECH, Warkworth, writes,—

If there is any known cure for warts on cows' teats, would you kindly let me know, as our cows are badly affected with the complaint. It seems to be very catching.

A reply to "Subscriber," Hastings, on the same subject appeared in the December (1911) *Journal*, but the Live-stock and Meat Division adds the following:—

As your cows are still milking, you might try painting them every night with a solution composed of salicylic acid 2 parts, zinc-chloride 1 part, and collodion 15 parts. Apply with a camel-hair brush. From the frequency with which warts spread, and their closeness of situation, it has been suggested that they may be infective, but this has not been determined.

LAMB TROUBLES.

MR. WILLIAM DODD, Glenham, Southland, writes,—

What is the cause of big joints in lambs ? Is there any cure ? We lose a few every year, and those that live are cripples and never thrive. I blame cold and wet, but may be wrong. The trouble begins when the lambs are about three weeks or a month old, and attacks either ewe or wether lambs, mostly after tailing. This season and last were the worst for the trouble in my experience.

On page 564 of your *Journal* a question is asked regarding still-born and weak lambs. The cause in the case in question was the nine weeks' turnips. From two to four weeks' turnips previous to lambing is sufficient. After that the death-rate will increase in proportion to the length of time the ewes are kept on turnips. Let the ewes have the turnips after lambing.

The Live-stock and Meat Division replies,—

The cause of this condition is not exactly determined. Cold and wet could hardly be the cause, as the condition is found in dry districts and in good seasons. A more probable cause is the entry of micro-organisms through the navel when the animal is a day or two old, this leading to enlargement of one or more joints—the so-called "joint evil." If you can possibly manage it, change your lambing-paddock next season. There is no telling how long the germs may live on a pasture, and it is as well to take every precaution.

Dairying Problems.

"Ego," Koromatua, Frankton Junction, writes,—

1. Will you please inform me why cows decrease considerably in milk-yield when fed mostly on clover? Towards the end of November my cows were milking well, but since the clover began to flower they have fallen in yield rapidly.

2. My farm is ordinary fern and scrub country, and was put into grass eighteen months ago after the ploughing. The herbage is mostly clover, which grows in great abundance. I should like to encourage the growth of grasses in preference to clovers. I notice that in the paddock where my young calves are fed (on skim-milk) the grasses thrive admirably. The same thing occurred in another paddock used last year. Could you suggest a reason? It is surely not the ammonia in the dung—the clover land should be rich in nitrogen. I top-dressed with basic slag last autumn: could I improve on it?

3. Is there any difference between "ulceration of the womb" and "septic metritis"? What are the symptoms? If the disease is infectious, why are not the same precautions advised as in the case of abortion? There is much trouble this season in the Waikato through cows discharging sometimes a thick whitish matter, and others a brownish fluid. Could you suggest a reason?

The Fields and Experimental Farms Division replies,—

Clover, under ordinary conditions, does not decrease the milk-yield. There is probably some other cause that has not been observed. It should be remembered that when the clover is flowering the period of lactation is lengthening, consequently there is a decrease. In your district clovers are luxuriant when first laid down. You will in all probability find that after the first season the clover will not predominate.

The paddock in which you keep calves is probably smaller than your other enclosures, and during the season when not occupied with calves it will have been closely stocked. Such paddocks are usually convenient, and on this account they are in constant use. Stock fed in other enclosures are brought in for the night, or horses fed in the stable are put there. This brings about complications, which are exhibited in the altered pasturage. Naturally, the actual cause cannot be defined.

The Live-stock and Meat Division replies,—

Evidently the condition referred to is what is termed "metritis" or inflammation of the womb. Owing to the cause generally being the absorption of decomposing material from this organ into the blood-circulation, the condition is usually called "septic metritis." It is practically a blood-poisoning, the most common cause being retention of the afterbirth, or part of it, and its decomposition. In other cases, especially where the symptoms are seen two days or so after calving, the probability is that some tear or abrasion, either of the uterus or vagina, has occurred. The symptoms shown are not always the same, and may come on two or three days after calving, or not until a week or more afterwards. You may say there is an acute and subacute form. The usual symptoms in the acute form are that the cow has not cleansed, and is not doing as well as she should be. She may not be eating or ruminating, and may be more than ordinarily thirsty, and the secretion of milk diminished, if not suspended. In some cases locomotion may be interfered with, and she may even be down and cannot be made to rise. These cases are sometimes mistaken for milk-fever. A cow, however, suffering from metritis does not lose consciousness, and does not show brain symptoms, such as allowing the eye to be touched with impunity, which you see in milk-fever. If the animal has not cleansed, the afterbirth is generally in a stinking condition. If she has done so, on passing

