Sheep at Pasture, Weraroa Experimental Farm.]

The

Journal of Agriculture.

VOLUME VI, No. 3. | WELLINGTON, N.Z., 15TH MARCH, 1913. | PRICE, SIXPENCE.

OX-EYE DAISY.

A. H. COCKAYNE.

OX-EYE daisy (*Chrysanthemum leucanthemum*) is widely distributed throughout New Zealand, and is often extremely prevalent in permanent pastures. Under certain conditions it appears, if left unchecked, to be able to obtain almost complete possession of the ground, and thus very seriously affect the carrying and money-earning capacity of the land. Like most weeds, however, its seriousness depends very largely on the purpose to which the land is devoted. In certain phases of agriculture it takes its place as one of our most pernicious weeds, while in other cases its presence may have but little economic importance.

The relative damage that weeds cause under different conditions is a most important matter for investigation, as on it depends to a very large extent the necessity for sustained efforts to avoid their introduction into certain types of land and for carrying out adequate control measures when once they have become established. Thus fat-hen in land that is

used for annually sown spring crops is an exceedingly bad weed, but the use of alsike containing fat-hen-seed in autumn-sown permanent-pasture mixtures will have very little, if any, deleterious effect on the future value of the pasture. One of the most important facts with regard to ex-eye daisy is that it is readily eaten by sheep and is almost always rejected by cattle even when feed is extremely scarce, and it is on the single point whether the land is to be utilized for sheep or cattle that will determine whether or not the sowing of small quantities of ox-eye as an impurity in the seed used will cause any appreciable harm.

EFFECT ON LAND USED FOR ALTERNATE CROPPING.

On land used for alternate cropping, and where the pastures are all of a temporary character, ox-eye daisy can never be looked upon as a serious weed. It is quite a shallow rooter, and the plants themselves are completely killed by ploughing. Of course, where it has been allowed to seed a good many new plants are liable to come up, but as on this type of country there is not a very long interval before the ground is broken up again the plants do not become sufficiently aggressive to cause much material harm. It would, however, be a good practice to graze sheep during the summer on any grass land containing ox-eye daisy that is to be broken up the following autumn. In this way the flowering and consequent production of seed will be reduced to a minimum. The same result may be secured by taking a hay crop off the land, followed by stocking with sheep. If the hay is cut very early in the season the ox-eye may frequently flower before the end of the summer, but the sheep will prevent any second flowering occurring.

EFFECT ON LAND USED FOR DAIRYING.

On dairying-land ox-eye daisy is a really serious weed, inasmuch as cattle will not touch it, and in eating down the other constituents of the pasture they improve the conditions for the ox-eye to spread, both by an increase in area occupied by the individual plants and the development of large quantities of seed. In time the carrying and money-earning capacity of the land for dairying is seriously interfered with. Under such circumstances, unless the ground can be profitably ploughed up and sown with a mixture containing a good proportion of clovers, heavy stocking with sheep will be the only remedy to adopt. In dairying-paddocks that are understocked the ox-eye is not nearly so likely to assume control, as the competition between it and the other constituents is much more evenly balanced than when the grass is eaten bare and the ox-eye left. Whenever ox-eye appears on dairying land sheep should be used to feed it down, and if this is done before the

Ox-eye Daisy.

From Leaflet No. 28, by T. W. Kirk.

weed has got too strong a hold any danger of its spreading will be eliminated. A very good example of the value of sheep for controlling the spread of ox-eye has been shown at the Weraroa Experimental Farm, where some time ago this weed threatened to become serious. Judicious grazing with sheep has, however, virtually eliminated this weed from the farm. On dairying-land where ox-eye daisy has been allowed to get the upper hand fairly heavy stocking with sheep will be necessary to control it, and this will lead to a considerable diminution in the feed available for the cows. In such cases it will be necessary to make extra provision for the production of forage to supplement the pastures. In this connection lucerne should play a very important part and provide a cheap fodder. By this means the control of the weed can be accomplished without interfering to any serious extent with the dairying side of the farming operations.

EFFECT ON SHEEP COUNTRY.

On sheep-country ox-eye daisy is rarely prevalent. Theoretically it should never be a troublesome weed on such land. In the 1895 report of this Department Kirk writes, "Heavy stocking with sheep will completely eliminate this weed." This is perfectly true, but it is not always practicable to stock sufficiently heavily. This is especially the case where the areas are large and are not sufficiently subdivided to enable the stocking to be properly controlled. In small sheep-paddocks ox-eye should never become in any way a serious weed. It is always desirable to maintain a certain number of sheep on a dairy farm. Their utility is in closely grazing the pastures in order to obtain an even growth, by eating down by the sheep of the patches rejected by the cattle. This implies, however, small paddocks, for the stocking by sheep must be heavy to be effective. The same thing really applies to sheep-country proper, where it is desired to reduce to a minimum those weeds which will be eaten by sheep under compulsion.

AGRICULTURAL SEEDS LIKELY TO CONTAIN OX-EYE DAISY.

Ox-eye daisy is very frequently introduced into new localities through the medium of impure seed. It is liable to be present in many kinds of agricultural seeds. The following is a list of those in which it has been found in samples that have been examined: (1) White clover; (2) alsike; (3) birdsfoot trefoil; (4) Boyd's clover; (5) crested dogstail; (6) meadow fescue; (7) timothy; (8) meadow foxtail; (9) yarrow.

In only a single sample of meadow foxtail has ox-eye-daisy seed been found, and as this grass is almost invariably harvested long before the ox-eye seed matures there is only a remote chance of this grass-seed ever containing any seed of the weed. When ox-eye is present in the

clovers it is a very good indication that the seed has been badly cleaned, as this weed-seed is easily dressed out. Seed-merchants having lines of clovers containing ox-eye daisy should always have them recleaned before placing them on the market. The same applies to meadow fescue. With regard to crested dogstail, very little ox-eye is ever found in New-Zealand-grown seed, but that of European origin frequently contains quite appreciable quantities. For this reason alone it is far preferable to use local seed, apart from the fact that its germination is often much superior to that imported. In timothy ox-eye is a frequent impurity, and it appears extremely difficult to dress it out satisfactorily. The larger ox-eye seeds are fairly easy to remove, but a percentage of the smaller ones invariably remain in the line even after it has been carefully recleaned. About 15 per cent. of the timothy examined has been found to contain ox-eye, often in quite small amounts, but at times lines containing 2 or more per cent. by numbers have been received for analysis. Farmers and seed-merchants are urged to take great care when buying timothy-seed to ascertain whether or not it is quite free from this impurity. Yarrow frequently contains large amounts of ox-eye-daisy seed. In one instance no less than 21 per cent. of the sample consisted of this weed. Yarrow is, however, rarely used in New Zealand, and where it is used, except in the case of lawn mixtures, there is little danger of the weed becoming a nuisance, as the conditions under which it is used are not favourable for the spread of ox-eye.

Ox-eye-daisy seed is very distinct from any other seed impurity, and when once known can be easily recognized. However, when ox-eye is present in timothy care has to be taken to carefully look through the sample, as in colour the two seeds closely resemble each other, and it is liable to be overlooked by a mere superficial examination. In localities where ox-eye is abundant the mere sowing of pure seed will be no guarantee that none of the weed will appear, as it can apparently be blown considerable distances. No doubt travelling stock may aid in its distribution. I know that whenever ox-eye appears on newly grassed land the seed sown is invariably blamed, but a proper examination of the seed before sowing will always show whether or not ox-eye is present.

USING SEED CONTAINING A TRACE OF OX-EYE DAISY.

It is, of course, always preferable to use seed that is quite free from any ox-eye daisy, but the question arises whether it is always imperative to reject seed that contains only a trace of this impurity. A case in point has recently come under my notice. The seed contained approximately three seeds of ox-eye per pound, or one seed to every 170,000 seeds of the mixture. This quantity is so small that in European practice it would be deemed to be ox-eye-daisy-free. It is naturally

difficult to decide whether such a small trace should be sufficient to condemn the line. I think a good deal would depend on what soil and for what purpose the seed was to be used. If used on land that is to be afterwards cropped there is no reason why such seed should not be sown. Again, if for sheep-country, there does not appear to be any need to reject such a line. If the seed is to be used on dairying-country it would probably be quite justifiable to reject such seed, but even in this case, if it is known by the farmer to contain small quan-

OX-EYE-DAISY SEED, MAGNIFIED FIFTEEN TIMES.

tities of ox-eye, measures can be taken to efficiently control the weed before it in any way gets out of hand. It seems advisable to recommend that such seed should only be utilized on poor sheep-country where there is little chance of the weed ever becoming serious even if nothing is done to try and suppress it. However, it has been said that timothy is the most likely to contain ox-eye, and it is dubious whether this grass is a profitable one to employ on any purely sheep-country, as it is generally rapidly eaten out and killed after the first season.

Agriculture is an art that renders those who understand it rich, but leaves those who do not understand it, however much they labour, to live in poverty.—*Xenophon.*

The most recent development in agricultural advancement in the United States is the proposal in the State of Washington to create a "Bureau of Farm-development," or the appointment of a trained agricultural expert in each county of the State. The duty of this expert will be to personally advise farmers and direct farm experiments. He will be under the control of a Board of County Commissioners. The Chairman of this Board will be the Director of the State Agricultural College, and the members will serve without salary. Other States are moving in a similar direction.

FAT LAMBS AT RUAKURA.

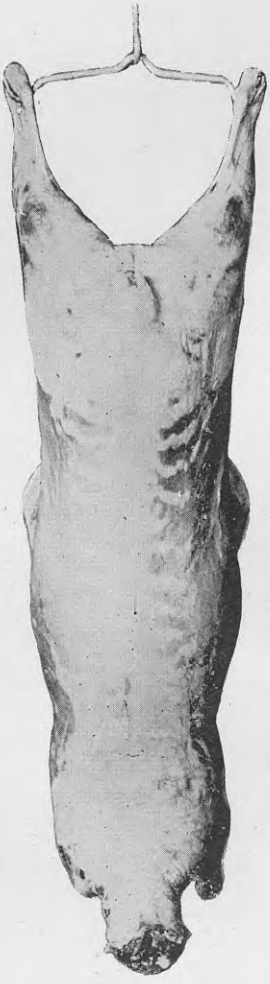
THE SEASON'S EXPERIMENTS.

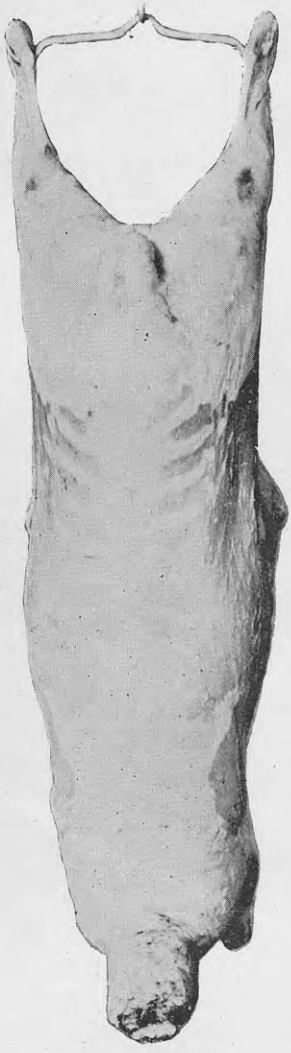
PRIMROSE MCCONNELL.

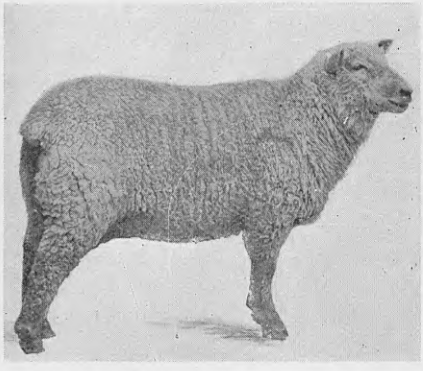
ON the 1st February, 1912, 600 Lincoln Romney full-mouthed ewes were put to the rams, half to the Border Leicesters, and half to the Southdowns, at the rate of fifty ewes per ram. Until within a week of lambing the ewes had no feed except pasture-grass. After the rams were removed the ewes were kept in one mob, and were constantly removed from paddock to paddock, and this, I believe, was the secret of their fine condition when the lambing season commenced. From a week previous to lambing until there was a full bite of grass they received a full ration of mangels, which were carted to the paddocks daily, and this was the means of keeping up a good flow of milk—the lambs benefiting accordingly. At the end of November an early paddock of rape was available, on to which at that date the earlier of the unsold lambs were drafted, a second paddock being available when the first was eaten off. With the exception of the last draft of 126, all were sold to local butchers, the said draft being the only one of which the weights of each cross could be compared. The average net price per lamb was 14s., the highest price being 17s. 6d.

The two lambs shown in the accompanying pictures were selected as two of the best from the last draft, and three weeks previous to their being slaughtered were rejected as not being quite finished. They were dressed and weighed by Mr. Jamieson, butcher, Hamilton. The live fasted weights were—Border Leicester cross, 98 lb.; Southdown cross, 78 lb. The dressed weights were—Border Leicester cross, 64 lb.; Southdown cross, 48 lb. The average weight of the last draft of 120 was—Border Leicester cross, 39·09 lb.; Southdown cross, 37·50 lb.; and all were classed as "very prime." Every lamb was fat by the end of January, and not a single cull is left on hand.

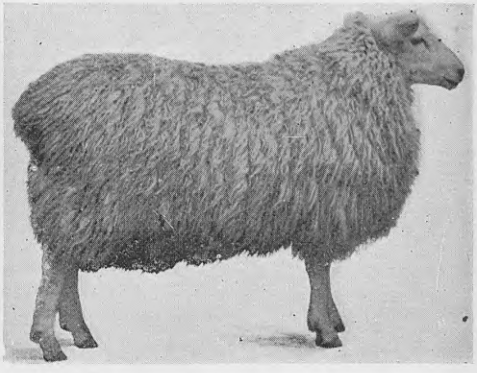
Five hundred of the ewes that had suckled lambs were sold on the 4th January, 1913, at 6d. per head more than the buying-in price, which would more than make up for the loss through deaths. Judging from the weights of the last draft, and from information received from butchers who killed previous drafts, the Border Leicester



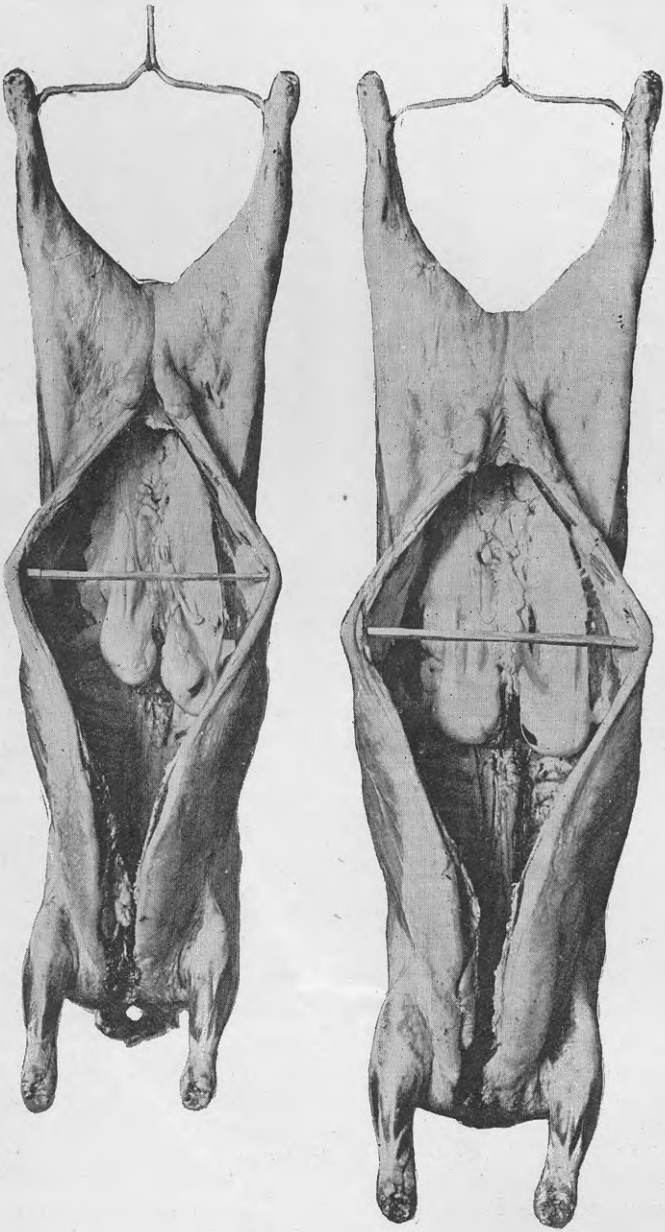




SOUTHDOWN CROSSBRED LAMB AND DRESSED CARCASE.



BORDER LEICESTER CROSSBRED LAMB AND DRESSED CARCASE.



Southdown. Border Leicester.

THE DRESSED CARCASES.

cross lambs would average fully 3 lb. per head more than the Southdown cross; and as long as export buyers do not take quality into consideration the value of weight must be recognized, although for quality of carcase the Southdown cross has no superior. The photos are not meant to demonstrate average carcases; they are intended merely to illustrate the type of the two crosses, alive and slaughtered.

The following table gives results:—

BORDER LEICESTER CROSS.

Dates of Drafts.	Number.	Net Amount realized at the Average of 14s.
		£ s. d.
October	33	23 2 0
November	149	104 6 0
December	75	52 10 0
January	51	35 14 0
Totals	308	£215 12 0

Realized for ewes' wool	.. £112 0 0
Gross profit realized from 300 ewes ..	.. £327 12 0
Gross profit per ewe	.. £1 1 10

SOUTHDOWN CROSS.

Dates of Drafts.	Number.	Net Amount realized at the Average of 14s.
		£ s. d.
October	45	31 10 0
November	174	121 16 0
December	65	45 10 0
January	88	61 12 0
Totals	372	£260 8 0

Realized for ewes' wool	.. £112 0 0
Gross profit realized from 300 ewes ..	.. £372 8 0
Gross profit per ewe	.. £1 4 10

Total gross profit, £700.

Although the results of the above table are decidedly in favour of the Southdown cross, yet had all the lambs been sold by weight the two crosses would have shown about similar results. In the matter of quality the Southdown carcase is much superior to that of the Border Leicester, there being no waste fat as in the case of the

latter. The Down also comes much earlier to maturity, although the experiment under discussion does not emphasize this so much as repeated experiments carried out at the Moumahaki Farm. Where it is not possible to fatten all the lambs I am of the opinion that the Border Leicester is the better cross, as it yields a good fleece and a heavy carcase later on; but for the purely early fat-lamb trade the Southdown is unsurpassed. Taking into consideration the fact that this is anything but good sheep-country, the results as shown above must be considered very satisfactory. During the season several first and second prizes were gained at the Waikato and Auckland shows for fat lambs.

It will be noticed that by the end of November 219 Southdown and 182 Border Leciester cross, or nearly two-thirds of the total number, were off hands, which result is undoubtedly due to the fact that sufficient feed in the form of mangels and rape was available at a critical season and was the means of keeping the lambs in a continually thriving condition. Where the ewe flock is renewed each year the advantage of early maturity cannot be overestimated—the risk of having the lambs left on hand as stores is avoided, the ewes being fat early in the season command a higher price, and, the land being freed, there is abundance of feed for the new ewe flock. To obtain the best results the ewes should be in good thriving condition before they are mated.

This season 800 crossbred ewes have been put to the rams, half to the Southdown and half to the Border Leicester.