your hand into the womb you can generally bring out a quantity of reddish mucous, which smells badly, and probably portions of the afterbirth which have not been expelled. The temperature, as shown by the clinical thermometer, may be higher than normal, or, on the contrary, below, so it is not to be relied on. In these cases treatment should be prompt and active. The first thing to do is to thoroughly flush out the womb with a warm antiseptic solution. As much as possible should be injected, and care should be taken to get as much as possible out again. Lysol, 1 to 80 (two teaspoonfuls to the pint), or Jeyes or Lawes fluids, 1 to 50 (three teaspoonfuls to the pint), can be used to make the solution, which can be repeated every day. A drench composed of Epsom salts 10 oz., powdered carbonate of ammonia ½ oz., powdered ginger ½ oz., and powdered gentian 1 oz. may be given in a quart of thin gruel or milk. The same drench, leaving out the Epsom salts, may be given three times a day afterwards. If the cow is a valuable one, and the case is urgent, I should give her quinine. This drug is, however, expensive. Two drachms dissolved in 2 oz. of sulphuric ether, in milk, may be given every four hours. What may be termed the subacute form may not be noticed for a week or more after calving. The cow may not be doing as well as she should, and be gradually losing condition. A reddish-chocolate discharge may be noticed from the vagina. In these cases the usual irrigation of the womb should be carried out, and the carbonate of ammonia drenches given.

LUCERNE.—COCKSFOOT-SEED.

MR. G. T. EMTAGE, Warkworth, writes,—

I should be glad if you would inform me (1) what is the best variety of lucerne to sow on sand, also what quantity per acre; and (2) how long would it be advisable to keep cocksfoot-seed.

The Fields and Experimental Farms Division replies,—

(1.) The Department has no definite information on a variety of lucerne specially suitable to such conditions. It must be remembered that sandy soils are of decidedly varying descriptions, and you give no details. There is practically no variety of lucerne specially adapted to sandy areas. The departmental *Journal* of October last supplies fairly complete information on lucerne experiments on sandy areas. The usual quantity of seed sown is from 15 lb. to 20 lb. per acre. The smaller quantity is ample if the cultivation is thorough.

(2.) The germination of cocksfoot-seed lessens each year after it is harvested. The conditions under which it is stored determine the deterioration. The recommendation is that if your seed has been kept for more than one year you should yourself test the percentage of its germination. Put a hundred of the doubtful seeds between damp paper or thin flannel and observe the results. The seeding can then be regulated.

EIGHT-WIRE FENCE.—BLACKBERRY-MOTH.

MR. CARL WEFFER, Northern Wairoa, writes,—

I enclose measurements of a standard seven-wire fence, copied from a southern newspaper. Will you kindly give in the *Journal* the measurements of a standard eight-wire fence.

You do not say where the blackberry-moth is working, or whether any attempt is being made to spread it into other places.

The Fields and Experimental Farms Division replies,—

There is no definite standard. The distances between the wires are regulated by the particular predilection of the owner.

The Biologist replies,—

The blackberry-bud moth (*Carposina adreptella*) appears to be prevalent over most of the South Island and in the North as far as northern Taranaki. No attempts at distribution have yet been made, as it is well to first secure accurate data as to its effectiveness in those districts where it is most prevalent. The results of its work this year have not been so encouraging as that of last season.

COMMERCIAL REPORTS.

BRITISH DAIRY-PRODUCE MARKETS.

The High Commissioner for New Zealand, reporting on the dairy-produce market, under date of London, 13th December, writes,—

When reporting to you on the 22nd November concerning the market in this country for New Zealand butter and cheese I indicated that, although I was not then hopeful of an immediate recovery in prices, there was one noticeable feature of the butter-market to which attention might be directed: that was that Danish butter had not participated in the decline, but had been firm, and its value had been fully maintained.