VEGETABLE HUMUS.—An interesting experiment is in progress at the Moumahaki Experimental Farm to test the plant-food value of different crops ploughed in as green manure. The field where the trial is being made carried an oat crop in the 1911–12 season. The stubble was disced, and the area, 15 acres, was apportioned out into four plots. On these, mustard, rape, buckwheat, and vetches were grown. It had been intended to plough in the whole of the four crops, but they made such vigorous growth, and the farm at the time was so heavily stocked, that the crops were partially eaten down. The remaining growth, of about 18 in. in height, was ploughed in, the whole area being then sown with ryecorn. In early spring this provided abundant feeding for ewes and lambs, and, being a crop that quickly recovers after grazing, a growth of about 2 ft. in height was soon made. This was ploughed in. The field was then sown in swedes, the seed being drilled. Careful note is being taken of the appearance of the crop on the different plots, and the rate of growth. It may appear that the ploughing-in of the ryecorn would to some extent nullify the test as to the respective merits of the first-ploughed-in crops, but it has to be remembered that the latter had ample time to decompose and be converted into plant-food, whereas the ryecorn was not sufficiently long in the ground to have any immediate appreciable effect.

ELECTRICITY:

ITS POTENTIALITIES IN RURAL ECONOMY.

C. J. DREWITT.

OF the benefits which science and mechanical invention have conferred on the modern farmer, it is now being realized that electricity will be the principal means of revolutionizing country life and work, and thereby bringing about such an amelioration of farming conditions that the rural exodus will cease to be a national danger.

The more the great question of maintenance of soil-fertility is studied —it is the dominant problem in the world to-day—the more the need is realized of thorough cultivation; not only the constant stirring and aeration of soils long in use, but the repeated working of swamp lands (following drainage) and intractable soils. This implies labour—or, rather, a simplified, effective, and economical power. This electricity promises to provide. In the coming days of intensive farming, when fewer but more profitable stock will be kept on smaller but better-worked areas, electricity will become a dominant factor in farming operations; and in no country should this truth become better exemplified than in New Zealand, with its many sources of potential water-power.

In the tilling of the soil electricity promises to play its most important part. With a good supply of current passing through a district from harnessed water-power it would be possible—indeed, the principle is already in operation in England—to have a main line running through farms near the supply route, with every pole (or post) carrying the wire a power-point. With 500 yards of armoured trailing cable attachable with ease between one of these many points and the electrically driven implements, the cheapest and best of all forces for cultivating and other farm operations will be at the farmer's command.

With power delivered under this system compared with the petrol-driven or steam tractor there is a vast difference. In the former case the capacity is very much extended. When the electrically driven implement gets into a soft place, or encounters an obstacle demanding exceptional force to overcome it, the series or three-phase motor will proceed, though, of course, at a slower pace, but it will operate; while with the petrol or steam tractor there is a limit beyond which one

cannot go. In other words, the motor-plough, or implement driven from a wire-conducted current, has a great reserve of force behind it, and is thus capable of work a self-contained motor can never accomplish. More than this, the farmer would only pay for the power he actually used. In light land, and an easy draught, the cost would be less than where stiff land was being worked and the draught heavy.

Electricity presents other possibilities in tilling the soil. Though our power of operation has increased, the plough itself has advanced little in design, and practically nothing in principle, since the sower went forth to sow. We still just turn over the soil and leave it in bulk, other operations being necessary to break it up freely and aerate the seed-bed. That this system still maintains is, in the writer's opinion, solely because of the absence of a power of the required flexibility. This difficulty disappears before the electric motor. If hard steam-coal can be reduced to a fine dust by a rotary-bar electric cutter, it is idle to suggest that tilled land cannot be dealt with in the same manner. The idea is that a rotary disc with transverse blades, set at an angle, should revolve at a high speed, each blade taking a fine cut of soil, which would be elevated and dropped to the side by the setting angle. With a 50 to 70 horse-power motor a sowing of lucerne could be made in one operation, the inoculated soil being spread from the front and thoroughly mixed in the breaking operation, the seed being sown and rolled in behind, there being no objection to small subsidiary motors for the spreading operations. The effect on weeds of such a system can easily be imagined, while a green crop ordinarily ploughed under would be thoroughly disintegrated and mixed with the soil.

Again, on the dairy farm electricity can be used to supply energy for milking-machines, for separators, for pumping water, and for sterilizing utensils, the passage of a current of electricity being one of the most powerful sterilizing agents known. There would be an entire absence of the taint of kerosene from the engine, and of noise, soot, and dirt inseparable from the boiler which now supplies the hot water.

The poultry-yard would be invaded. The present-day incubator, for instance, is still in its initial stage. The incubator of the future will probably be a slowly revolving wheel in the vertical plane, while electricity will supply a perfectly even heat, which could be increased or decreased by the snapping of a switch. The passage of a small quantity of electricity would evaporate the required amount of moisture, while the eggs, by passing a regulated space, would automatically be cooled in succession. The cost of incubating 1,000 eggs, at 1d. per unit, would work out at about 4s., which would be saved many times over in labour.

In the orchard the value of an electric spray to control pests has yet to be determined. This suggests a rich field for experiment, while the beneficial effect upon growth would be undoubted. Again, a system of light-resistance wires run at intervals would ensure against frost.

The possibilities in electricity on the farm are, it will be seen, undoubted, and now that the Ruakura Farm of Instruction has a complete electric installation an excellent opportunity is afforded for experimenting in the directions indicated. The lighting-wires run through a considerable portion of the property. These could be disconnected from their ordinary duty at a pressure of 220 volts and connected to 600-volt wires, and thus be made to supply 30 horse-power from an outside source without difficulty at any pole. Duplicate the wires and that portion of the farm is already equipped to carry a power-supply of the required 50 to 70 horse-power. The lighting of Ruakura by means of electricity is a matter for congratulation. It was particularly desirable from a safety viewpoint. In valuable buildings with a number of youthful inmates candles, oil-lamps, and matches are undesirable. Then, no better place for the development of electricity as a power as well as a lighting medium could be desired. If all the available power from the Waikato River were utilized, as it one day must be, the district from a productive standpoint would be revolutionized. As one stands on the bridge at Cambridge and attempts to realize the amount of money spent on coal and petroleum for power, while thousands of horse-power roll down unused to the sea, the potentialities of the district under electricity made available to the farmer—considering the greater economy of production combined with the increased productivity thereby made possible —are seen to be almost illimitable.

The establishment of a series of about twelve demonstration farms has been authorized in Kentucky. These will be about 20 acres each. The State University and Agricultural Experiment Station have made arrangements whereby four of these farms, all located in the western part of the State, will be donated to the nation.—*Spokesman Review.*

FOOD PRODUCTS FROM BANANAS.—In a recent issue of the American Consular and Trade Reports, Consul Dreher, of Port Antonio, Jamaica, gives some interesting particulars regarding the manufacture of food products from bananas on that island. Mr. Dreher states that this industry, which has been established for not more than six years, is rapidly assuming importance, and that a number of factories are being erected to supply the increasing demand. So far, most of the product has been shipped to England, France, Germany, and Austria, and in those countries the demand is steadily increasing, but numerous letters of inquiry recently received indicate a growing interest in the United States.

THE RED POLL.

A BREED WITH POTENTIALITIES.

THE Red Poll, or Norfolk or Suffolk Poll as they were formerly termed, are one of the most interesting races of British cattle. Opinion is divided as to their origin and antiquity. By some the breed is regarded as indigenous to the district it now occupies in England, where the Suffolk Polls, or Duns, have existed from time immemorial. One writer has traced the breed from the time of the Norman invasion, while others believe that it sprang from Galloway Poll cattle introduced in the eighteenth century, probably soon after the Union of England and Scotland, when numbers of cattle were driven every year from Galloway and elsewhere from the south of Scotland into Norfolk and other parts of England. Again, a Norfolk authority—while admitting the probability of the Galloway Polls in the main being their progenitors—claims part of the credit of the breed's origin for an old native race which existed previously in East Anglia. This much, however, is certain: that the Red Polls are improved editions of a breed known to early writers for their deep-milking qualities, while being credited at the same time with a capacity to furnish, under good feeding, excellent-quality beef. Red Poll cattle have in the past been more remarkable for their milking than for their beef qualities, and at the present time there are individual Red Poll cows of such a distinct dairy type that the possibility of making these cattle highly profitable milking-stock by breeding according to a pedigree of performance is most encouraging. It is impossible to supply definite information as to their milking-capacity, owing to very few herds having been systematically tested. But many cows are credited with giving annual yields of 10,000 lb. of milk, testing in the neighbourhood of 4 per cent. of butter-fat.

At the last London Dairy Show the winning Red Poll cow gave, under the adverse show-yard conditions, 136 lb. of milk in two days, the fat-percentage ranging from 2·72 to 3·34. The second-prize winner gave 96 lb. in the forty-eight hours, the test ranging from 4·40 to 3·87 per cent.

The thirty-five cows in the Tring Park herd of Lord Rothschild gave in one year a milk-yield of 249,078 lb., an average of 7,116 lb. The fat-percentage is not furnished.

A herd on a Government Victorian farm gave the following yields last season :—

Cow.	Weeks in Milk.	Milk, in Gallons.	Butter-fat.	Value.
			lb.	£ s. d.
Season 1910–11.				
Vuelta	38½	556·5	405·1	17 10 10
Connecticut	40½	818·2	269·0	11 17 4
Bullion	40½	773·3	356·7	15 17 10
Beulah	39¾	646·5	342·6	15 3 6
Cuba	40½	526·9	231·8	10 5 11
Cigarette	34	504·4	211·6	8 18 9
Sumatra	4¼*	43·6	19·6	0 19 2
Kentucky	36½	531·1	225·9	9 12 7
Muria	40½	548·9	240·7	9 14 9
Pennsylvania	38½	461·9	189·7	8 4 3
Carolina	40½	570·5	253·1	11 3 4
Virginia	40½	636·2	254·7	11 5 1
Havana	40½	575·5	229·9	10 5 0
Season 1911–12.				
Vuelta	41¼	775·2	485·1	26 5 9
Connecticut	40½	678·2	364·0	19 11 10
Bullion	43½	694·8	344·0	18 10 7
Beulah		(Not completed.)		
Cuba	43½	701·4	337·8	18 10 4
Cigarette	41½	648·1	285·9	15 14 6
Sumatra	42	666·2	284·2	15 6 2
Kentucky	39½	669·5	277·7	15 1 1
Muria	41	580·2	275·7	14 14 10
Pennsylvania	45½	634·8	271·9	14 13 10
Carolina	32¼	580·6	254·3	13 11 4
Virginia	39½	551·2	221·7	12 0 7
Havana	37½	535·6	215·3	11 15 4

* Short lactation-period due to accident.

At the Royal Show of England the winning Red Poll gave a yield for the twenty-four hours of 51 lb. 8 oz. of milk, testing 4·47 per cent. of fat.

"The details of the milk-yield class at the Royal Show," says a Home writer, "again evidenced the capabilities of the Red Polls for milk-production in competition side by side with all other breeds. In this competition points were awarded as follows: 1 point for every pound of milk; 1 point for every ten days since calving,

A Typical Member of the Herd of the Hon. R. H. Rhodes, Tai Tapu, Canterbury.

A Group of Red Polls.

deducting the first forty days—maximum lactation points 12; 4 points for every 1 per cent. of fat shown on an average of the morning and evening milkings. Eight cows were entered in the Red Poll class, and in the result Lord Rothschild's Clarissa gained first prize with a total of points of 73·03, a record only beaten in the breed class totals by the Shorthorn first-prize winner with a total of 73·70 points. Clarissa had been 139 days in milk, and in the twenty-four hours gave 49¼ lb., showing a fat-percentage of 3·47 points. The second-prize winner—Lord Rothschild's Rustic—twenty-seven days in milk, gave a total of 51¼ lb., and 3·10 fat-percentage, her total of points being 63·65. Third prize went to Lord Radnor's Ashlyns Rose 2nd, eighty-nine days in milk, giving a total milk-yield of 43¾ lb., with 3·52 butter-fat — total of points, 62·73. It may be of interest to state, for comparison, the total of points of the first-prize winners of each breed represented: Shorthorn, 73·70; Red Poll, 73·03; Lincoln Red, 73·03; Jersey, 72·85; South Devon, 68·43; Ayrshire, 65·23; Guernsey, 64·92; Kerry, 62·88; Dexter, 58·18; Longhorn, no prize."

The record of the Red Polls at the fat-stock shows of England clearly proves the fleshing-qualities of the breed. The most successful steer in 1910 had gained in weight from the 1909 show season 340 lb. —a percentage of 26·2, his actual weight at thirty-five months old being 1,683 lb. At the Suffolk fat-stock show of 1911 the open championship was won by a Red Poll heifer, another Red Poll being reserve. The first-prize Red Poll steer at Islington in the same year weighed 16 cwt. 3 qr. at two and three-quarter years of age.

The essential colour of the breed is a deep red, with an udder of the same colour; white at the end of the tail being allowed. The nose must not be dark or cloudy; the head and throat must be neat, the eye full; a tuft of hair should hang over the forehead; and the frontal bones should begin to contract a little above the eyes, and should terminate in a comparatively narrow prominence at the summit of the head. A characteristic Red Poll is a distinctly attractive beast, a strong businesslike type of animal which responds well to good treatment, but will give a decent account of itself under ordinary farm conditions.

NO country can permanently establish a successful dairy-produce trade if the quality of the milk produced and that of the butter and cheese manufactured is ignored.

THE TOMATO.

CULTIVATION AND DISEASE-CONTROL EXPERIMENTS.

T. W. KIRK, F.L.S.

THE outbreak of disease amongst tomatoes in the Christchurch district had become so serious and had caused such heavy monetary losses that growers were almost in despair. They therefore appealed to the Department for assistance. The Government arranged to conduct co-operative experiments in two glasshouses in the district in order to ascertain the various causes of the outbreak, but the owners of the houses asked for such high terms that the Department could not accept them. The Canterbury Fruitgrowers' Association then very kindly agreed to co-operate and endeavour to secure houses on more favourable conditions. This they did, with the result that a house was obtained at Redcliffs from Mr. Maffey, and one at Spreydon from Mr. Odering.

It was felt that some of the growers were proceeding upon wrong lines, inasmuch as they set out their plants in very heavily manured soil, and kept up what was regarded as an excessive degree of humidity in the houses. These conditions were specially encouraging to fungus disease. It was therefore decided to take Mr. Maffey's house and treat it as a whole on lines approved by the officers of this Department, whilst Mr. Odering's should be divided into a number of plots and a series of experiments be conducted therein.

The conditions under which the houses were taken were as follows: The grower to place his house at the disposal of the Department for experimental purposes, he undertaking to perform the work required by the Department in conducting the experiments. The Government to pay for the plants and fertilizers, soil-fumigants, &c., and for the use of the house. In each case the owner to have the crop.

The following instructions in regard to the treatment of the two houses above referred to were given to Mr. Reid, Orchard Instructor, the local officer in charge of the experiments:—

Please arrange to have both houses sprayed as soon as possible with a 2½-per-cent. solution of formalin for disinfection purposes.

As arranged with you verbally, Mr. Maffey's house will receive what we consider to be the best possible treatment in manuring, spraying, watering, cultivation, &c.

Mr. Odering's house will be used for experiments, for which purpose it will be necessary to subdivide into eight plots: Plot 1 to be treated with Apterite according to the directions on the package; 2 to be treated with Vaporite according to directions on

package; 3 to be treated as soon as possible with 2 oz. of kainit per square yard—this fertilizer to be lightly worked into the soil; 4 to be treated as soon as possible with 2 oz. of sulphate of iron per square yard, to be lightly worked into the soil; 5 to be treated as soon as possible with 1 oz. of kainit and 1 oz. of sulphate or iron per square yard, to be lightly worked into the soil; 6, a good dressing of stable manure, such as Christchurch growers are in the habit of using; 7, a light dressing of stable manure; 8, 1 oz. of superphosphate and ¾ oz. of bonedust per square yard. 6 and 7 will be applied when the plants are commencing to fruit. 8 will be divided into three, and applied at intervals of a fortnight, the first application to be made when the plants are commencing to fruit. This quantity will not be considered as arbitrary, but subject to increase if the plants show later that one or two more dressings will be beneficial.

Mr. Maffey's house will receive similar treatment to this plot.

Spraying for the control of fungus diseases will commence as soon as the plants are well established after transplanting. This will apply to all plants in both houses.

Thermometers (self-registering maximum and minimum), hydrometers, and diaries for recording results shown by these instruments will be forwarded to you at an early date.

T. W. KIRK,
Director of Orchards, &c.

The experimental work in Mr. Odering's house is not yet completed, but it is anticipated that the report will be available for the next issue of the *Journal*.

Another series of experiments is being undertaken in the Hutt Valley, for the benefit of the tomato-growers in the Wellington District, arrangements having been made between the Department and the Hutt Tomato-growers' Association.

A glasshouse has been secured belonging to Mr. Hobbs, on the main Hutt Road, and arrangements have been made for a piece of land at Mr. Brassell's, so that both indoor and outdoor experiments may be conducted. Both properties are being worked in co-operation with the owners, and the testing will be carried out throughout the varying seasons of the twelve months.

The following is Mr. Reid's report on Mr. Maffey's house:—

MR. E. A. REID'S REPORT.

The dimensions of Mr. Maffey's house are 38 ft. by 17 ft. It has glass sides and ends, and floor of concrete. This floor was laid by Mr. Maffey, sen., mainly for control of eelworm. Operations were commenced on the 31st July. The house was disinfected with a solution of 2½-per-cent. formalin. A warm day was chosen, and the whole of the interior was thoroughly drenched, the solution being applied with a spray-pump. The house was then closed until the following day.

On the 10th August the house was resoiled to a depth of 5 in. to 6 in., fresh turf soil being carted in from one of Mr. Maffey's allotments; this soil was of a loose sandy nature, and, having a good turf, would be well supplied with humus at a time when plants required it for assimilation. The plants were raised from selected seed by

Mr. Maffey. Seed was sown on the 12th June, and on the 8th July the plants were pricked out into boxes, ample room being allowed the plants for robust development, short-jointed sturdy plants being the aim. The soil, both for seed and pricking out, was sterilized by heating to 210°. It was noticeable that by using the sterilized soil the plants were slow in getting a start, but later on made up for the delay by rapidity of growth and sturdiness, while sterilization prevented any possibility of eelworm infection.

On the 9th September the plants were set out in the house at a distance of 2 ft. between the rows and 1 ft. between the plants. The plants "came away" in good style, and on the 19th September the first spraying of Bordeaux mixture was given, at a strength of 3 lb. of sulphate of copper, 5 lb. of lime, and 50 gal. of water. On the 27th September the plants were tied and trained, as recommended by Mr. S. F. Anderson (see Department's *Journal*, No. 2 of Volume iii).

A second spraying was given with Bordeaux mixture on the 2nd October, and on the 8th the soil—which up to this time had received absolutely no manure—was given a dressing of superphosphate and bonedust, at the rate of 1 oz. of superphosphate and ¾ oz. of bones per square yard. This was lightly raked in. On the 22nd October a third spraying was given with Bordeaux, and a fourth on the 9th November, the fifth and final spraying being given on the 25th of the same month. On the 18th November a second dressing of superphosphate and bones was given, at the same rate as the former dressing. As the plants were growing strongly this was deemed sufficient, and no further manure of any description was given.

The fruit colouring at this time, 9th December, sulphur was used and tested for control of "spot" (*Cladosporium fulvum*), and later on, 20th December, the plants were again sulphured. Experiments then ceased as far as spraying and sulphuring were concerned.

Concrete Floor.

The use of a concrete floor for control of eelworm (*Heterodera radicicola*) is to my mind excellent. Up to the present time we have no remedy within reasonable cost that will combat or check eelworm ravages [experiments with soil-fumigants, &c., are being conducted in Mr. Odering's house, and a full report will no doubt appear later], and until such time as a reliable remedy is forthcoming a concrete floor and changing the soil every season is the only reliable safeguard against eelworm infection, and this is borne out by the number of practical commercial growers who have already adopted this remedy. Care must also be taken that nothing but sterilized soil, or soil absolutely free from eelworm infection, is used in rearing the plants.

PLANT-PROPAGATION.