Having this in view, and recollecting my statement of the 1st November that the outlook might be described as doubtful and speculative, and that a "bear" effort might be expected, the peculiarity of the butter-market during the past three weeks may to some extent be understood. During the week following my last report the depression in the dairy-produce trade continued, and became somewhat intensified. My quotations for choicest New Zealand butter were 120s. to 116s. per cwt.; at these figures buyers were holding back. Naturally, holders were not desirous of putting fresh arrivals into cold-store to add to the accumulations and to risk deterioration in quality. The result was that further reductions were made in order to induce trade, and as low as 116s. to 114s. was accepted for choicest butter in the week following the despatch of my report to Wellington.

This rapid drop—6s. in a fortnight—especially as there was then a difference in price established between Danish and New Zealand butter of 14s. per cwt., naturally directed attention to shipments from the Dominion. Buyers began to offer more freely to purchase at the reduced values, and holders, taking advantage of the position, fortunately agreed to fight for satisfactory prices and to keep the market firm. This, it will be recollected, is what I indicated in my report of the 1st November would have to be done.

Retailers throughout the country, having been induced by the reduction in price to place New Zealand new-season's butter before their customers, and the quality this season proving satisfactory, found that they must continue to stock it, so that each week shipments have been successfully disposed of at an advance in quotations. The reduced prices taken for the first shipments must therefore be accepted by consignors as satisfactory, in that they have had the effect of inducing a good consumptive demand throughout the country, which must eventually tell, and the preliminary losses sustained should be written off by them as "advertising expenses." The outlook has now greatly improved, and it is to be hoped that the high prices again ruling may be continued after Christmas and well into the New Year.

Cheese, while now showing slightly more firmness, has not advanced in price as butter has done. There are many who are of opinion that when New Zealand shipments become heavier, as they are expected to do after Christmas, all that can be hoped for is that present values may be maintained. First-grade New Zealand cheese is now realizing from 60s. to 62s. per cwt. for white and 61s. to 63s. for coloured, according to quality.

First-grade New Zealand butter is now fetching from 118s. to 126s. per cwt., according to quality, the former price being accepted for lots of very ordinary quality, and the latter being paid for a few choice brands. It will have been noticed that so far this season, in cabling weekly quotations, commencing with the arrival of the s.s. "Turakina" shipment, which was the first of the new season, I have given a range of prices for butter of several shillings. This I have done, as it was found impossible in the unsettled, fluctuating state of the market to give a reliable average price that would be acceptable. The custom in former years has been to give the average price of choicest quality only, and this practice I shall recommence when I find the settlement of the market warrants it.

SHIPMENTS OF PRIMARY PRODUCE FROM NEW ZEALAND TO UNITED KINGDOM

COMPILED FROM MANIFESTS OF VESSELS SAILED DURING RESPECTIVE MONTHS OF THE CURRENT AND PRECEDING SEASONS.

Month.		Mutton, Carcases.	Lamb, Carcases.	Beef, Quarters.	Butter, Boxes.	Cheese, Crates.	Wool, Bales.	Wheat, Sacks.	Oats, Sacks.	Rabbits, Crates.	Hemp, Bales.	Tow, Bales.	Kauri-gum, Cases.	Sundry.
January,	1913	166,714	229,179	6,886	109,251	63,864	118,986	..	329	..	6,969	2,215	4,110	6,611 carcases pork.
"	*1912*	*237,284*	*302,399*	*12,424*	*114,512*	*64,005*	*95,994*	..	..	*7,295*	*6,365*	*1,942*	*3,407*	*59* "
February,	1912	208,424	273,246	13,052	101,544	62,398	106,074	607	..	..	6,831	1,615	1,056	..
"	*1911*	*242,090*	*450,406*	*24,924*	*86,368*	*46,667*	*70,030*	*23,694*	*200*	..	*4,428*	*1,302*	*2,113*	*1,369 carcases pork.*
March,	1912	324,192	518,402	20,201	64,925	49,308	70,022	..	4,980	..	3,832	1,352	2,644	16 carcases pork.
"	*1911*	*264,297*	*665,822*	*26,657*	*45,912*	*40,668*	*58,362*	*40,276*	..	..	*3,650*	*1,583*	*8,982*	*2,408* "
April,	1912	213,178	355,829	7,046	38,986	38,137	31,615	4,905	2,180	..	5,134	1,958	4,458	..
"	*1911*	*172,503*	*491,413*	*19,106*	*14,823*	*33,411*	*42,917*	*38,456*	*6*	..	*9,233*	*1,827*	*2,577*	*2,431 carcases pork.*
May,	1912	454,506	744,287	32,691	1,441	40,535	51,833	11,157	26,569	1,500	11,963	2,826	6,287	..
"	*1911*	*204,390*	*377,105*	*20,173*	*995*	*20,732*	*33,033*	*93,854*	..	..	*7,443*	*1,210*	*7,720*	*1,087 carcases pork.*
June,	1912	170,738	287,697	24,605	558	7,712	18,138	9,160	7,622	2,039	5,646	1,168	1,213	221 carcases pork.
"	*1911*	*214,079*	*448,432*	*15,789*	..	*6,323*	*19,568*	*39,422*	..	*14,128*	*4,763*	*525*	*5,528*	*2,434* "
July,	1912	291,097	371,474	29,457	684	1,255	16,567	44,324	23,216	20,573	7,463	1,856	5,892	210 carcases pork.
"	*1911*	*206,869*	*260,761*	*14,296*	..	*276*	*14,100*	*29,452*	..	*10,334*	*6,022*	*1,073*	*2,786*	*175* "
August,	1912	207,239	157,589	10,478	559	..	10,409	42,580	38,802	19,562	3,758	523	4,219	..
"	*1911*	*66,608*	*110,054*	*3,653*	..	..	*5,260*	*31,976*	..	*18,231*	*3,443*	*303*	*3,475*	*203 carcases pork.*
September,	1912	44,657	40,759	1,174	8,723	1,204	6,671	15,742	17,363	19,933	2,957	501	3,671	..
"	*1911*	*102,081*	*40,057*	*6,059*	*6,404*	..	*7,390*	*38,151*	..	*33,059*	*5,604*	*393*	*7,672*	*220 carcases pork.*
October,	1912	51,263	15,393	3,882	49,962	16,389	4,647	7,952	64,480	5,396	4,193	401	9,075	..
"	*1911*	*9,417*	*2,043*	*100*	*49,626*	*11,501*	*2,182*	..	..	*32,094*	*4,514*	*754*	*2,982*	..
November,	1912	54,175	8,286	282	140,751	57,181	33,305	3,680	40,896	13,892	9,866	1,911	5,466	..
"	*1911*	*47,770*	*10,427*	*403*	*135,741*	*57,319*	*44,934*	*15,833*	..	*16,606*	*7,844*	*2,183*	*3,085*	..
December,	1912	117,740	106,310	4,774	119,885	66,213	44,789	5,868	30,490	10,070	3,816	2,613	3,686	..
"	*1911*	*72,192*	*91,965*	*765*	*109,397*	*46,883*	*54,297*	..	..	*4,366*	*5,719*	*1,364*	*2,708*	..

HEMP AND TOW GRADING RETURNS.

JANUARY, 1913.

Hemp.—The total number of bales graded was 12,716, as compared with 7,643 for the corresponding month of last year, an increase of 5,073 bales. For the twelve months ending 31st January, 1913, the number of bales graded was 105,541, as compared with 85,217 for the previous twelve months, the increase being 20,324 bales.

Tow.—During the month 4,844 bales were dealt with, as compared with 2,355 for the corresponding month of last year, an increase of 2,509 bales. For the twelve months ending 31st January, 1913, the number of bales graded was 34,199, as compared with 23,974 for the previous twelve months, the increase being 10,225 bales.

HEMP AND TOW GRADED THROUGHOUT THE DOMINION DURING THE MONTH OF JANUARY, 1913.

Hemp.

Port.	Superior.	Fine.	Good-fair.	Fair.	Common.	Rejected.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	..	..	488	1,578	625	8	86	2,785
Napier ..	..	..	..	..	..	..	..	..
Foxton ..	..	..	1,021	2,579	200	15	2	3,817
Wellington ..	..	11	2,165	1,643	36	2	..	3,857
Blenheim ..	..	41	105	..	..	..	..	146
Picton ..	..	146	28	150	..	..	..	324
Lyttelton ..	..	..	..	..	..	..	..	..
Dunedin ..	..	56	114	284	..	..	1	455
Bluff ..	..	..	117	1,215	..	..	..	1,332
Totals ..	..	254	4,038	7,449	861	25	89	12,716
Percentages of totals	..	2·0	31·78	58·63	6·78	0·11	0 7	100

Tow.