The success of tomato-culture depends to a very great extent on the care in selection of a good type of plant and fruit for seed purposes. Many growers simply select a fair type of fruit and pay no attention whatever to the parent plant, nor do they give any thought to the plants in the vicinity, consequently the number of plants with one truss of fruit and no leader is becoming noticeable. The cause of this peculiarity in some measure may be due to relying solely on selection of best type of fruit, and a plant having only one fruit-truss will naturally possess some good specimens, and a grower not having taken into consideration the constitution and environment will no doubt select these for seed purposes. I am inclined to think that this indiscriminate selection by growers of their own seed, season after season, is causing a deterioration in the constitution and vitality of the plants, thereby making them more susceptible to disease and less resistant to sudden climatic changes. I would suggest paying more attention to the selection of both fruit and plants for seed purposes, and occasionally introducing fresh stock, in order to preserve sound vitality, and also give plenty of room to young plants when "pricking out"—say, boxes of dimensions 12 ft. by 18 ft. Allow six rows and four plants to a row in the box. This will provide ample room for strong development; and aim at getting sturdy short-jointed plants, these being better able to resist disease owing to their strong constitution. The Department has a good illustration of this in Mr. Odering's house. This subject will be again dealt with in the report on experiments in this house.

VENTILATION.

No side or bottom ventilators were used at any time during the experiments, top ventilators being relied upon, and occasionally, during a very warm day, the end doors were used. The use of side ventilation by an inexperienced grower is apt to cause trouble, and the idea of this experiment was to simplify matters and demonstrate that the risk of disaster by indifferent use of side ventilators could be avoided. Many instances have come under my notice where growers, when the house has become too warm, have at once opened the side ventilators, thereby creating a cold draught on the plants in the vicinity. Should any of these plants have been weak in constitution they have at once collapsed, the trouble being in many cases put down as "sleeping disease"—quite an erroneous impression. This experiment proved that this risk of collapse can be obviated by a judicious use of the top ventilators with the assistance of an occasional use of the end doors during the very warm days. Moreover, it is unnecessary to undertake the extra work of manipulating two sets of ventilators when one set

answers the purpose. At least it does so in this district, although conditions may be different in the North Island and necessitate the use of side ventilators. Many of the commercial growers in Christchurch have no side or bottom ventilators in their tomato-houses, but rely solely on top ventilation, occasionally making use of the end doors in very warm weather. This fact speaks for itself, and bears out the above contention that side ventilators, unless used very carefully, are better left alone, and that it is better to rely solely on the method adopted in the above experiment.

"Sleeping disease" as known in this district is not the true "sleeping disease," which is due to the attack of a soil fungus known as *Fusarium lycopersici*.

TEMPERATURE.

The average maximum temperature, taken daily at 1.30 p.m., from the 8th October, 1912, to the 1st January, 1913, ranged from 61° to 104°, the average daily maximum for this period taken daily being 81·5°. The average minimum temperature for same period ranged from 40° to 61°, the average minimum taken daily being 50°.

It was suggested that a maximum working-temperature of, say, 75° to 90° was desirable, but with a variable season and severe changes in temperature almost constant attention to ventilation was required to keep the atmosphere anywhere near this range. However, the average maximum temperature of 81·5° proved a very fair working-temperature for tomato-houses.

WATERING.

To test for humidity of the atmosphere in the house a Lloyd's hygrodeik was used. This instrument, having a carefully graduated chart, makes the matter of ascertaining the degree of moisture per cubic foot in the atmosphere a simple one, and particular attention was given to ascertaining the most favourable degree of humidity for fertilization. It was noticeable that when the humidity was over 70° the pollen was inclined to become pasty, whereas under this reading it was freer, and the lower the humidity the more easily the pollen moved, thus becoming more useful for fertilization purposes.

MULCHING.

To test the question as to whether plants succeed without a mulching of stable manure, no manure or mulching of any description was used. A light raking of the surface soil answered the purpose. The use of stable manures as mulching can easily be abused, resulting in many cases to injury to the plants by too much forcing, and also creating a condition favourable to development of fungoid diseases. For these

reasons artificial manures, applied as before mentioned, were solely relied upon, and although the amounts at first sight appear to be small, yet a little calculation of same proportions per acre will convince one that the supply was sufficient, considering the soil in this house was well supplied with humus. The plants were sturdy, healthy, and fruitful, plainly showing they had ample nourishment.

I am inclined to think that watering after 8 a.m. during fine or warm weather may seriously affect satisfactory fertilization. I should prefer to water the plants after the heat of the day—say, not earlier than 3 p.m. Some growers think that this method is apt to cool the house too much at night, but I do not think it makes any material difference. During warm summer weather I certainly prefer afternoon watering, as it cannot interfere with fertilization, while watering in the morning on a warm day raises the humidity at once, and may, as mentioned above, interfere seriously with fertilization. Again, when watering plants, *water*, do not *sprinkle;* on the other hand, do not *soak*. Water the soil so that the particles of soil will move freely asunder and will not stick together when handled.

The humidity in Mr. Maffey's house from the 6th November, 1912, to the 1st January, 1913, taken daily, ranged from 40° to 94°, averaging daily for this period 68°.

I hope to make further comment on this question when the experiments are completed at Mr. Odering's house, as the Department also dispensed with mulching of any description in this house.

SPRAYING.

It will be noticed that Bordeaux mixture—strength 3-5-50—was used no less than five times, commencing as soon as the plants had hardened after transplanting, and at no time were injurious effects noticeable. Knowing that there is a great difference of opinion among growers as to the Bordeaux solution being injurious, particular attention was given to this matter, and I am confident that spraying, carried out properly, in no way injures the fertilization and setting of fruit. Regarding disease-control, right up to a fortnight after the last spraying very little "spot" (*Cladosporium fulvum*) was noticeable, and there was no sign whatever of other fungoid diseases. The fruit ripening rapidly, and to lessen, if possible, the work of wiping off the Bordeaux sediment, sulphur was blown on the plants with bellows. Later on the "spot" became noticeable, but even then not to any injurious extent. Taking into consideration that other houses on the same property and only a few yards distant from the experimental house were severely attacked by "spot," and that Mr. Maffey had to move freely from house to house, the test was severe, and in this experiment the

Bordeaux solution, 3-5-50, proved an excellent preventive. I do not consider that sulphur had any appreciable effect in controlling "spot."

Growers complain about having to wash or wipe the fruit after using Bordeaux. These growers will be interested to know that the Department is experimenting with carbonate-of-copper solution in Mr. Odering's house, and if this solution proves successful in controlling fungoid diseases the question of extra labour for wiping and cleaning the fruit will be solved, as the carbonate-of-copper mixture leaves no sediment or deposit.

OTHER REMEDIES.

For slugs and woodlice, or "slaters," tobacco-dust and lime were used, the tobacco-dust especially being very effective.

McDougall's fumigators were used for control of green aphis, and proved excellent. The cost is reasonable, 12s. a dozen, one fumigator being sufficient for 1,000 cubic feet. The operation is simple.

THE CROP.

Unfortunately, no record of crop and prices, &c., from this house was kept by Mr. Maffey last season, so I cannot make any definite comparison between the crop of that season and that of the present one. Mr. Maffey states that the present crop is the best harvested for some seasons. Altogether 622 lb. of tomatoes were marketed, at an average price of 8½d. per pound, which is a fair record for a house of small size.

CONCLUSION.

In conclusion, there are several items in this report which I have not dealt with fully—viz., humidity, fertilization, watering, and spraying—as we have similar experiments on hand in Mr. Odering's house under slightly different conditions, and I wish to compare notes with these experiments before reporting on such important subjects. Thanks are due to Mr. Maffey for his hearty co-operation in carrying out the experiments, and also to Mr. J. Maffey, "The Cutting," Redcliffs, for his assistance.

In looking over young orchards in the Nelson District recently, a fact which struck me very much was the great superiority of "rods" or "sticks" (yearlings) over the "pinched" or "headed" trees. In some cases pinched yearlings are being sold as two-year-olds. On these trees the buds on the lateral growth are frequently semi-dormant, and do not come away well the first year.—*T. W. Kirk.*

HOME SEPARATION.

THE SEPARATOR.

G. M. VALENTINE.

THE PRINCIPLE OF SEPARATION.

To get the best results from machinery of any description it is essential that the operator should understand the principle upon which it is worked. In the case of the cream-separator it is the law of gravity as applied by centrifugal force—in other words, the law which compels any weight to fly to the extreme limits of the circle within which it is confined when rapidly revolved. The inflowing stream of whole milk first strikes the bottom of the bowl, which is running at high speed. It is immediately thrown to the outer wall and is then forced upwards to the skim-milk and cream outlets near the top of the bowl. The skim-milk, being the heavier, is thrown to the outside, while the lighter cream collects nearer the centre. In the old type of hollow-bowl separator this action could be clearly seen. After a long run the bowl would often have a pyramid of very rich cream suspended in the centre. Generally speaking, however, there is no clearly defined line between the cream and skim-milk—rather a gradual shading from very rich cream in the centre to practically pure skim-milk on the outside. First the skim-milk escapes through the outlets provided to the skim-milk covers, while the cream rises to an outlet on or near the top of the bowl, where it escapes to the cream-covers. The higher the speed of any bowl of a given diameter the cleaner the skimming, due to the increased centrifugal force exerted on the milk, and the smaller the diameter of the bowl the higher must be the speed. Speed is perhaps the most important point, and is, I believe, the most neglected. The richness of the cream delivered is regulated by a screw, which acts either on the cream or skim-milk outlets. In the former case the further the screw is turned *in* the nearer it is to the centre of the bowl, the amount of skim-milk which escapes with the cream being thereby less and the cream richer. According to the same rule, if we turn the screw *out* we get a thinner cream. In the latter case, the further the screw is turned *in* the smaller does it make the skim-milk outlet, thereby forcing more skim-milk out with the cream and causing later the cream to be thinner. To turn the screw *out* in this case will give us a thicker cream.

A poor separator makes a discontented supplier, and a discontented supplier is a thorn in the flesh of the factory-manager. It is a source of continuous loss to its owner and to the factory he supplies. The patron of a whole-milk factory is credited with the whole of the fat contained in the milk, and the losses in separation are borne by the factory. With home separation the loss is borne by the supplier, and, as the latter is not generally so well equipped for getting the best results, the loss is proportionately heavier. Farrington says, "Under ordinary factory conditions few separators will deliver skim-milk containing less than one-tenth of 1 per cent. of fat when the sample is taken from the whole day's run. This must be considered a most satisfactory separation." ("Testing Milk and its Products," page 88.) This conclusion is arrived at by gravimetric analyses of samples of skim-milk. The Babcock test does not claim to show the actual fat-content of skim-milk, but, according to the same authority, 0·05 of 1 per cent. must be added to the reading contained by that method to get the correct amount (page 91). This is due to the fact that the finer fats, which are not recoverable during separation, are equally difficult to get into the neck of the bottle in testing. Allowing that 0·1 per cent. is good skimming under average factory conditions, it is probable that there is an actual loss of at least 0·15 of 1 per cent. under the varied conditions obtaining where home separation is adopted. The writer has tested samples of skim-milk showing a fat-content of 0·17 by Babcock's test, or, say, 0·22 per cent. by gravimetric analysis. How this works out in money value may be shown thus, taking 0·15 as average skimming: 1,000 lb. of milk testing 4 per cent. contains 40 lb. of butter-fat. Allowing that this produces 100 lb. of cream and 900 lb. of skim-milk containing 0·15 per cent. of fat, the loss is $\frac{900 \times \cdot 15}{100}$ = 1·35 lb. of fat, equal to 3·375 per cent. of the total butter-fat contained in the milk—*i.e.* $\frac{1 \cdot 35 \times 100}{40}$ = 3·375 per cent. This in a herd of fifty cows yielding 200 lb. of fat per year each represents a loss of £16 17s. 6d., at 1s. per pound for butter-fat. A portion of this loss is, however, unavoidable. Where whole milk is delivered to a factory the loss is made by the dairy company, whereas where the farmer skims his milk it is he who suffers the loss. What the loss is when separating is carelessly done can only be guessed, but these figures will serve to show the absolute necessity of exercising the greatest care both in the selection of a machine and in the subsequent use of it. The first question asked of a separator salesman is, "Does it turn easy?" The first one should be, "Does it skim clean?" Clean skimming, accessibility for cleaning, durability, and light drive are of prime importance.

TIME OF SEPARATING.

The best results are obtained when milking and skimming proceed simultaneously, and when this is possible the separator should be of such a size that a start can be made as soon as milking is well under way, always provided that the number of milkers employed is such that the milk will not be left standing long enough to become cold while waiting for enough to be milked to keep the machine going. Neither must the separator be run so long that the accumulation of dirt in the bowl will interfere with clean skimming—say, an hour and a half. If the milk has to be left until milking is finished, a feed-tank with a false bottom should be provided, so that the temperature can be raised with hot water. In this case the bigger the machine the better.

HOW TO SET UP MACHINE.

Having chosen a machine, carefully read the directions. Set it on a firm base, preferably of concrete or a block of wood set into the floor. Leave a space of about 1 in. between the block and the base of the machine by means of a reel at each screw-bob. This prevents oil, &c., from accumulating under the machine, and allows of washing. See that the frame is perfectly level after it is screwed down. Thoroughly oil all bearings. Use only a high-grade oil made specially for this purpose, as on this chiefly depends the ease in driving, and the life of the machine. Carefully wash and scald the bowl and all tinware, to remove the grease with which they are smeared; then put the machine together again, with all parts in their proper place, and you are ready to start separating. Avoid sudden jerks in starting, or you will run the risk of snapping the ratchet-pawl in the handle, which is very hard and brittle. Raise speed slowly, taking care in the hand-machine to apply an even pressure on the handle. A heavy push on the down stroke will only cause irregular running of the bowl, and will tend to wear the bearings and gearing unevenly. The separator must be run at the speed given by the maker, but it is better to err on the side of overspeed rather than underspeed. The hum of the machine gives an indication when the speed is right, but this must not be relied on. A metronome placed where it can be seen and heard, and set to the speed of the handle, is the best means of counting. Satisfactory results will not be attained when stops have to be made to fill up the milk-cistern. Slow speed will give more cream of a lower test, and will cause a big loss of fat in the skim-milk. Excessive speed will give less cream of a higher test, and ensure a more perfect separation. Take care that the speed is up before turning on the milk, and see that it is maintained when the extra weight caused by the milk in the bowl is felt. With the increasing use of the milking-machine the power-driven

home separator has also become more common, and, if intelligently used, should give better results than the hand machine, as a more even speed can be obtained. Where the motive power is steam, turbine machines are most popular, and in good hands do very good work. With an oil-engine plant a hand-power machine, with fast-and-loose pulley attachment, a friction-clutch, or governor-pulley, is usually found, all of which are more or less satisfactory, but require careful watching to see that the belts or clutches are not slipping. It is absolutely necessary to try the speed of the machine at intervals during each separating. This can be easily done by counting the number of revolutions of the driving-shaft on the separator.

TREATMENT OF SEPARATOR.

Return the first two or three gallons of skim-milk to the feed-tank, as it has always a fairly large percentage of butter-fat left in it. While the best temperature for separating is the natural heat of the milk as it comes straight from the cow, good results will be obtained with fresh milk not colder than 86° Fahr. If the milk from one milking is left over till the next, it will be necessary to heat it to 96° Fahr. before separating, and it will be all the better if held at this temperature for a few minutes to ensure a thorough heating of the fat-globules. Cold milk will give less cream with a higher test, but will mean a very serious loss of fat in the skim-milk. This is caused by the increased viscosity, or stickiness, of the cold milk, which prevents a clean separation of the fat. The amount of milk fed into the bowl is regulated by a float, which will act well with the tank supplied with the machine; but if a larger tank is required the pressure on the float will be greater, and care must be taken not to feed the machine too fast, as this will result in a thin cream and loss in the skim-milk. Underfeeding is also to be avoided. An uneven feed will cause an accumulation of thick cream in the bowl, and a consequent loss in skimming. Maintain a uniform feed, speed, and temperature throughout the run, and flush out at the finish with a gallon of skim-milk or clean warm water, to force all the cream out of the bowl. Wash the separator *immediately* after separating is finished, and do not forget to keep the frame sweet and clean as well as the bowl and tinware. Set the machine to deliver a cream containing not less than 40 per cent. of butter-fat, but do not be surprised if the test should vary a few points either above or below that from time to time, without altering the cream-screw. The test will be higher if the machine is run overspeed, the milk too cold, the feed not sufficient or irregular, and the cows are going off in milk, &c. Thin cream will result from slow speed, overfeeding, fresh cows, cold

weather affecting cows, too much flushing of the bowl, and the machine running rough, &c.

A separator which is in good order should run with a smooth musical hum, and without vibration, and should deliver the cream and skim-milk in a steady stream. Vibration and noise are signs of something wrong, and should be seen to at once. The more common troubles are—frame not being level, bowl-spindle bent, a broken spring in the top bearing throwing the bowl out of plumb, bearings worn and having too much play. A frequent cause of trouble in disc machines is through the discs getting worn with use, and fitting loosely on the centre pillar, thus causing vibration. This can be overcome by putting an extra disc in the bowl.

A separator set to deliver a 40-per-cent. cream in spring with fresh cows will give a much richer cream in the autumn, all other conditions being equal, and will require to be altered a little. A sample of skim-milk should be tested frequently. This can best be done by punching a small hole in the shoot, if one is used, and catching the drip. If there is no shoot, a large jug, or billy, can be held under the skim-milk spout at frequent intervals during the whole run, and a sample taken from it after it has been thoroughly mixed. The fact that no cream rises on a sample of skim-milk is no proof that it contains no butter-fat. The argument that "the calves and pigs get it anyhow" is, after all, only an excuse for bad work. The old saying that "if a thing is worth doing at all it is worth doing well" still holds good. If you are going to separate your own milk, do it as it should be done. You will be surprised how interesting it will become. By all means rear good calves and pigs, but make a business proposition of that also, and remember that butter-fat at 1s. per pound is rather expensive pig-feed.

GREEN MAIZE.—The dairy-farmers of the South Island are coming to appreciate the value of green maize for their milking-cattle. In the North maize is the chief means of maintaining milk-production when grass dies off. The climate of the North is naturally more suitable for the cultivation of maize, but even in the South maize for green fodder succeeds in average seasons. The experimental farms and the co-operative field plots have effected useful work in popularizing the cultivation of this plant. Quite recently a party of farmers inspected a heavy crop of maize near Christchurch—grown in a series of field-plot demonstrations. The party was highly gratified at the result. The South Island Fields Instructor, Mr. A. Macpherson, expresses his great appreciation of the help he receives from the cordial concurrence of the farmers who undertake these trials.

A NEW SPECIES OF GRASS-GRUB.

A SERIOUS PEST OF SEEDLING FOREST-TREES.

A. H. COCKAYNE.

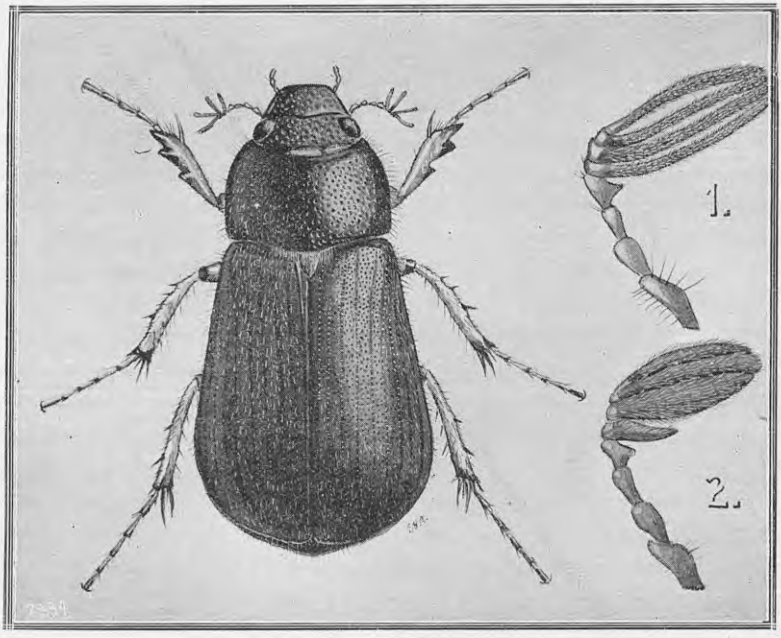
A CONSIDERABLE loss is annually sustained in the seedling-beds at the State Forestry nurseries through the roots of the young trees being destroyed by the larvæ of certain species of grass-grubs. I was under the impression that the damage was occasioned by the ordinary grass-grub (*Odontria zealandica*), so well known in New Zealand on account of its very serious effect on pastures. A visit to the Whakarewarewa State Nursery in the second week of last December showed conclusively that the insect damaging the seedling trees at that nursery was not *O. zealandica*, as full-grown larvæ were abundant in the larch-beds at that date. If the damage had been due to *O. zealandica* there would have been very few larvæ present, as normally the majority would have pupated and emerged during the latter part of November.