Port.	First Grade.	Second Grade.	Third Grade.	Condemned.	Total
	Bales.	Bales	Bales.	Bales.	Bales.
Auckland ..	..	391	764	142	1,297
Napier	..	..	..	..	..
Foxton	85	544	326	..	955
Wellington ..	215	1,161	287	23	1 686
Blenheim ..	29	10	..	..	39
Picton	23	45	109	..	177
Lyttelton ..	35	..	..	..	35
Dunedin ..	..	51	69	..	120
Bluff	..	205	313	17	535
Totals ..	387	2,407	1,868	182	4,844

Stripper-slips.—Passed for shipment: Auckland, 29; Foxton, 371; Wellington, 496; Picton, 14; Dunedin, 9; Bluff, 98: total, 1,017. Condemned: Auckland, 48; Foxton, 6; Wellington, 21; Dunedin, 1; Bluff, 3: total, 79.

STOCK EXPORTED.

JANUARY, 1913.

THE following table shows the numbers and descriptions of stock exported from the Dominion :—

Port of Shipment.	Horses.			Cattle.		Sheep.				Swine.
	To Australia.	To Pacific Islands.	To Fiji.	To Australia.	To Pacific Islands.	To Australia.	To Pacific Islands.	To South America.	To Argentine.	To Pacific Islands.
Auckland	7	21	..	..	10	..	507	..	..	43
Gisborne	..	..	..	..	..	..	..	..	..	..
Napier	1	..	..	..	..	28*	..	..	..	..
Wellington	33	..	..	..	..	..	..	10*	..	..
Lyttelton	11	..	..	..	..	10†	..	20*	..	..
Timaru	..	..	..	..	..	..	..	..	..	..
Dunedin	1	..	..	..	..	..	..	..	..	..
Bluff	..	..	..	..	..	..	..	10*	..	..
Totals	53	21	..	..	10	38	507	40	..	43

* Rams. † Ewes.

The following are the particulars of the horses shipped: 2 thoroughbred stallions, 13 thoroughbred mares, 7 thoroughbred geldings, 7 light harness mares, 13 draught stallions, 29 draught mares, and 3 pony mares.

PRODUCE IMPORTED.

THE following return, compiled by the Customs Department, shows the total importations into New Zealand during the month of January, 1913, of agricultural and farm products :—

Item.	Quantity.	Value.
		£
Bran	Nil	..
Butter	Nil	..
Cheese	2 cwt.	9
Chaff	3 tons	28
Fruits, fresh, all kinds	1,999,297 lb.	14,158
Barley	Nil	..
Oats	18 centals	12
Wheat	4 centals	4
Onions	5,455 cwt.	1,800
Pollard and sharps	Nil	..
Potatoes	8 tons	73
Seeds, grass and clover	10,181 cwt.	38,085
Total values imported ..	..	£54,169

NEW ZEALAND–VANCOUVER SUBSIDIZED STEAM SERVICES.

FOLLOWING are the shipments of produce for Vancouver and North American ports from New Zealand since August last:—

—	"Zealandia," 30th Aug.	"Marama," 27th Sept.	"Makura," 25th Oct.	"Zealandia," 22nd Nov.	"Marama," 20th Dec.	"Makura," 17th Jan.
Butter, boxes ..	2,717	4,428	9,777	5,945	11,377	10,960
Eggs, " ..	..	8	226	..	..	..
Beef, quarters ..	..	..	..	..	580	716
Veal, carcases ..	..	..	..	..	393	276
Frozen sundries, packages ..	8	..	12	5	12	..
Wool, bales ..	..	..	..	6	20	30
Grass-seeds, beans, &c., sacks ..	..	..	50	177	..	..
Hides and skins, sacks, &c. ..	454	657	721	559	595	329
Onions, cases ..	3	..	..	..	..	14
Sheep-skins, bales	..	..	138	..	..	24
Jam, cases ..	50	..	125	100	50	50
Sundries, packages	90	5	21	329	92	313
Potatoes, crates ..	21	..	23	..	165	20
Kauri-gum, packages ..	72	69	46	53	21	..
Hemp, bales ..	..	..	..	..	..	246

The "Aorangi," which left the Dominion for San Francisco on the 3rd January, carried the following produce: Grain, &c., 343 sacks; meats, 523 cases; onions, 6 sacks; potatoes, 11 sacks; sundries, 948 packages; butter, 5,894 boxes; hemp, 173 bales.