No method for distinguishing the various species of grass-grubs while in the larvæ or grub stage has yet been worked out, so it was necessary to wait till the beetles emerged before the species could be ascertained. From the size of the grubs they were thought to belong to one of the larger species, such as *O. sandageri* or *O. striata*. On the 27th and 31st January a fine series of the beetles collected in the ground before they had taken to the wing was received by me from Mr. H. A. Goudie, Superintending Nurseryman of the Forestry Branch of the Lands and Survey Department. Being unable to determine the species, I sent specimens to Major Thomas Broun, the well-known Coleopterist, who decided they belonged to a new species, and named it *Odontria puncticollis*. He very kindly drew up a diagnosis of this species, and this is appended.

The following notes supplied by Mr. Goudie give some interesting information with regard to this insect:—

On the 23rd January a blank portion of one of the larch-beds, where all the trees had been killed, was selected: 1½ ft. by the full width of the bed—viz., 6 ft. All the soil to a depth of 9 in. in this space was put through a sieve. Ten grubs were obtained in this way, most of them from 6 in. to 9 in. from the surface. Below this the subsoil to a depth of 6 in. was taken out and screened, with the result that I secured twenty fully developed beetles, and eleven in the pupa stage, or forty-one in all. If this is representative of the whole of the beds, then there are about five thousand grubs in each bed, or about one grub to three trees. Probably the grubs have been going down into the subsoil since about the beginning of November. They apparently

burrow into the hard subsoil, where they pupate. The beetles will probably emerge from the ground about the beginning of February. The larch-beds are in a frightful state, there being huge patches in which every tree is dead. I propose laying scrim over these places in order to catch the beetles as they emerge from the ground. There is no doubt that tillage is the best means of eradicating this pest. I have tried to get grubs and beetles in various other places without any great success. Breaks Nos. 5 and 6 were sown in larch in October, 1910. From July, 1911, to July, 1912—when the crop was lifted—the grubs were very bad. The soil was top-dressed with apterite in August, 1912, and was well harrowed and ploughed deeply. Cow-peas and Soya beans were sown in November, 1912. I have since failed to find a grub or beetle. A horse-paddock has been in grass for ten years. Here the land is very hard and consolidated, with the turf 4 in. thick. A few grubs were near the surface. Block 1 was sown with Corsican pine (*Pinus laricio*) in October, 1910. The crop was lifted in July, 1912, no grubs or beetles being discovered. It was sown in prairie-grass in October, 1912, and no grubs or beetles are now present.



ODONTRIA PUNCTICOLLIS, MAGNIFIED FIVE TIMES.

1, Antennæ of male, magnified thirty-five times; 2, antennæ of female, magnified thirty-five times.

On the 6th February a large flight of *Odontria puncticollis* occurred, over one hundred beetles being collected by hand in a few minutes. This shows that the time of the main emergence differs very considerably from that of *Odontria zealandica*, and, in consequence, the control measures for *O. puncticollis* will be different to those that would be effective against *O. zealandica*. A small flight of the Rotorua grass-grub occurred in September, and I am inclined to think this is due to a small proportion of the grubs not completing their life-history in the twelve months.

It is a matter of great importance to determine what are the species that are causing damage in the southern nurseries, as until that is known and their life-histories are worked out it is useless to endeavour to formulate control measures.

DATA REQUIRED.

The following data are urgently required with regard to *Odontria puncticollis* :—

(1.) Dates of emergence of the beetles.
(2.) Crops in which egg-laying takes place.
(3.) Length of time the grubs remain in the larvæ condition.
(4.) Food-plants of the adult beetles.
(5.) Food-plants of the grubs.
(6.) Effect of fires in destroying the beetles.
(7.) Effect of spraying and application of soil-fumigants—(*a*) poison sprays, (*b*) deterrent sprays, (*c*) soil-fumigation.

When reliable data under these headings have been secured a satisfactory method of control should be able to be devised so far as protecting the young trees is concerned. This is extremely important, because this insect is greatly increasing the cost of the production of certain trees, notably the larch. Any reduction in the cost of the raising of trees is of fundamental importance in forestry, and this is especially true of species with a long rotation.

SUGGESTED METHODS OF CONTROL.

One of the most suggestive methods of control would be the covering of the beds each evening with beetle-proof frames during the short period the beetles are on the wing. The present seed-frames employed could easily be adapted for this purpose. It is more than probable that the main flights will occur at approximately the same date each year, and if the beetles are stopped from laying in the beds during that period the damage should be reduced to a minimum.

The important fact that *O. puncticollis* does not damage Corsican pine is a most suggestive one. It would appear as if the beetles do not lay any eggs in soil occupied by seedlings of this pine. This appears to be correct, as larch-trees that come up accidentally in the Corsican-pine breaks are not affected. It might prove feasible to combine the sowing of a certain amount of larch with the Corsican pine, and this is a matter that can easily be determined. The Corsican pine is an extremely aromatic one, and the question of experimenting with deterrent sprays may probably yield valuable results. If any specially favourite food-plants for the beetles are found, the growing

and spraying of these with arsenical washes might prove a valuable method of control.

The following is Major Broun's description of *Odontria puncticollis* :—

GROUP MELOLONTHIDÆ.

ODONTRIA, white, Man. N.Z. Coleopt., p. 265.

Odontria puncticollis, sp. nov.

Subovate, broadest near the hind thighs, moderately convex, somewhat nitid; head and thorax reddish-chestnut, elytra and legs rather paler, the latter often testaceous; sparingly covered with distinct, decumbent, moderately short, yellowish hairs, but also with longer erect ones along the sides, the base of elytra thickly clothed, in the middle, with elongate pubescence.

Head coarsely and moderately closely punctured, except at its extreme base, the forehead with reflexed, well-developed margins, broadly rounded in front, the upper surface nearly nude. *Eyes* large, only slightly convex, hyaline. *Thorax* almost twice as broad as long, its sides finely margined, nearly straight, and only slightly narrowed behind the middle, gently curvedly narrowed towards the front; anterior angles acute, the posterior somewhat rounded; base widely sinuate towards the sides, rounded in the middle, the apex widely emarginate; its surface very distinctly, moderately closely and evenly punctured, frequently with a smooth linear space along the middle. *Scutellum* punctate, cordate or suboblong. *Elytra* thrice the length of the thorax, of the same width as it is at the base, gradually dilated posteriorly, the apices rounded at the sides, much less so, sometimes subtruncate, towards the suture; on each elytron there are nine fine striæ, the outer ones indistinct, the central ones obsolete near the shoulder; interstices plane, their punctation distinct, slightly finer than that of the thorax. *Pygidium* broad, with distant subgranular sculpture.

Under-side more or less finely punctate, fusco-testaceous, the abdomen a little shining and often fuscous in mature individuals; the sternum with numerous elongate, slender, fulvescent setæ, those on the femora erect.

Male.—Antennæ rather short, basal joint elongate, oblique and thickened at the extremity, the second as stout but only half as long, third more slender, fourth stout, angulate, and generally slightly produced in front; club minutely and densely pubescent, composed of four nearly equal leaflets.

Female.—Fifth antennal joint short, usually somewhat prolonged in front, but only a third, or less, of the length of the club, which is triarticulate and shorter than that of the male.

Length, 12–14; breadth, 7–8 mm.

This species can be distinguished from almost all the others by the very distinct, though not coarse, thoracic punctation, which is quite perceptible to the unaided eye, whereas in many other cases the punctures, either very fine or obsolete, can only be detected by means of a powerful lens. As a further aid to identification, it may be stated that, with the exception of White's *Rhizotrogus zealandicus*, 474, and one or two others, the surface is opaque and often maculate, and the elytra in some instances broadly sulcate. In the more closely allied, but larger, much paler, and rather more glossy, *O. nitidula*, 3233, the hind angles of the thorax, though obtuse, are more rectangular, and only those striæ that are near the suture are well marked.

Specimens collected by H. A. Goudie, in larch nursery-beds, Whakarewarewa, 6th February, 1913. The illustration is drawn from nature by Mr. E. H. Atkinson.

A very striking demonstration of the success of dry farming when aided by green-manuring may be seen in No. 40 paddock (lately reclaimed, and naturally very poor) at the Ruakura Farm of Instruction. A crop of crimson clover was recently ploughed under, and is now growing a splendid crop of tares and barley which is quite unaffected by the dry weather. The land was thoroughly worked, and when the crop was sown was left unrolled so as to ensure a deep, loose surface mulch.

PRAIRIE-GRASS AND LUCERNE.

T. W. LONSDALE.

WITH the object of deciding the value of prairie-grass and lucerne as a temporary pasture in a crop rotation, an area of 6 acres at the Moumahaki Experimental Farm has been laid down to this mixture. The land previously carried a crop of vetches and rye-corn, which was cut and threshed for seed, after which the soil was ploughed.

In the autumn of last year the prairie-grass and lucerne was sown, 20 lb. of the former and 10 lb. of the latter being used. The crop came away well, and throughout the winter and early spring it provided splendid feed for store sheep and ewes and lambs. It was pastured till October, when it was closed for mowing. After developing a thick growth of about 2 ft. it was made into hay, the growth representing a weight of 10 tons of green material to the acre. The hay was an excellent sample. A fortnight after stacking was completed there was a heavy aftergrowth, which has been almost continuously grazed to the present time by dairy stock. Both sheep and cattle eat this mixture with avidity, and it is apparently admirably suited for fattening and milk-production. It has been noticeable that when the dairy cows were taken off this feed and put on to good pasture the milk-yield declined, notwithstanding that the pasturage was supplemented with ensilage carted out. After the prairie-grass and lucerne had been given a rest of several days in which to recover, the milk-flow rapidly increased on the cows being returned to field. This mixture is definitely a temporary crop, and should not be expected to last more than two years. At Moumahaki it has provided heavy feeding for six months, and should be good for at least another year. In addition to this, the heavy crop of hay was obtained. Though it is desirable to utilize the land for other purposes when the wealth of feed diminishes, the lucerne, of course, will continue to make growth if not disturbed. But the ploughing-in of the lucerne and prairie-grass will undoubtedly enrich the soil, and provide a good seed-bed for subsequent crops, and this with little manuring.

Extensive tests are being conducted at the Moumahaki Experimental Farm to determine the most suitable varieties of potatoes for the environment, their disease-resisting capacity, and their manurial requirements. Altogether sixty varieties are under trial. Several experiments are being conducted in regard to the effect of different specifics in warding off disease. All the potato plots are looking remarkably healthy.

SOWING ONION-SEED.

W. H. TAYLOR.

THERE is much diversity of opinion as to the best time to sow onion-seed, but I am bold enough to say it is only among men of little experience that such diversity exists. Those who have been long at the game, or who have had the advantage of a good training, work on definite fixed rules. Giant Rocca, and all similar large-growing varieties, must be sown in autumn, or they will not attain large size, and they are not worth growing unless they do that. Regarding keeping-varieties, spring sowing would be always best but for the fact that in many places mildew is very destructive, and when that disease attacks them they seldom ripen off properly, or, if they do, they are likely to be small. Experienced men who are working in such circumstances know two things which guide their action: First, it does not pay to handle a large number of small onions; secondly, autumn-sown onions seldom keep as long as spring-sown. They compromise by sowing at both times. Autumn sowing provides good-sized bulbs for early handling, and spring sowing smaller ones that keep longer. The reason why those sown in autumn are not injured by mildew is because the disease does not make its appearance till about February, and they have nearly finished growth by then. Being earlier than those sown in spring, they ripen early in March instead of late in the month.

An important fact that must not be forgotten is that all autumn-sown onions must be transplanted in spring, or a large number will run to seed. Keeping-varieties show very little tendency to bolt when they have been transplanted.

Regarding silver-skinned, my experience has been that they seldom keep long, though I have seen Silver King and Silver Glove keep well, but they came from a favoured place.

I have had considerable trouble with English seed, a very large proportion coming bull-necked. Australian seed is best for this country.

An eighth of an acre of Buda kale at Moumahaki Experimental Farm, which last year produced feeding-material at the rate of 57 tons to the acre, was allowed to go to seed. The result was highly gratifying. Though the small birds were very troublesome, and it is estimated from close observations they took fully half the seed, the threshing produced a fine sample, representing a return equal to a local market value of £48 per acre.

GRAZING OF LUCERNE.

EXPERIMENTS AT MOUMAHAKI EXPERIMENTAL FARM.

IN the brief history of lucerne-cultivation in this country the grazing of it has not yet been tested. Now, however, an experiment is being conducted at Moumahaki Experimental Farm to determine the best means of grazing an established field by both cattle and sheep. The field where the trial is being made has been in lucerne for two years and a quarter, and the plant is there thoroughly well established. After the first cutting of this season 525 head of sheep (ewes and lambs) were turned in on the 7 acres. At this time the lucerne was 18 in. in height —rather high for feeding off, the wet weather which prevailed having made it necessary to postpone the stocking. The sheep, not being accustomed to the rich feeding, were not kept continuously on the lucerne for the first few days. They were taken off after two hours' feeding the first day, on the second day they had four hours' grazing, and on the third day they were allowed to remain in the field. The sheep rapidly improved in condition, and on the tenth day, the lucerne being eaten down to a safe height, about 2 in. above the crown, the sheep were taken off. When put on the lucerne the sheep were in forward condition, and the bulk of them were fit for freezing when taken off. After seven days, the lucerne having recovered sufficiently, 300 lambs, just weaned, were turned on, and remained for a period of seven days, being taken off after a few hours' feeding for the first few days, as with the first lot. The lambs were followed by 260 ewes, which remained on the lucerne for seven days. The field remained without stock for seven days, and the 260 ewes were returned and depastured for another week. After this seven young bulls were turned on, and remained for ten days. The field was then closed up. As far as the eye could see, there was no deleterious effect on the plant, which is growing as vigorously as before. The 7 acres are now being subdivided, and experiments to test the gain in weight in fattening will be carried out.

During February the three main experimental farms of the Department were visited by 1,270 farmers. Ruakura Farm of Instruction attracted 735, Moumahaki Experimental Farm 460, and Weraroa Experimental Farm 75.

SCRUB LAND.

ITS EFFECTIVE UTILIZATION TO BE TESTED.

A LARGE extent of land in the Waimakariri and West Eyreton districts of Canterbury is not in profitable occupation. Its character is peculiar. The chief feature in the formation is a mixture of gravel and sand, more or less covered with soil, these combining in varying proportions. The open nature of the substratum can retain water but feebly. This is general over the whole of the area, and is naturally the cause of the difficulty of useful occupation. Where the soil is in reasonable proportion good crops are raised in seasons of abundant rainfall. Where the boulder and gravel are in the greater proportion the natural vegetation is reduced to manuka, a certain amount of danthonia, and grey moss.

Some of the owners have approached the Department with a request to test plants and methods of cultivation that may assist to provide profitable utilization. With this in view the South Island Fields Instructor, Mr. A. Macpherson, has arranged that a typical area near a road be selected. This land will be available for the Department for five or seven years, to permit of comprehensive experiments being conducted to definite conclusions. The scrub will be felled and burned, and the land ploughed. The experimental area will be enclosed with a vermin-proof fence, while shelter-trees will be planted on the exposed aspect. The Department will provide seeds, fertilizers, and the plan of operations under the supervision of its officer. The farmers will provide the required labour. It is expected to proceed with the operations this autumn.

The most effective move towards reduced cost of living is the production of greater crops. This is attributable to the work of the Department of Agriculture, the agricultural colleges, and the experiment stations, and the help of the Press in publishing every movement to help the farmers. Demonstration work in Southern States in the fields has been of immediate benefit. The South has increased the food-supply very much in the last few years. The movement ordered by Congress to take farm demonstration into all Northern States will bring more food into our markets. Our fields can and will steadily increase their output in coming years as ways and means of growing heavier crops become better understood.—*Scientific American.*

TOBACCO-GROWING.

A. W. GREEN.

SEVERAL attempts have been made in New Zealand to establish the tobacco-growing industry, but without any marked success. Consequently the area now planted in tobacco is much less than that of some former seasons. The general opinion of old settlers visiting Ruakura

TOBACCO-PLANT AT RUAKURA FARM OF INSTRUCTION.

supports this statement, for when passing the tobacco-plots they invariably refer to having grown crops over twenty years ago, and having seen large tobacco-plantations cultivated by Maoris. On the other hand, younger farmers frequently state that it is the first time they have seen the plant growing.

There are several difficulties to face by any one who attempts to grow, cure, and sell the leaf, and it is probably these difficulties which have checked the industry. The price of labour is the main obstacle, for the crop requires much attention, and that during the busy season of the year, from November to March. Secondly, the plant must be grown to perfection, in order to compete with foreign tobacco in quality and flavour. This limits the areas to suitable soils and favourable situations, where the plantations can be sheltered from wind and lie exposed to the sun for the greater part of each day. Again, until growers could supply leaves in sufficient quantities to meet the demand of manufacturers, the latter much prefer to buy in foreign markets, where from a number of samples submitted they can choose one which when prepared will give them their standard article. Should numerous growers be induced to enter the field for tobacco-growing, this last-named difficulty would be easily overcome, for tobacco of good quality can undoubtedly be grown in New Zealand.

The accompanying photograph of a specimen plant growing at Ruakura will serve to illustrate the success achieved after experimenting with different varieties and manures. A tobacco expert who lately inspected this plot considers the quality excellent, and stated that he never saw better-grown plants in the United States. He estimated the crop at 9 cwt. of dried leaf per acre, and valued it at 1s. 6d. per lb. The soil is of a light sandy nature, shallow, with gravel subsoil. This is not by any means the most suitable soil, a deep well-drained sandy loam rich in humus being far superior for the purpose.

Poultry-manure has given the best results, but when this is unprocurable farmyard manure must be substituted. With either of these manures it is advisable to plough them in some time before planting. With artificial manures, dissolved bone and sulphate of potash surpass all others on this soil. The sulphate of potash adds quality to the leaf. The Maoris applied wood-ashes to their plantations, mixing these well with the soil. The variety which best adapts itself to this climate and soil is one named Pryor Virginia, secured from Australia by Mr. A. Chocqueel, a local manufacturer of tobacco. It far surpasses the Old Virginian, Turkish, or Connecticut previously tried here. The leaves are of a darker shade of green, are larger, and contain more oil. Many of them measure 18 in. across and 30 in. in length, while the largest leaves of Old Virginian do not exceed 11 in. by 18 in.

A few notes as to the cultivation adopted with this season's crop may here prove interesting. The seed was sown in trays under glass on the 14th October, 1912. The seed germinated in seven days, and the young plants appeared above ground on the 25th October. These were transplanted into rows 3 ft. apart each way on the 17th December. The soil was hoed three times to check weeds. Hoeing must not be deep close to the plant, as this destroys many fibrous roots. As side

shoots appeared they were pinched out, the leading shoot only being allowed to grow. On the 16th February the leaders were stopped, with the exception of those plants required for seed. An average of fifteen leaves were left to develop on each plant.

First-grade seed is obtained from the uppermost flowers, so that all lateral branches of the inflorescence were removed early.

Stopping the leaders forces suckering, and these growths must not be left to develop, otherwise the quality of the leaf is diminished.

Much care is needed when working amongst the plants, for during ripening the leaves become brittle and easily break across the midrib.

At ripening the plant presents an entirely different appearance. The top leaves attain a size equal to the lower ones; secondary suckers commence to shoot out below the bottom leaves at the soil-level; the colour changes from a deep green to a yellow spotted appearance, and all leaves become much wrinkled.

It is expected that the crop at Ruakura will be ready for harvesting about the 15th March.

RUAKURA MANURIAL EXPERIMENTS.

PRIMROSE MCCONNELL.

IN connection with the permanent manurial experiments (this year being tested with a swede crop), the plots manured with a mixture of guano and sulphur take the lead, while highly nitrogenous manures, such as blood and bones, stand at present at the bottom of the list. On a previous occasion I ventured the opinion that the damage caused by blights and parasites was to some extent due to the exhaustion of the soil, in which condition it could not produce a plant sufficiently robust to resist an attack of the above nature. This opinion would seem to be emphasized by the fact that, although the cabbage-fly has done some slight damage to the manured plots of swedes, the unmanured plot is so much damaged as to be in some places past recovery. In the mangel-paddock the cross-dressing of sulphur and lime now stands up very clearly, the colour of the foliage being of a deeper green than other portions of the paddock. On the other hand, where sulphur was applied alone, at the rate of 5 cwt. per acre, the crop is at present not as good as that grown with no manure at all. Nitrolin applied as a top-dressing had no visible effect on the oat crop, but, strange to say, has had a marked effect on the colour of the soil, the portion dressed being of a much darker colour than other portions of the paddock. All pastures are at present so brown that no comparison can be made of top-dressings.

A WELL-MANAGED FARM.

THE WAIMAHAKA ESTATE.

A. MACPHERSON.

THE farm of the late Mr. James Holmes, of Waimahaka, Southland, is regarded as one of the best managed in the South. Some particulars of the methods in vogue—introduced by the late respected owner and continued by his son, the present manager—may be of interest and assistance to others engaged in farming similar country and following the same phases of primary production. They are assuredly worthy of emulation.

The property consists of 1,641 acres of freehold, of which 1,000 acres are in grass, 200 acres in turnips and oats, and the balance of 441 acres in native bush. There are also 250 acres of leasehold. The land is undulating. Some of the grass-paddocks have been down fifty-five years. The mixture of grasses sown has not been varied since the first paddocks were laid down, and is as follows: Perennial rye-grass, 20 lb.; Italian rye-grass, 5 lb.; meadow fescue, 7 lb.; meadow foxtail, 2 lb.; crested dogstail, ¾ lb.; timothy, 5 lb.; cocksfoot, 5 lb.; cow-grass, 3 lb.; white clover, 2 lb.; alsike, 1 lb.: total, 50¾ lb.

The pastures are excellent, being covered with a thick sole of succulent grasses, the most prominent varieties being cocksfoot and perennial rye-grass.

The cultivation given is somewhat on the following lines: The land is broken up as a rule in the month of June, ploughed 6 in. deep, and fallowed all winter; double-disced the same way as ploughed and double-disced at an angle; tine-harrowed three times and Cambridge-rolled. The land is cultivated for five years before laying out to grass. During that time usually two crops of oats are taken and three crops of turnips. The oats are drilled in, and the turnips are sown on ridges. No fertilizers as a rule are applied when oats are sown, but for turnips 3 cwt. of manure per acre is used, two-thirds of the mixture being bones and one-third superphosphate. The bulk of the land under cultivation has been subsoiled. All the cultivated land has been limed at the rate of 2 tons per acre. The liming is done before sowing down with grass. A light chain harrow is used to cover the grass-seed. The land is not rolled afterwards.

Swede and yellow- and white-fleshed turnips grow well, the seeding being—swedes, 2 lb. per acre; yellow- and white-fleshed turnips, 1½ lb.

per acre. The plants are thinned out to about 8 in. apart in the rows, and intercultivation is frequently given. Amongst a number of varieties tested Crimson King has proved the best swede, and Aberdeen Green-top Yellow and Stobo Blue the best of the yellow-fleshed turnips.

The stock carried from year to year consists of—Cattle, 400 purebred Herefords; sheep, 1,500 purebred Romney Marsh; horses, 30 draughts and a few hacks. Besides the foregoing, there were also at time of my visit 700 lambs and 150 calves. With the exception of males for stud purposes no stock is bought in. The Hereford herd and Romney Marsh flock are said to be among the oldest established in the Dominion.

Three teams of horses are employed to carry out the work of the farm.

POTATOES.

SELECTION AND STORAGE.

T. W. LONSDALE.

THE time is opportune for a few words regarding the selection and storage of potatoes from which next season's crop will be raised. Many growers lift and cart the whole of the crop direct to the shed, the tubers being afterwards sorted as time permits. When stored in this promiscuous way the tubers heat, thus causing them to send out long spindly shoots which are easily broken off. These shoots, being the first, should also be the strongest; later shoots will not produce good plants. Moreover, by allowing the clamp to heat, a great many potatoes fail to germinate, with the result that, instead of an even crop, numerous blank places occur.

When lifting the crop, selection of seed should receive immediate attention. This is best done by observing which plants produce the most marketable tubers, and if these are true to type of their variety, select seed from these plants and discard those which give an uneven and light yield.

The tubers should then be placed in shallow boxes where the light and air can freely reach them. The eyes start into growth slowly, and the shoots themselves are short and not easily broken. When planted they grow away without any check, and time is saved which, in a season of growth as short as that of the potato, is most important.

Numerous experiments have shown that the selection and sprouting of the tubers give an increased yield. Should not every grower, therefore, aim at producing the utmost on the land he cultivates?

COW-TESTING.

NOTES ON THE SEASON'S WORK.

W. M. SINGLETON.

THE extension of the cow-testing movement this season has been gratifying, and bears splendid evidence to the fact that dairy-farmers are improving their herds, and are doing so by building on sound basic principles. There are some twenty associations in operation this season, and already there are others mooted for next season.

The associations represent the testing of some 25,000 cows this season. These monthly tests prove good educative factors when taken in the right way. The dairyman has a chance to get a better idea of cow-nature, and interesting avenues of thought are open to the dairyman who is a student.

Possibly the matter which puzzles some cow-testing-association members most is the variation which occasionally occurs in the individual tests of a cow. This seldom applies to many cows of the herd, it being the general experience that tests do not vary more than three or four tenths from month to month. Still, some cows do vary very considerably at times, and over 1 per cent. of variation may be evidenced in the tests of certain cows over two consecutive periods. This does not indicate that the testing is wrong, for we have ample evidence that such variations occur where the strictest care is taken with the sampling and testing. Further than this, it is our experience that even where the sampling and testing are right, where the cows are milked punctually on the stroke of the clock, and where cows are treated kindly and never hurried—even under these ideal conditions—variations of over 1 per cent. on the Babcock bottle are to be found occasionally in the test of a few cows between two consecutive months.

Such variations might suggest that cow-testing is not sufficiently reliable for the dairy-farmer. We believe it evidences the fact that one or two tests only for the season may be very misleading, and that tests should be made at regular intervals, monthly, during the whole lactation period to ensure good results. With a number of tests variations tend to counteract themselves. In any case it must be remembered that very few members have even one cow showing the extreme variations indicated above.

A comparison of cow-testing-association returns and factory returns for the season are interesting. In one association it was found that

for the whole season we had credited the average cow in that association with 10 lb. of fat more than that for which the factory paid. This 10 lb. would be accounted for by the following considerations :—

(1.) We credited each cow with yield from date of calving, whereas this cow's milk would not be delivered at the factory for three or four days.

(2.) Our yield for season includes milk fed to calves. The factory return does not.

(3.) Our return includes milk used by the household and any spilled. The factory return does not.

The variation of 10 lb. of fat would be just about the quantity these items would represent in the average herd, and these figures go to show that the system of cow-testing-association work followed in New Zealand is sufficiently accurate for the purposes of culling inferior cows and selecting the best cows of the herd for breeding purposes. In fact, the system is all right for anything save making records for pure-bred cows—a phase of cow-testing provided for in another way.

GREEN FODDER FOR DAIRY COWS.

T. W. LONSDALE.

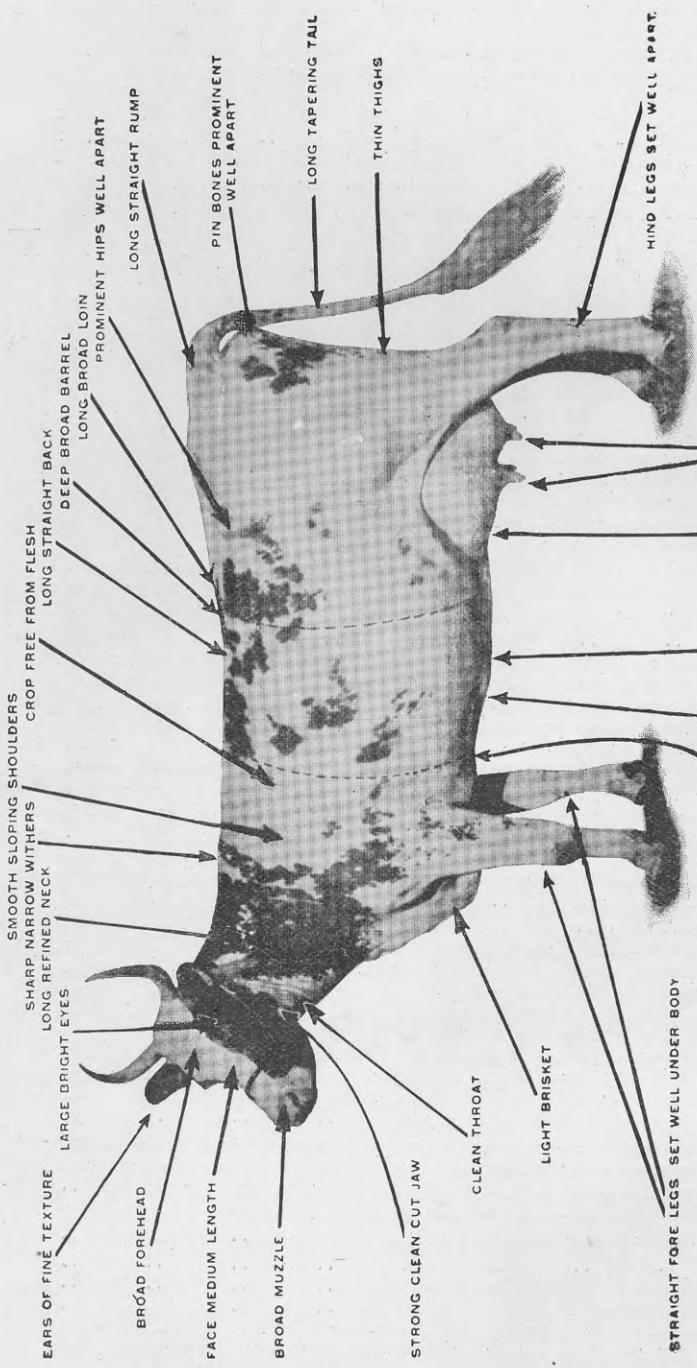
IT is an admitted fact that the best returns cannot be obtained from dairy stock except under a liberal system of feeding, and this should be maintained right throughout the lactation-period. Many farmers will acknowledge that they seldom supply all the members of their herd with sufficient feed at all seasons of the year to induce them to provide their maximum flow of milk. The proper feeding of dairy cows is one of the most pressing problems of the day. It is gratifying to know that milk-producers in this country are realizing the necessity for more attention being paid to this matter. Many kinds of fodder are being grown for the purpose. A fodder which is not appreciated as it should be, and one which is in great favour in older-established dairying-countries, is a mixture of oats and peas. There are numerous varieties of oats, some being more suitable than others, for providing a large amount of fodder. It is therefore advisable to select the oat best adapted to the purpose. It is questionable whether a better variety than the Triumph is available for producing green fodder. Grown in conjunction with peas, it provides an ideal food for dairy stock. The Triumph is a strong-growing variety, and produces a great quantity of flag and a strong upright straw. It is, therefore, well adapted for giving the necessary support to the peas, whereas an oat producing fine straw would be useless.

AYRSHIRE CATTLE.

As several readers of the *Journal* have expressed a desire for the breed-points of Ayrshire cattle, the standard adopted by the Ayrshire Cattle-breeders' Association of New Zealand is herewith published, together with a diagram illustrating the points of an Ayrshire cow, which, indeed, may be utilized in determining the desirable points of a dairy cow of any breed.

SCALE OF POINTS FOR AYRSHIRE COW.

Head		8
Forehead—broad and clearly defined	1	
Horns—wide set on and inclining upward	1	
Face—of medium length, slightly dished, clean-cut, showing veins	1	
Muzzle—broad and strong without coarseness, nostrils large	1	
Jaws—wide at the base, and strong	1	
Eyes—full and bright, with placid expression	2	
Ears—of medium size and fine, carried alert	1	
Neck—fine throughout, throat clean, neatly joined to head and shoulders, of good length, moderately thin, nearly free from loose skin, elegant in bearing		3
Forequarters		11
Shoulders—light, good distance through from point to point but sharp at withers, smoothly blending into body	2	
Chest—low, deep and full between the back of forelegs	6	
Brisket—light	1	
Legs and feet—legs straight and short, well apart, shanks fine and smooth, joints firm; feet medium size, round, solid and deep	2	
Body		13
Back—strong and straight, chine lean, sharp and open-jointed	4	
Loin—broad, strong, and level	2	
Ribs—long, broad, wide apart, and well sprung	3	
Abdomen—capacious, deep, firmly held up with strong muscular development	3	
Flank—thin and arching	1	
Hindquarters		11
Rump—wide, level and long from hooks to pin-bones, a reasonable pelvic arch allowed	3	
Hooks—wide apart and not projecting above back nor unduly overlaid with fat	2	
Pin-bones—high and wide apart	1	
Thighs—thin, long and wide apart	2	
Tail—long, fine, set on a level with the back	1	
Legs and feet—legs strong, short, straight when viewed from behind, and set well apart; shanks fine and smooth, joints firm; feet medium size, round, solid, and deep	2	
Udder—long, wide, deep, but not pendulous nor fleshy; firmly attached to the body; extending well up behind and far forward; quarters even; sole nearly level and not excessively indented between teats, udder-veins well developed and plainly visible		20
Teats—evenly placed, distance apart from side to side equal to half the breadth of udder, from back to front equal to one-third the length; length 2½ in. to 3½ in., and not less than 2 in., thickness in keeping with length, hanging perpendicular and slightly tapering, and free flow of milk when pressed		12
Mammary Veins—large, long, tortuous, branching, and entering large orifices		5


EARS OF FINE TEXTURE
LARGE BRIGHT EYES
SHARP NARROW WITHERS
LONG REFINED NECK
SMOOTH SLOPING SHOULDERS
CROP FREE FROM FLESH
LONG STRAIGHT BACK
DEEP BROAD BARREL
LONG BROAD LOIN
PROMINENT HIPS WELL APART
LONG STRAIGHT RUMP
PIN BONES PROMINENT WELL APART
LONG TAPERING TAIL
THIN THIGHS
HIND LEGS SET WELL APART
BROAD FOREHEAD
FACE MEDIUM LENGTH
BROAD MUZZLE
STRONG CLEAN CUT JAW
CLEAN THROAT
LIGHT BRISKET
STRAIGHT FORE LEGS SET WELL UNDER BODY
DEEP BROAD CHEST
MILK WELLS
LONG TORTUOUS MILK VEINS
LARGE WELL PLACED UDDER
TEATS RIGHT SIZE—FAR APART

Escutcheon — distinctly defined, spreading over thighs and extending well upward		1
Colour—red of any shade, brown, or these with white, mahogany and white, black and white, or white; each colour distinctly defined		2
Covering		6
Skin—of medium thickness, mellow and elastic	3	
Hair—soft and fine	2	
Secretions—oily, of rich brown or yellow colour	1	
Style—alert, vigorous, showing strong character; temperament mild		4
Weight—at maturity, from 800 lb. to 1,000 lb.		4
Total		100

SCALE OF POINTS FOR AYRSHIRE BULL.

Head		15
Forehead—broad and clearly defined	2	
Horn—strong at base, set wide apart, inclined upward	1	
Face—of medium length, clean-cut, showing facial veins	2	
Muzzle—broad and strong without coarseness	1	
Nostrils—large and open	2	
Jaws—wide at the base, and strong	1	
Eyes—moderately large, full and bright	2	
Ears—of medium size and fine, carried alert	1	
Expression—full of vigour, resolution, and masculinity	3	
Neck—of medium length, somewhat arched, large and strong in the muscles on top, inclined to flatness on sides, enlarging symmetrically towards the shoulders, throat clean and free from loose skin		8
Forequarters		15
Shoulders—strong, smoothly blending into body, with good distance through from point to point and fine on top	3	
Chest—low, deep, and full between and back of forelegs	8	
Brisket—deep, not too prominent, and with very little dewlap	2	
Legs and feet—legs well apart, straight and short, shanks fine and smooth, joints firm; feet of medium size, round, solid, and deep	2	
Body		18
Back—short and straight, chine strongly developed and open-jointed	5	
Loin—broad, strong, and level	4	
Ribs—long, broad, strong, well sprung, and wide apart	4	
Abdomen—large and deep, trimly held up with muscular development	4	
Flank—thin and arching	1	
Hindquarters		14
Rump—level and long from hooks to pin-bones	4	
Hooks—medium distance apart, proportionally narrower than in female, not rising above the level of the back	2	
Pin-bones—high, wide apart	2	
Thighs—thin, long, and wide apart	3	
Tail—fine, long, and set on a level with back	1	
Legs and feet—legs straight, set well apart, shanks fine and smooth; feet medium size, round, solid, and deep, not to cross in walking	2	
Scrotum—well developed and strongly carried		2
Rudimentaries, veins, &c.—teats of uniform size, squarely placed, wide apart, and free from scrotum; veins long, large, tortuous, with extensions entering large orifices; escutcheon pronounced and covering a large surface		4
Colour—red of any shade, brown, or these with white, mahogany and white, black and white, or white; each colour distinctly defined		3
Covering		7
Skin—medium thickness, mellow and elastic	4	
Hair—soft and fine	2	
Secretions—oily, of rich brown or yellow colour	1	
Style—active, vigorous, showing strong masculine character; temperament mild		10
Weight—at maturity, from 1,200 lb. to 1,500 lb.		4
Total		100

WERAROA EXPERIMENTAL FARM.

SOME members of the Empire Trades Commission visited the Weraroa Experimental Farm on the 8th instant. They were accompanied by delegates of the Wellington Chamber of Commerce, and at the farm they met

SIR RIDER HAGGARD INSPECTING A WERAROA HOLSTEIN BULL.

a number of representatives of the agricultural and pastoral interests. The stock commended itself specially to the visitors, Sir Rider Haggard expressing the opinion that the farm might well be proud of its Holstein herd.

The best margarine is now made entirely from nut-oils and milk instead of from animal-fats, and can be retailed at lower prices than the old oleo-margarine.—*British Trade Journal.*

In the list of qualified veterinary surgeons published in our last issue the degree of Mr. A. A. Johnson, of Christchurch, was given as M.R.C.V.S. It should have been F.R.C.V.S.

MILK-PRODUCING FOOD.

PRIMROSE MCCONNELL.

IN connection with the various crops of forage, an abundance of which is now available at the Ruakura Farm of Instruction, no feed seems to dominate another in the matter of milk-production. A balanced food has produced no more milk than a one-sided one. What seems to be required most is an abundant supply of succulent palatable food. Of all plants grown at this station (lucerne excepted) none is so much relished as maize. It has been found that when a full ration of green maize and peas is given, the cows eat the maize and reject the peas; while, on the other hand, horses eat a pea ration greedily. It has also been found that an addition of 2 lb. of bran to the forage ration increases the milk-yield by about a gallon per week. The present lucerne-paddock being a long way from the dairy, the feeding of this plant in the green state to dairy stock was not tested, but its value is too well known to need further proof.

IMPORTATION OF DOGS FROM UNITED KINGDOM.

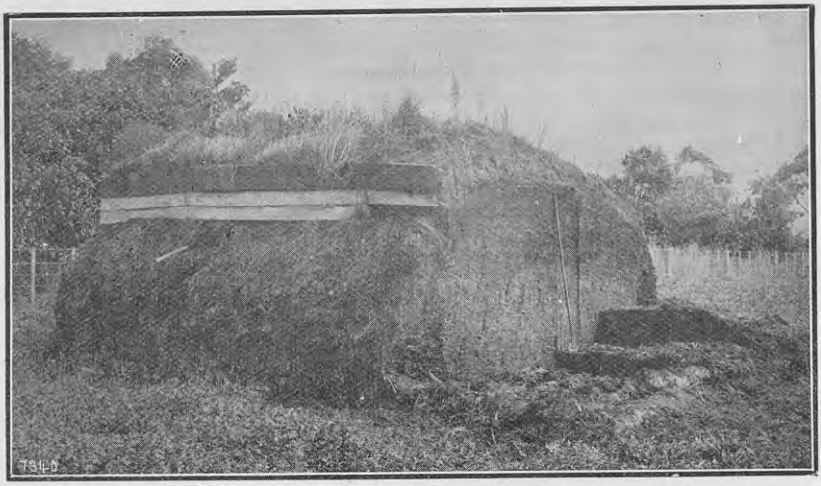
IT has been decided by the Government to reduce the period of quarantine to sixty days of dogs imported into New Zealand from the United Kingdom, dating from the time of removal of the animal to the quarantine-station. This concession, applying only to dogs coming from the United Kingdom, is subject to the furnishing by the shipper of a sworn declaration to the effect that the animal has been domiciled in the United Kingdom for not less than nine months (or, if under nine months of age, from birth), and that it is his belief that it is free from disease, and has not during the preceding nine months been in contact with any dog suffering from disease. The last portion of the declaration must be certified to by a qualified veterinary surgeon practising in the immediate neighbourhood of the dog's domicile.

In addition to the shipper's declaration, the usual certificate issued at the port of shipment by the Veterinarian acting for this Government must also be obtained.

Both declaration and veterinary certificate must accompany the animal to New Zealand.

LUCERNE ENSILAGE.

IN the month of December, 1911, a stack of ensilage was made from lucerne at the Moumahaki Experimental Farm, nothing being mixed with the lucerne for the purpose, though at the time there was a good proportion of sow-thistle growing in the crop. It was impossible at the time to make hay, owing to the very unfavourable weather; indeed, the silage was made in practically continuous rain. The stack, weighted merely with earth, was not disturbed till January of this year. When opened it was found that the material was as green as when stacked, while the aroma was excellent. Stock took it very readily, and it provided excellent succulent fodder in the dry months of the season. The weight of silage per cubic foot was 60 lb.



STACK OF LUCERNE ENSILAGE AT MOUMAHAKI EXPERIMENTAL FARM.

RUAKURA RUST-RESISTANT OAT.—Reporting on the progress of the Marton experimental plots, the *Farmers' Union Advocate* says, "The experiment where two or three rows of various kinds of oats were sown together with the rust-resistant oat in the middle is very interesting. It is not, however, very convincing, because there is so little rust on any of them. There is scarcely any on the Algerian, none on the rust-resistant, and little on any of the others. A friend who has just visited Moumahaki Farm says that a similar experiment is being tried there, and the result is very marked. Rust is bad on nearly all the others, whereas Green's Ruakura oat does not show a speck. This is very satisfactory, and if it proves a better-looking oat than the Algerian will be of great value. Curiously enough, the Ruakura oat is ready for cutting, whereas the others are all green."

SERIOUS DANGER TO NEW ZEALAND CHEESE INDUSTRY.

THE following circular letter by Mr. D. Cuddie, the Director of the Dairy-produce Division of the Department, has been sent to all dairy companies manufacturing cheese :—

GENTLEMEN,—

There are several most important matters connected with the present position of the cheese industry in this country which it is desired to bring under the notice of dairy companies and others concerned.

Since the warmer weather set in this season, much too large a percentage of inferior cheese has been exported from the Dominion. Unfortunately, this faulty produce has been more in evidence in cheese from the Provinces of Taranaki and Auckland, although that from other districts has been affected to some extent.

The early shipments of this class of cheese are now being marketed in London, and cable advice has reached us within the last few days from Mr. Wright, Inspector of New Zealand Dairy-produce in London, which confirms the judgment of our officers on the quality of the produce before it was loaded into the Home-going steamers. It appears that the trade is making serious complaint about the quality of our cheese at the present time. On examination at this end much of the produce was found to be of poor flavour, such as would undoubtedly increase with age. Then, again, the body of many of the cheese was too weak for an export article.

The faults that have been complained of can safely be put down to one or more of three causes—viz., (1) inferior milk, (2) over-anxiety to increase the yield of cheese, and (3) lack of cool storage and the unsatisfactory carriage of cheese to the final port in New Zealand.

As to the need for more care in handling the milk on many farms and the thorough cleansing of all dairy utensils, much has already been written and said on the subject. The experiences of the Dairy Instructors this year prove conclusively that there is yet a great deal of room for improvement in this connection. Many of the milking-machines in use have been found on inspection to be in a deplorably insanitary state, and in some cases parts of them have had to be taken to the factories for cleaning. There is not the slightest doubt that the dirty condition of a large number of these machines is a serious menance to our dairy industry. Some are found to be so very unclean that it would be impossible for milk to pass through them without becoming badly contaminated and so spoiled as to be totally unfit for the making of good cheese. The rejection of such milk at all costs is the only effective cure for this evil, and managers of factories should be given a free hand in the matter, in the interest not only of those who deliver sound milk to the factories, but of the reputation of the particular brand and the good name of New Zealand cheese.

The attempts that are being made to abnormally increase the yield of cheese are proving disastrous, and if continued will end in heavy financial loss. No further comment on this point is necessary, as the remedy is obvious.

At the present time I believe that cause No. 3 is even more serious than the other two; at least it is certainly so for about three months of the year, when the atmospheric temperature is high. In the first place there are many districts where the transport of cheese from factory-door to grading-port cannot be considered altogether satisfactory. The long cartage which is necessary in some places is undoubtedly harmful to the cheese. As a matter of fact, in one of the most important cheese districts in New Zealand those engaged in the business are without the conveniences of a railway, with the result that the produce has to be carted long distances in road wagons. Then, even in places which are conveniently served by a railway, there is at times a scarcity of proper closed-in vans for conveying cheese to the shipping-port, with the result that open trucks covered with taupaulins have to be used for the purpose.

The present position of affairs is greatly accentuated by the fact that the cheese industry has expanded so rapidly and to such dimensions as to have quite outgrown the facilities provided for the proper handling of the produce at some centres. The cool-storage accommodation available is altogether inadequate, and where it is provided in some cases it is not taken advantage of as fully as might be the case.

This season already—up to the 20th February last—some 20,407 tons of cheese have been exported from New Zealand, which is an increase of 30 per cent. on last year's figures for the same period. Surely, then, the value to this country of a trade of such dimensions would warrant the provision of proper cool stores wherever quantities of the produce have to be collected!

At Auckland and New Plymouth such stores are provided, although in some cases dairy companies have failed to make use of them, while at Patea the volume of cheese handled is so great that it is absolutely impossible for the freezing-works to store it all in cool chambers. At the Bluff no attempt is made to store the cheese at all, notwithstanding the fact that the industry has grown enormously in Southland during the last few years. It is true that a new cheese-store is being erected in Wellington; but, unfortunately, arrangements are not at present being made for controlling the temperature of it. Large quantities of cheese from both North and South are centralized in Wellington, much of which is carried to this port in steamers provided with absolutely no means of cooling the holds; and with such a valuable product as cheese this should be tolerated no longer. At present during the busy season thousands of tons of cheese are collected in the Wellington Harbour Board's sheds and held at ordinary temperatures while awaiting shipment, and in many instances it has been found that cheese bearing a first-grade stamp had deteriorated to second grade in quality before being placed on board the ocean-going vessels.

Although during the last few years many of our dairy companies have spent large sums of money in building up-to-date curing-rooms for their cheese, in which the produce is protected from excessive heat and the temperature maintained at a degree which gives the best results in the curing of cheese fresh from the hoops, it is a most regrettable statement to

have to make, although a true one, that in many instances the benefits derived from these places are being nullified by the treatment received by the cheese before finally leaving the Dominion.

The defects in the present arrangements, as outlined above, are most harmful to the industry, and steps should be taken immediately to alter the existing condition of affairs. Cheese is frequently loaded on to the oversea steamers in an unsatisfactory state owing to the want of proper cool-storage accommodation, and such produce must be some distance on the voyage before this unwanted heat becomes extracted. The time has come when all cheese shipped from the Dominion should be handled in exactly the same way as butter intended for export—that is to say, it should be in a proper cool store for at least four clear days prior to shipment, while all cheese from coastal ports should be carried in steamers having mechanically cooled chambers.

The question of proper cool storage and better transport arrangements for cheese is without doubt a most pressing one ; in fact, the existing lack in this connection is by far the weakest point in the industry to-day. The matter is one which calls for the attention of every cheese-making dairy company and cheese-factory proprietor in the Dominion, and it will require united action to bring about the improvements needed.

Damage to cheese of the nature mentioned above affects the Dominion as a whole ; and now that New Zealand is one of the leading cheese-exporting countries of the world, the matter cannot be ignored without heavy and continued loss to the producers of this Dominion.

Yours faithfully,

D. CUDDIE,

Director of Dairy-produce Division.

SANDON RYE-GRASS.—It is satisfactory to know that Sandon rye-grass of this season is of first-grade quality, both as regards bushel weight and germination. Sandon rye-grass can once again take its place among the best types of rye-grass produced in New Zealand. Farmers are particularly warned in buying Sandon rye-grass to insist on having 1913 seed. There is almost certain to be a considerable quantity of 1912 seed held over, much of which, owing to unfavourable harvest conditions, is of such an inferior nature that its use even at a cheap rate is an expensive proposition.—*A. H. Cockayne.*

While the imports of beef for the past year into Great Britain show a large increase, those of mutton are less. The total quantity of mutton imported was 5,021,529 cwt., against 5,330,070 cwt. in 1911, and 5,405,923 cwt. in 1910. Moreover, the Argentine, which has taken such an enormous lead in the supply of beef, has sent less mutton, her contribution having been 1,580,200 cwt., against 1,782,066 cwt. in 1911. The largest quantity ha. come from New Zealand, which shipped 2,165,433 cwt., against 1,981,467 cwt. Australia, on the other hand, sent 977,068 cwt., against 1,291,696 cwt.

THE HEMP INDUSTRY.

W. H. FERRIS.

UNSATISFACTORY QUALITY.

WITH many millers working for only high-point fair-grade, combined with a good percentage of diseased leaf in some phormium-areas, the quality of the fibre which reached the grading-stores last month was decidedly disappointing. This was practically confined to the Manawatu and Auckland districts. In several cases the stripping has been so unsatisfactory, thereby resulting in bruised fibre, that the hemp has only reached a common grade. Two or three Wairarapa mills have been short of water for washing purposes, with the result that the fibre has been badly stained. Consequently only a common grade could be awarded.

POOR SCUTCHING.

The most unsatisfactory feature of milling-work as disclosed by the grading of the past month has been the decidedly inferior scutching generally in evidence. Failure to scutch the fibre properly is a very serious defect, as it means that cordage-manufacturers cannot produce a twine free from lumps. The presence of these lumps in binder-twine causes the twine to break, and thereby delays reaping operations. The unsatisfactory scutching is solely due to careless work on the part of the scutcher. This defect in our fibre is undoubtedly prejudicing it in the eyes of manufacturers, especially those who have a profitable substitute available.

HAWKE'S BAY AND SOUTHERN MILLS DOING GOOD WORK.

Very little good-quality fibre came to hand from the Manawatu and Foxton mills. The best phormium has been forwarded by mills in Hawke's Bay, Marlborough, and Westland. I had the pleasure of grading 189 bales of fine-grade fibre in Hawke's Bay the other day—a beautifully stripped and prepared line from one of the cleanest and most uniform fields of phormium I have seen. This swamp is practically in its native state, there being only a few shallow drains in evidence. The leaf is therefore growing under natural conditions. There was not a speck in the leaf throughout the area, in strong contrast to the poor condition of the leaf in many of our over-drained swamps. The Marlborough hemp is generally of a very satisfactory standard. In only one case is a miller of that district turning

out a fair line, principally owing to the distance the leaf has to be carried, thereby inducing heating, which turns the leaf black and makes good dressing and colour impossible. Four or five millers have been securing a fine grade, and one miller has produced a "superior" line. The Westland mills are turning out a fibre of an excellent standard, generally reaching high-point good-fair. They have a good leaf to work with, and the milling of it is being conducted on sound lines.

SOUTHLAND MILLS WORKING UP-TO-DATE METHODS.

Southland millers are improving their methods of stripping, and, having installed automatic washing-machines, are turning out a free and good-coloured fibre, which has been commonly reaching high-pointed good-fair. One or two millers with a small output are obtaining a good-fair article under the old methods. They certainly, however, have a good leaf to work with, though this is rather on the short side.

UNSATISFACTORY TOW.

Tow is reaching the grading-stores in a very unsatisfactory condition, except in a few instances where millers are having it shaken well. Seeing there is an increasing demand for this by-product, it is most unsatisfactory to know that the quality is declining instead of advancing.

DEVELOPMENT IN THE SOUTH.

Just sixty mills have recommenced operations in Otago and Southland this season, after having been out of commission for five or six years. The output was considerably restricted during the month owing to unfavourable weather, which was also the cause of the fibre milled being of poor colour.

CANTERBURY FIBRE OF GOOD STANDARD.

The hemp being produced in the Canterbury district is of good quality. Little of it is being graded, as the bulk is being purchased by local cordage-manufacturers. Canterbury fibre is very well milled, the resulting thread being free, strong, of good colour, and well scutched. It is thought highly of for binder-twine purposes.

STRIPPER-SLIPS.

Altogether too much gum and vegetation is being left in stripper-slips. This gives the by-product a very bad colour, and thereby militates against its extended employment. In several cases millers have been packing the slips in a damp condition, which brings about a dangerous heating of the bales. Two or three lines have arrived at the grading-stores during the month in a very heated state, with the result that they had to be condemned for export.

APIARY WORK FOR APRIL.

F. A. JACOBSEN.

WITH summer on the wane and the approach of autumn bees will develop that restlessness peculiar to them. This is due, no doubt, to the lessening amount of nectar available. At this period every enthusiastic beekeeper watches carefully his stocks until Father Winter lulls these with compelling force into torpor. How different is this rest and quietude to the commotion of a few short weeks before, when millions of wings sang music and the golden harvest of honey was being transferred to the combs! The proverbial busy little bee unwillingly relinquishes work. Those which laboured so laboriously in the summer sunshine gathering what was necessary to rear the future generation did, in a few short weeks, win death as a reward, and when their wings were so worn as to make it difficult to fly they sought oblivion and crawled from their hive-entrance to die. Those remaining evidently knew the necessity to keep quiet and not exhaust themselves by fruitless labour, for they live through the cold winter months and still retain sufficient vitality to give the colony a fresh start when the flowers bloom in the spring.

So live the bees; and their pleasure is centred in industry. If a queen fails in her mission the workers plan to supersede her, and she is suffocated as soon as her rival emerges from the royal cell. They plan to increase and spread themselves over the country to gather its wealth of nectar and prevent this going to waste. Thus it is that several swarms often issue from one hive and seek fresh fields for their labours. The study of bee-culture is a charming one, and appeals strongly to those who pursue it. Every beekeeper should read "The Life of the Bee," by Maeterlinck, to fully appreciate the sagacity of these wonderful little beings.

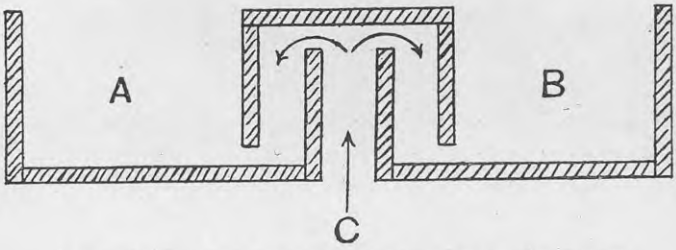
THE FEEDING QUESTION.

Colonies of bees under proper control frequently require attention in various ways, and at this period a few descriptive notes on different feeders may be helpful to those who have not seriously considered this question before. I will endeavour to explain as clearly as possible the advantages claimed for each respective feeder. The beekeeper can then decide which he should use. It is seldom necessary for those keeping only a few colonies to resort to their use, but the practical apiarist frequently finds it helpful to do something of this

kind occasionally, on account of non-productive seasons, to stimulate brood-rearing or to supply stores for winter consumption. It is always best, of course, to winter bees on sealed combs of good-quality honey. It certainly would not be wise to extract from the combs all the honey and feed sugar syrup as a substitute. This system would be foolish, yet sometimes would be preferable to leaving in the hives a very poor quality of honey, or honey-dew, which would be likely to cause severe losses through dysentery and its attendant evils. The best quality of sugar should be used, such as that bought for household purposes. Experiments have shown that this granulated kind is cheaper in the long-run than inferior qualities. It is not recommended to feed with molasses or sorghum, although some grades give fairly good results, but as a rule they are too stimulative and make the bees restless during winter. The simple method of making the syrup has been explained in a previous issue of the *Journal*.

THE MILLER.

For those who are desirous of supplying a sufficiently large quantity of provisions to last the bees right through the winter the Miller feeder would be the best. It enables about 25 lb. of stores to be fed at one time, which is a distinct advantage when a large quantity of colonies have an insufficient supply. It is made to fit completely



A AND B ARE FEED RESERVOIRS; C IS THE BEE-ENTRANCE.

over the brood-chamber and comes out flush with the super on all four sides, and the cover fits over this. Some are made to slide easily inside a super, and these are in many cases preferable, as they have a double wall to help preserve the heat in the warm syrup. They are made on the liquid-level principle, as the cross-section clearly shows.

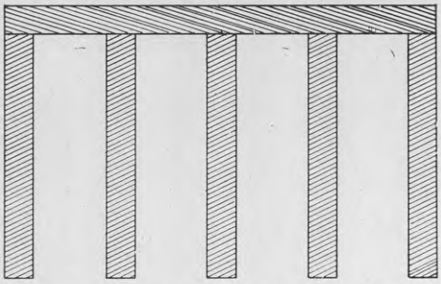
THE DOOLITTLE DIVISION-BOARD FEEDER.

This feeder is neither more nor less than a large brood-frame boarded up on each side nearly to the top. Down through the centre runs a partition nearly to the bottom. A hole is bored through the top bar, through which the feed is poured. This method of working is very convenient. The feeder may be placed right

alongside the bee cluster without disturbing the bees. When a refill is required all that is necessary is to push the cover a little to one side and quietly pour in the syrup.

THE ALEXANDER FEEDER.

The Alexander is a feeder that is very convenient, and is popular for outdoor working. It may be left under the hive the whole season, and so could be used at any time for stimulative or other feeding. It is in the form of a trough, and when the brood-chamber is pulled

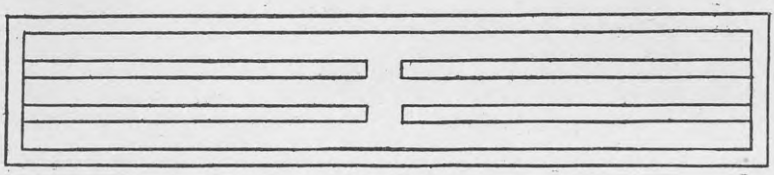


THE ALEXANDER FEEDER.

back over the end of the bottom board it is blocked up underneath, with the end protruding past the side of the brood-chamber. Over this end is placed a wooden block, which is only removed for the purpose of refilling. All work with this kind is exceedingly simple and speedy.

THE SIMPLICITY.

This feeder is most extensively used, and is simple, and cheap in price. When not in use numbers of them may be packed into a



TOP VIEW OF THE SIMPLICITY. MADE ON THE SAME PRINCIPLE AS THE ALEXANDER, BUT SMALLER.

very small space. They are good for stimulating brood-rearing, and occupy very little room on top of the frames. When flat covers are used in the apiary, however, this style of feeder cannot be adopted.

PEPPER-BOX FEEDER.

This is simply a can with a finely perforated top. When filled it is inverted and set directly over the top of the brood-frames. The

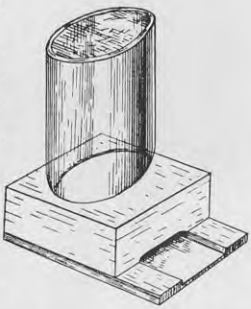
syrup slowly drains through the perforations, and is immediately sucked up by the bees.

THE BOARDMAN STYLE.

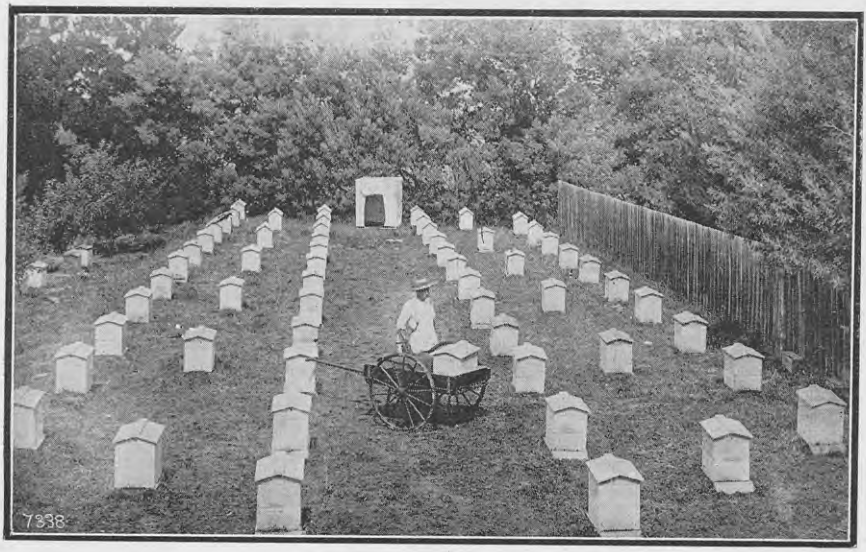
This is an entrance feeder, and makes use of the common Mason jar, which fits on to a box arrangement. The sides of the box are made to project some distance into the hive, thus guarding against robbers. A special cap is necessary for the jar, and is sold by bee-supply manufacturers, who also supply the box which completes the feeder.

The advantage with these is that one can see at a glance how quickly the bees are taking the syrup and when the jars need refilling.

It is seldom so cold in the Dominion that it is necessary to feed candy in place of syrup, but sometimes the beekeeper has been careless and finds his bees require nourishment during a cold snap. If the temperature is exceptionally low the bees may not be able to crawl away after syrup. It is, therefore, well to place a cake of candy immediately over the cluster without disturbing it, thus conserving the heat of the hive as much as possible. It will be found that the bees will eat this, and that it will probably keep them going until the warmer weather commences.



THE BOARDMAN, AS USED WHEN ENTRANCE FEEDING.



A WELL-ARRANGED APIARY.

ORCHARD WORK FOR APRIL.

W. A. BOUCHER.

WITH the exception of the gathering and storing, or packing and shipping, of late varieties of apples and pears, the most important of the summer work in the orchard will have been completed. Still, as the time for undertaking important winter work is approaching, it would be as well to arrange for procuring such supplies of red oil, bluestone, &c., as may be required for the winter spraying.

The use of a red-oil spray for the control of mussel scale, red spider, and woolly aphis has proved very effective, as well as for the control of red spider on peaches, but it may be as well for the benefit of new subscribers to repeat a warning already given in this *Journal* with regard to the use of red-oil sprays. The winter strength should only be applied when the trees are quite dormant. To spray too early before the growth of the season has become properly ripened, especially in the case of peaches, will probably produce disastrous results.

CULTIVATION.

As the trees of most classes of fruits are now approaching a dormant condition, they will derive no further benefit from the cultivation of the soil during the current season. Soil-working in established orchards may therefore be allowed to cease for a time.

COVER-CROPS FOR ORCHARDS.

Attention was drawn in the last issue of this *Journal* to the necessity of planting at intervals a cover-crop of some kind in order to restore to the soil the humus which becomes exhausted after a period of systematic and thorough cultivation. If such a crop has not been planted earlier in the season, rape or mustard may still be sown with advantage for ploughing under in the spring. Both are hardy and will make good growth under conditions which would be altogether unfavourable to other vegetation that might be selected for cover-crops.

PLANTING NEW ORCHARDS.

There are but few districts in this Dominion where shelter from prevailing winds is not an important factor in connection with the

planting of an orchard. If shelter has not been provided, it may even be preferable in some localities to postpone the planting of an orchard for a season, set out the necessary shelter-belts, and by manuring and cultivation induce a maximum of growth, so that when the orchard-trees are planted the shelter-belts will already have become well established.

There are two periods when the planting of new orchards may be carried out—autumn and spring. Many growers prefer autumn to spring planting, but it must be remembered that in any case the condition of the soil at the time of planting is a most important consideration. In some seasons when persistent rainfall sets in early the soil becomes and remains wet and cold, just at the time when the planter has intended to set out his orchard. In such instances planting should be deferred until spring. In the meantime the trees should be heeled in, a well-drained block of land being selected for the purpose.

The preparation of the land for the planting of an orchard should be very thoroughly carried out. Intending planters should never lose sight of the fact that an orchard is intended to be practically permanent, and that mistakes made prior to planting cannot be easily rectified afterwards. Drainage is, of course, most important. In some instances tile draining to take the water away from low-lying spots may be necessary, but as much of the land that is now being planted is undulating, thus affording natural drainage, tile draining will not be required to any great extent. With few exceptions the land should be deeply worked and well subsoiled, for in districts where the rainfall is not necessarily heavy but at times persistent, even hillside land will lie very wet often for some little time if the soil has only been lightly ploughed.

STRAWBERRY-PLANTING.

The foregoing remarks with regard to the preparation of the land for an orchard apply equally well to the preparation of land for strawberry-culture, if the grower desires to secure the best possible return from his beds. The plants should be set out when the soil is moist, but in good friable condition. In some districts the month of April is the most suitable time for planting, in others the month of May. As in many localities the strawberry is very subject to attack by leaf-spot (*Sphærella fragariæ*), during the winter months it is advisable to spray the young plants soon after they have become well established with the Bordeaux mixture, summer formula.

VINEYARD WORK FOR APRIL.

S. F. ANDERSON.

MARCH and April are busy months with the winemaker. Provided the good weather continues the Pinots (Gris, Meunier, and Noir) and Golden Chasselas will be ripe this month, followed by Malbec, Shiraz, Pinot Chardonay, Carbenet Sauvignon, Pedro Ximenes, &c., a little later.

It is no new statement to make that ripe grapes contain all the elements for making a sound and good-keeping wine, provided the utensils used are clean and the methods employed are such as one would expect in making an article for consumption.

Every winemaker should be provided with a saccharometer, to enable him to tell the saccharine-content of the grapes. Any grape showing up to 20 per cent. by this instrument will make a wine that will keep—that is, a good dry wine. Many kinds of grapes will in a dry season exceed this, such as the three Pinots above mentioned, Pedro Ximenes, Shiraz, &c., but they must be quite ripe. Rainy weather and the depredations of birds very often cause the vine-grower to commence the vintage before the fully ripe stage is reached. It is, however, doubtful whether the loss by birds and rain is as great as the loss in quality of the wine by gathering the grapes too soon. The making of wine from grapes thoroughly ripe is simple, rapid, and every way satisfactory in our climate, compared with that of making wine from grapes insufficiently ripened, and where sugar has to be added to the must to bring up the saccharine to the normal requirements. In the case of the former fermentation is over in from forty-eight to seventy-two hours, in the latter it may last a month.

Where the quantity of grapes is not large—say, from 1 to 3 acres—it is a good plan after picking to spread out the grapes on a floor for twenty-four hours or longer, to let them cool and evaporate any moisture. If the sugar-percentage is low and a drying wind blowing, they might be left some days before crushing.

VINE-HOUSE WORK FOR APRIL.

With the exception of the late grapes, most of the vine-houses will be cleared this month. If it happens to be warm and mealy-bug

exists, an opportunity occurs for dealing with this pest by cyaniding. The usual formula may be used, but the gas can be left on all night.

The mildew may also receive a final sulphuring. A good dressing now may considerably lessen the chances of trouble next season. It happens sometimes that a new house may be very bad with mildew for the first year, and if well sulphured may not be troubled for years afterwards, but it is a safe plan to be before it in the spring with the sulphurator. Vines should now be left to grow all they will until winter—the more rampant the better, as they are recuperating after the heavy cropping and stopping of the foliage during the fruiting-period.

THE SULPHURING OF VINES UNDER GLASS.

Mildew (*Oidium Tuckerii*) may always be expected, and this grape season it has been more than usually prevalent. The most effectual remedy known for this fungoid disease is sulphur. There are only two ways in which sulphur can be applied to vines without injuring the foliage. The first is by dusting or blowing the flowers-of-sulphur direct on to the foliage and fruit, making it come in contact with every portion of the plant. The second is where a vine-house is heated by hot-water pipes. In this case the pipes may be coated with a paint made of lime-water and sulphur. The heat of these pipes will not exceed 212° Fahr., and it will probably range from 160° to 200°. Between these temperatures sulphur is slightly volatile, and is driven off and deposited in very fine particles on the vines.

Where a vine-house is heated by flues or steam-pipes the heat would be greater than 212° Fahr., and this coating of them with sulphur would cause sulphur-dioxide fumes, which is the same as burning sulphur, and is very destructive to vegetation.

The mistake of burning sulphur in a vine-house to stop mildew is rather frequently made, but always with the result of destroying foliage and fruit. A light dusting with the hand or a sulphurator soon after the leaves unfold, and at intervals up to the colouring of the berries, is the most effectual remedy known, and no harm can be done.

The new orchards around Nelson, especially the great extension about the Moutere Inlet, are looking particularly well this season. A Canadian horticulturist who recently visited the district was very much struck with the remarkable growth made this season, which was, he said, in marked contrast to the annual growth made by apple-trees in Canada. He was much impressed with the possibilities of the district from a fruitgrowing point of view.

THE FARM GARDEN.

W. H. TAYLOR.

VEGETABLE-CULTURE.

FOR the guidance of those who may wish to grow for a special purpose some details are given regarding the time required to produce various vegetables and the probable duration or currency of the crops.

Broad Beans.—Sow in May or early in June. Gathering should begin early in November. Another sowing may be made during November. The two sowings will provide beans till April or May.

French Beans are ready for use in about sixty days from the time of sowing. The average currency of a crop is from four to five weeks. The first sowing should be made early in October, the last early in February.

Runner Beans.—Sow early in October. They take about eighty days. If the crop is kept closely gathered one sowing is sufficient.

Cabbages. — Sow on 1st April. The first of them will be ready early in November. Seed sown in spring or summer produces heads in about twenty weeks. Three sowings—1st April, 15th October, and 1st December—will provide for the year.

Cauliflowers.—Sow both an early and a late variety on 1st April. The early will be in use in November; the late will begin to come in about Christmas. Sown in spring, they take about six months to mature.

Red Beet.—The turnip-rooted varieties are fit for use in sixty-five days from sowing. The long varieties take upwards of a hundred days. Sow the first kind at the end of August and the long sorts in the middle of November.

Broccoli.—Sow from 15th September to the end of October. These may be available from May to December if the right sorts are sown.

Carrots take about a hundred days to reach usable size. Sow early in spring, and early in November for a year's supply.

Lettuce.—Sow on 1st April and transplant in spring. They are ready early in November and have a currency of about four weeks. Sow again in August to succeed the first crop, and again monthly till February. In summer lettuces are fit to cut in from ten to twelve weeks from sowing the seed.

Onions.—Sow large kinds on 1st April. They are fit for use as salading all the winter. Transplant in the spring for large bulbs,

which are fully grown early in March. Sow keeping-varieties in July or August, not to be transplanted. These should be ripe in March. Sow for pickling in November—they will be ready in March.

Parsnips may be sown from August till November, according as they are wanted, early or late. They take about 140 days from seed to a good table size.

Peas.—These take on an average about 120 days to come into use, the time varying with varieties—dwarf, medium, and tall, the last named requiring nearly 140 days. The currency of a crop is about two weeks with dwarf and medium-height sorts, but often four weeks with tall varieties.

Radish.—These are usually fit for use in about twenty-eight days from sowing. A bed may be considered good for two weeks.

Turnips.—In use about sixty days from sowing. The currency of a crop is about sixty days, except that the winter crop is fit for use till they bolt to seed in August.

The above particulars are as accurate as can be stated. It must be understood that local conditions—varying weather, quality of soil, and varieties—all exercise their influence in preventing an absolutely accurate statement. It will, however, be found reliable enough for working purposes.

Leeks may still be planted if it is thought the supply will be deficient; they will not attain large size. A little nitrate of soda will help them to get into growth quickly. Allow the plants to get a fresh start before applying the nitrate; then, on a rainy day, put about a teaspoonful near each plant. Keep weeds away from those planted earlier, and keep the soil loose about them. Soot is a most valuable manure for leeks—for almost everything, in fact. A light dusting may be given occasionally all over the surface of the soil, if that is in a proper condition. The first rain will wash the soot in. Basic slag I have found to have a marked effect on onions, so it must be good for leeks. A slight dusting over all the surface soil may be given.

Turnip-seed may be put in up to the end of the first week in April for the winter supply. Though a later date sometimes answers, there is some risk attending it; still, it must be understood that it is advisable to delay the sowing as late as is reasonable—a rule proved safe by past experience, for if sown too early the turnips get overgrown, and will not stand long enough. It is wise to sow two kinds—a white (Snowball) and a yellow-fleshed (Golden Ball or Orange Jelly). The yellow-fleshed varieties, though rather poor in flavour in summer-time, are quite excellent in winter, and usually remain firm longer than the white-fleshed varieties. Overgrowing in turnips is sometimes caused by giving them too much room. This is very likely

to happen if they are thinned to a single line. It is better to leave them somewhat crowded, several deep rather than in single line. It is surprising how well they do when crowded and the quantity a given space will produce. Market growers practise this method. It requires a little practice to know just how thick to leave the plants; it is certainly difficult to describe it.

Sow *cabbage*, *cauliflower*, and *lettuce* for the early spring crops. The cabbage selected should be one of the many early varieties. Among those commonly on the market are Early Etamps, Early York, Large York, Lamb's Earliest of All, and Enfield Market. As a small early I have found Lamb's the best of these, and would grow Enfield Market with it, or Large York in preference to Lamb's if size would be of more value than an earlier supply. Enfield Market will be in cut two or three weeks later, and is best for quantity. Two kinds of cauliflower are usually sown—one of the Early London type, and a giant kind. Some of the so-called earlies are not exactly early. Early Erfurt, for instance, is not a true early—that is, if the seed supplied is true. True earlies are somewhat precocious, and are frequently difficult to manage to prevent premature buttoning, but they provide the only opportunity to get early cauliflowers. Lettuce of any good cabbage variety may be sown. If ground can be spared to sow some in lines, to be thinned out in lieu of transplanting, they are pretty sure to be fit for use several months before those sown in beds for transplanting.

Onion-seed should be also sown about the 1st April, the time the foregoing should be sown. I will here venture a caution against sowing early in the hope of getting the produce earlier in spring. Better be a week later than a week earlier, for there is considerable danger of premature flowering if there is too much autumn weather after sowing the seed. These remarks apply to all the varieties above enumerated. Onions will mostly be harvested by now. Be sure they are thoroughly dry when stored. They keep longest when made up in strings or tied along sticks, so that they can be hung up. It is quite worth while to treat a few of the best in this way. They should be hung up where they will be dry; the cooler the place the better.

Dried herbs are often useful in winter for flavouring soups, &c. Mint, thyme, savoury, and marjoram are usually cut for drying while they are in flower, thus indicating maturity of foliage. Sage and parsley are chosen from well-developed leaves. The way to dry herbs is to tie them in fairly large bunches and suspend them from a ceiling in a dry room or shed, and pass the suspending string through a sheet of paper, which is to be allowed to droop over the bunch so as to catch dust, and thus keep the herbs clean. When they are thoroughly dry the bunches may be put in paper bags and laid on a shelf.

Brussels sprouts are frequently at this time attacked by a grey-coloured aphis, which, if unchecked, speedily puts an end to them. It is easily destroyed by syringing them with boiling water. Use an ordinary garden syringe and apply with plenty of force. Keep the ground well hoed between growing crops of cabbages, broccoli, &c. This keeps the soil open and ready for rain, and ensures that when the rainy season sets in, as it soon will, it will find the ground free of weeds and in a condition that will allow it to sink in readily. Frequent working of the ground has also some effect in checking the ravages of the caterpillar of the diamond-back moth, for when disturbed many of them drop to the ground, and if they are buried by the hoe they cannot rise again.

SMALL FRUIT.

Sow *Cape gooseberry* seed in boxes. The young plants should be pricked off into other boxes, and kept under shelter till danger of frost is past in spring. It is important that strong plants be secured for planting, otherwise the first season's crop of fruit is likely to be small.

Strawberry runners should be taken off as soon as there is moisture enough in the soil to re-establish them in nurse-beds. If the foliage on established beds is diseased, it should all be mown off, gathered up, and burned. Some authorities of repute advise that in such cases the whole plantation should be burned over. To effect this a light covering of straw is applied, unless a mulch has been employed, which may now supply material for the purpose. In any case the foliage should be cut off first, but if the bed is to be burned over there is no need to remove it. Let it dry a little and all will burn together. This appears to be a rather drastic measure, but it is said that the plants break up again with remarkable vigour. Discrimination is doubtless necessary in determining the thickness of cover to burn.

FLOWER-GARDEN.

Chrysanthemums will be showing buds. The plants should be properly secured to stakes. Growth is very rapid about this time, and if the plants are not properly secured to their supports the branches become twisted and cannot be satisfactorily lifted afterwards. If the plants have several main stems these should be spread out, not bunched up indiscriminately to one stake. It is advisable to thin the buds in most instances. No amount of thinning at this time will cause the production of large blooms, but it will increase the size and prevent overcrowding with small blooms. The object of thinning should be to reduce the number of flowers on a spray to reasonable limits, not to destroy its contour.

Anemone-plants raised from seed may, if strong enough, be planted out as soon as the soil is well soaked with rain. It is not likely to get very dry again. The class of anemone most commonly grown here is the St. Bridgid strain, double and single. Anemone Fulgens is a quite distinct flower, having narrow pointed petals of vivid scarlet. Being a very effective plant-flower for decorating or garden ornamentation, it is well worth growing. Tubers may be purchased. They increase fairly rapidly with ordinary care.

Sow by the beginning of next month—April—such seeds of biennial plants as may yet be held over—Dianthus and other things mentioned in last month's *Journal*. *Pansies* may be also sown, as these will provide the early blooms, the best of the season. Where they are appreciated they should now be sown in quantity, a number of varieties rather than many of one strain. The plants are to be kept under glass till well established after pricking off. Then put them outside till they are ready for planting and the beds are ready for them.

All the *primrose* family, which includes polyanthus, may be planted as soon as the ground is in a fit state of moisture. Where clumps have become matted, or the soil becomes poor, they should be lifted, broken in pieces, and replanted in well-prepared soil moderately enriched with manure.

It is not well to transplant *violets* at this time except for purposes of convenience. They seldom flower well if planted in autumn—possibly I might say they never do; still, they will flower more or less. There may be no harm in doing so in some cases, but in general and proper practice immediately after flowering in spring is the correct time. They then become established and are ready for flowering the next season. These will be dealt with in a later article.

Propagation of plants for next season by cuttings should be undertaken now. Where carpet bedding, or adaptations of it, is carried out, iresines, altenantheras, and variegated ice-plant will require to be taken before frost comes. They must be rooted under glass and kept from frost.

Verbena-cuttings will root readily in a close frame in a greenhouse. The proper wood for cuttings is young shoots that have not flowered. Take them about 3 in. long, remove the lower leaves and dibble them close together in boxes of light soil surfaced with sand, water through a fine rose, and let them dry somewhat before closing the frame.

Pentstemons of the later gloxinia-flowered type are very fine garden plants, quite unlike the older forms. They require renewing every second or third year or they get scraggy and worn, and the flowers

deteriorate in quality. Cuttings may be rooted in several ways and at various times. The best plan for the amateur is to strike them in the open ground in a well-sheltered and semi-shady place. Cuttings must be of unflowered shoots, 4 in. or 5 in. long, the lower two or three pairs of leaves removed, and the shoot cut squarely across just below, not through, a joint. Wait till the weather cools a bit before putting them in. The old-fashioned blue Ageratum can be rooted in the same way.

Shrubby calceolarias, meaning those that grow in the garden, can be struck from cuttings with the greatest ease if they are put in at the right time. Cuttings about 3 in. long, prepared as described for pentstemons, may be inserted in May in a cool part of the garden. Surface the soil with sand first. Every cutting will grow.

Hardy annuals of all kinds may be sown in the open ground during March and early April.

Preparations for Planting.—When the next number of the *Journal* is issued it will be time to begin general planting, therefore a few words in regard to preparation may not be out of place. It is always a mistake to begin before you are ready. When a thing is not done in its proper sequence it most frequently is never done at all. Before beginning to plant a garden it should be determined what ought to be done by way of preparation, and then do it. Maybe it wants draining. If you do not put drains in before planting, it is very unlikely you will ever do so. Draining is the first thing to attend to. If a proper fall can be secured there is no difficulty; put the drains in deep enough to be out of the reach of tree-roots. It is seldom safe to make them less than 3 ft. deep. If the subsoil is hard or of a clayey nature it is generally necessary to trench, and it is always best to do so. When trenching, keep the layers of soil in the same relative positions they now occupy—that is, keep the top on top. I have heard men argue that the top should be underneath, giving as a reason that when shrubs are planted they are not planted in the top soil. This has always proved good logic but very bad practice.

Presuming a plot of ground is to be laid out in grass, beds, and paths, then the whole patch should be trenched, thus securing uniformity of texture for rain to sink through. Beds laid out on untrenched land, unless they are specially drained, become mere water-holes. Paths left solid dam the water instead of helping it off. In countries where this kind of work is always properly done the paths are so constructed as to drain the land contiguous to them. The whole block is trenched, loose soil is thrown out of the path, pipes laid along the side, then 12 in. of rough metal and a covering of gravel. These paths are finished at a lower level than the lawn or garden; they are always dry, and are seldom weedy.

THE POULTRY INDUSTRY.

F. C. BROWN.

APRIL WORK.

APRIL is a month of the year when the pullet must be depended on for the main egg-yield. The majority of the old birds are passing through the moult, and will not lay well till the latter end of winter and in spring. Obviously the main objective at the present time is to give the pullets every opportunity to produce the dear-season egg. They should, of course, be now well settled in their winter quarters, for changing pullets from house to house after they have commenced to lay is only inviting the moulting process. They should be receiving a plentiful supply of good food, with green material in abundance. The meat ration should, where possible, be given by itself at a regular time—say, at midday; though where meat substitutes have to be fed, these can be supplied with the morning mash. It is unwise, however, to provide the same proportion of meat food to every member of the flock irrespective of the individual egg-laying capacity. I have seen a pen of six record layers ravenously eat up a 1 lb. piece of boiled liver, while an adjoining pen of six poor layers would not touch the meat. This was a repeated occurrence not only with the pens in question, but with other pens of varying egg-producing capacity. In the case cited the heavy-laying birds ate up every particle of the 1 lb. weight of liver day after day without any harmful effect, and this in face of the fact that the hot morning mash was mixed with meat-soup. The result was that they established a record in egg-yield and were in excellent condition at the end of their season of exceptional production. In feeding meat substitutes great care is necessary to guard against ill effects following the feeding of the concentrated nitrogenous material. It is not to be supposed that only heavy layers have ovarian troubles, generally the result of an over-supply of blood-meal. I have seen one of the poorest layers in a flock affected with this trouble. She had been forced to eat in her morning mash a much higher proportion of blood-meal than her nature demanded, and with the inevitable result.

Green food is always a necessary accompaniment to healthy and vigorous stock, to say nothing of the rich yolk colour always to be found where the birds have a plentiful supply of green stuff. There is nothing better than watercress. The best-looking flocks I have seen lately have been receiving liberal supplies of this cheap food material.

One man who secures a cartload of watercress a day has his pullets laying at top, and his flock in the pink of condition; his eggs have a most attractive yolk colour, and he finds the cress an excellent means of reducing his feed bill. The cress is chaffed and fed separately in troughs. It is little economies like this that go to make up the difference between profit and loss.

If eggs are to be produced in winter good feeding is imperative. It is desirable, of course, to produce them at the lowest possible cost, but this principle can be carried too far. If eggs are to be secured in heavy supply in cold weather the birds must be kept at concert pitch, and the best means of doing this is to provide the birds with an abundant supply of the most desirable foods. I have seen pig-potatoes and waste vegetables boiled up and mixed with a little pollard as a morning mash. Neither did the owner feed any animal food. He complained that his fowls were not paying although from a great laying strain. It would have been surprising had they done so. The best layer will not be profitable if she has not the necessary material from which to produce her special egg-yield. Of course, the poor layer will not be profitable if fed on the ration demanded by the bird of heavy-laying strain. It is a commonly accepted rule with all classes of stock that if the maximum results are to be secured the animal capable of it must be fed to the very best advantage. The day is gone for the argument to hold water that a fowl is too fat to lay. If she becomes fat she is not a high-type layer, for the bird capable of laying two hundred eggs or over in the season cannot be overfed, even if an ample supply of the right class of food is always before her. Of course, her natural tendency to lay eggs may be checked and her energy diverted to flesh and fat formation if she is provided with the wrong class of food—with a sloppy innutritious ration, instead of a balanced and concentrated diet including a safe proportion of nitrogenous material.

It cannot be expected that pullets will lay well in cold weather unless they have everything in their favour. They must be quartered in dry, roomy houses where no vermin is allowed to live. They should be also managed intelligently. Never allow them to wait about in a wet yard on a cold morning for their breakfast. Feed them in the house at all times, throwing the evening grain in litter. They will have something to scratch for in the early morning—and thus obtain the necessary exercise—in the grains of corn left from the evening meal. The scratching-quarters should be roomy enough to comfortably accommodate all the birds, so that in cold and wet weather they need not go into the runs at all; but it is not advisable to keep the layers continually confined. If the quarters are comfortable, and the birds are habitually fed and watered in them, they will only go out in

favourable weather. Of course, it is possible to keep laying birds always under cover, but I prefer to believe that the birds will be more healthy and vigorous if given every opportunity to use runs in decent weather.

ADVANCING UTILITY TYPE.

If the laying competitions have taught one lesson more convincing than another it is the important bearing of the moulting-period on profitable production. The bird that holds out longest—the most persistent layer—is the bird that is in the lead in the competitions; in other words, the first bird to moult is too often the last bird when the year's yields come to be published; and the experience of the laying competitions is being repeated on private plants all over the country. I was visiting a poultryman the other day who complained to me that his last season's pullets have not given the same yield as did those of the previous season — in fact, they were going into a deep moult. This was the second week in February. I went carefully through the flock, and noticed that a fair percentage exhibited no sign of moult—in fact, they were still laying heavily. I made the pointed remark that there were a good many birds in the flock which were worth breeding from—the best of these late moulters; but the owner disagreed with me, although he admitted that the birds in question were laying heavily, and were therefore probably among his most profitable layers. But the birds in a heavy moult had come from a particular breeder, and he therefore intended to breed from them—this notwithstanding they had no laying pedigree behind them. I am afraid this is a common mistake. If nothing is known about the laying ancestry of a fowl, she assuredly must be judged on her own performance, and there is no better rough guide to performance than the time at which she moults, and the extent of that moult.

When we speak of pedigree of performance, it must be understood that the egg-record not only of the mother but that of the mother of the father must be known. Of course, there are birds, however desirable the pedigree possessed, which fail to come up to the standard, and must be culled, for there are wasters in the purest strains ever bred. It should be also clearly understood that it is not always the best performer that is the best breeder. It is an accepted principle by all who have concerned themselves in the advancement of types in the animal kingdom that it is only the type which has been bred true to a given ideal from generation to generation which has the power to transmit desired characters. It will often be found that the medium layer, descended in the right way and built on the right lines, is the more desirable stock bird. Take the characteristics to be looked for in their respective order of merit: 1, Constitution; 2, pedigree of performance;

3, individual performance; 4, possession of utility characters; 5, trueness of type. Or, more briefly put, laying-capacity and possession of the desired constitutional, utility, and breed points. The common argument I have been met with in laying down these principles to individual breeders is, "Oh! I have had a layer, the best bird on the nest I ever saw, and she was nothing to look at either as a layer or a type of the breed." This may be true enough; but "one swallow does not make a summer." There are freaks and exceptional animals in all classes of stock, but these do not prove a principle to be wrong; they merely constitute the exception which proves the rule.

After all, it is not the single high-type individual we are after so much as a flock of them; nor even the swell competition-pen which can put up a record and which is the selected half-dozen from a flock of hundreds. The objective of the poultryman should be to breed a flock of sturdy layers of a uniform type which plainly exhibit the desired points referred to—constitution, laying-power, and breed characters. It is no easy matter to attain this ideal, and it is even more difficult to perpetuate the type when once it has been secured. Too much importance cannot be attached to constant study of the egg-yielding type, so that the layer may be distinguished at a glance. When this facility is attained all else will follow. There is a limit, of course, to all things, and if everything is sacrificed to egg-yield something will suffer. Constitution will be weakened, the size of the eggs will decline, ovarian troubles will be intensified, and the difficulty of rearing vigorous stock will be increased. The danger in improving a character by weakening another should always be kept in mind, and while aiming at the ideal laying form see that other important features are not sacrificed in the process. There is a limit to which we can go in the laying-capacity of a bird, and if phenomenal layers only are looked for, the power responsible for it will weaken with the poorer constitution which must result.

The laying competitions have done good work, but they are capable of working much harm. It is high time the chief honours were awarded to the birds producing the greatest weight of eggs in the year rather than the largest number. The consumer will soon protest against paying full market rates for miniature eggs. With the prevailing tendency I can see a revival in some of the old popular breeds, such as the original type of Minorca, by reason of the fine large eggs they produce, especially when the market value of eggs is fixed according to quality rather than on the mixed and doubtful lines sold through the city auction-rooms.

The best thing the laying competitions have done has been to expose the show monstrosities. In the earlier competitions it was proved that

the utility type of White Leghorn could lay well over two hundred eggs in the year. This fact has not been added to, while the striving after higher records has reduced the value of many strains of White Leghorns by bringing about deterioration in the size of the eggs they produce.

It should hardly be necessary to again emphasize the importance of proper feeding and careful management if a flock of laying-birds is to be made really profitable.

CONSTITUTION.

The problem of the age is the maintenance of constitution. In a state of nature constitution is effectively maintained—the strongest male selects the best breeding female by reason of brute force. With the advent of civilization and man's interference with the breeding of the animals he has domesticated, natural selection is rendered impossible, and man has not the wit nor the knowledge to mate according to nature's dictation.

The history of the domestic fowl is a striking instance. With the natural process of selection impossible, we have improved the egg-yielding capacity to such an extent that every ounce of stamina is demanded if the modern high-type layer is to continue its great artificial production without bringing about its deterioration. The fact cannot be too strongly emphasized that the greater demands we make on a fowl by way of egg-yield the greater the care we must exercise in seeing that her vigour is not impaired in the process, while we must take every means to see that she has all the care and attention (particularly in the matter of housing and feeding) which she demands if she is to produce her maximum and if her breeding-power is not to be lowered. Disease is the thing the poultryman has most to fear, and we know that the more we remove an animal from natural conditions of life and production the greater the tendency to contract disease. The best way to fight disease is by never allowing the constitution to deteriorate, and to house the birds in fresh air but draught-proof and roomy quarters, and feed them liberally with sound and suitable food. The more artificial the animal the greater the care demanded of the owner, and there is no domestic animal of a more artificial type than the New-Zealand-bred egg stamp of White Leghorn.

In many tribes of farm stock breeders have attained almost an ideal in a certain character of an animal, only to find that their life's work has been thrown away, because in the process they neglected constitution. Breeders of utility poultry stock should heed the lesson and see to it that in aiming for extreme egg-production they do not neglect the vital consideration of constitution, or the power of production without

deterioration of the animal vigour. It has been declared that the heavy-laying White Leghorn known to this country is weaker in constitution than the type from which it sprang. This is an exaggeration. While no doubt some strains are exhibiting the effect of striving for yield alone, in reduced size of fowl and egg, there are still strains in the country which retain the needed stamina with great productive power. The warning, however, is there. If we would permanently succeed we must consider something other than performance, for we can attain productive capacity at too great a cost.

AMERICAN POULTRY INDUSTRY.

According to the annual report of the United States Department of Agriculture, there were produced in America in 1912 1,700,000,000 dozen eggs, valued at £70,000,000, while the total value of the product of the hen was stated to be £114,000,000. And yet in the first national egg-laying competition held in the States and concluded on the 1st November last the winning pen only laid 160 eggs per hen.

THINGS TO BE REMEMBERED.

The male sound in wind has mostly a clear, loud crow without a broken note at the end of it.

From a breeding point of view good results can be obtained by feeding the birds on mixed whole grains night and morning.

If eggs containing dead germs have to be tested out at different periods it is obvious something is wrong with the breeding-pens.

When breeding for egg-production don't sacrifice constitutional vigour to maintain some minor quality.

Select a male with masculine qualities. The feminine male and the masculine female are undesirables.

Desired type, sound constitution, combined with laying-records, is the keynote to breeding profitable stock.

Heavy-laying birds must be fed according to their appetite. They eat what they want, and what they want is usually what they need.

Always remember that the male bird is more than half of the flock. He should be the son of healthy parents which have a pedigree of egg-laying performance behind them.

There is no better way of forcing the pullet to moult now than to give her a feast to-day and a starvation ration to-morrow. Regular attention is imperative if winter eggs are to be secured.

PASTURES AND CROPS.

FEBRUARY.

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.—The weather continues in a state of drought, as it has been since October, and there seems no prospect of it breaking. It has had very disastrous results on live-stock, especially dairy herds, and the factory-suppliers are in consequence complaining of small cheques. Grass and bush fires are raging in many parts of the district, doing serious damage, and causing the winter outlook for live-stock to appear very gloomy, with the result that prices at the last monthly sale were considerably affected. Every settler in the district is praying fervently for the heavens to pour forth their watery blessings.—*W. J. Dunlop.*

AUCKLAND.—The February month, from every point of view, was all that could be desired. The fine warm weather experienced allowed the farmers time to harvest their crops in splendid condition. The dry weather, though retarding growth, was, at all events, of benefit in giving the land a spell for a time. When the late rains set in they very soon freshened up everything again. Grass, turnips, mangels, maize, and other crops benefited by the change. Stock of all descriptions are looking well. It is noticeable that the early-autumn-sown potatoes are strong and healthy. The root crops since the change set in promise to be good. The rainfall was much appreciated by the farmers, the dry weather was having a serious effect on the supply of milk for the factories.—*R. Rowan.*

TE AROHA.—The former part of the month was very dry, and pastures and root crops suffered. The last week was showery, which has done considerable good generally, but not enough rain has fallen to soak the land. However, at time of writing there are prospects of a good fall. Owing to the continuous drought the butter-fat output has fallen considerably. The showers experienced have given the root crops a start, and with a good rainfall they ought to be good, being practically free from disease and fly. Potatoes are very good generally.—*J. L. Morris.*

CAMBRIDGE.—Hot and muggy weather was the rule for the month, some days being very oppressive. Useful heavy rain-showers fell at intervals towards the end of the month, which did much to keep the grass fresh and green, and also benefited the swedes. The latter are looking particularly well just now, and a heavy turnip crop is almost assured. Hay and grain crops have been harvested in good order.—*A. A. Clapcott.*

HAMILTON.—Rain on the 6th of the month and again on two or three days towards the latter end, which, though not enough to saturate the ground, was sufficient to benefit the pastures and turnip crops. Root crops generally are looking well, and as there is every prospect of a good autumn growth of grass there should be a good supply of feed for the winter months.—*J. Kerr.*

KING-COUNTRY.—Beneficial rains fell last month, promoting a good growth in all root crops and freshening up the pastures, and should produce good results on newly sown burnt-bush areas. Tilling is now progressing favourably in the agricultural portions of the district, preparing the land for autumn sowings.—*B. Bayly.*

NEW PLYMOUTH.—The rainfall was above the average last month, consequently the pastures are looking very green, and feed is very plentiful. All root crops have made excellent growth.—*R. E. Fairfax-Cholmeley.*

STRATFORD.—A fine growing month—fine days interspersed with rain, which has had the effect of keeping pastures and crops fresh. Meadow hay and oaten hay have been well saved. Farmers are now starting to use their maize, and the milk-supply is keeping up well. Farmers who left the sowing of their turnips till late in the season have patchy crops, these being attacked by diamond-back moth. At present the prospects for winter feed are good.—*Austin F. Wilson.*

HAWERA.—Rain fell on the 18th, after which the weather was showery and unsettled. Pastures are making a good recovery, and turnips, mangels, carrots, and other green crops are making excellent growth since the rains set in. Swedes are, so far, free from blight, but rot has appeared in a good many turnip crops of the soft varieties. The small areas of potatoes grown are yielding well, the tubers being sound and free from blight. All classes of stock are in good condition. Supplies at factories are still good, although a rapid falling-off must naturally soon be looked for.—*A. J. Glasson.*

MANGAWEKA.—Very warm weather was experienced during the early part of February. On the 21st instant a fair amount of rain fell, which was wanted to freshen up pastures and other crops. There is still an abundance of feed, and future prospects for farmers in this district are bright. Considering the dryness of the month, stock of all kinds are doing well.—*J. A. Melrose.*

POVERTY BAY.—The weather during February was exceptionally dry. Pastures of low-lying and coastal country are parched and scanty. On the higher bush land they are rather better, but large areas have been destroyed by very severe bush-fires, which swept away timber and grass. Numbers of sheep perished in the flames and smoke. In two instances the number is reported as high as 11,000 and 12,000. However, the ultimate benefit will more than repay the present loss, as a great area of very dirty country has been cleaned of rotting timber.—*William Ross.*

WAIROA.—Weather during the February period was very hot and dry, there being but two light rainfalls throughout the month. The root crops are showing the effects of the lengthened dry spell. There is still a sufficiency of feed on the hills, but the shortage of water is being seriously felt by the stock. The potato crop is not up to former standards, but the maize crop promises to yield well. Stock continue in good condition.—*T. F. Mullaly.*

WAIPUKURAU.—A very dry month. Bush and grass fires have done considerable damage, some settlers being left without any feed for stock. Houses and sheds in the Piripiri, Ruaroa, and Ruamati districts were burnt. Light showers fell on the 23rd and 24th, but were not heavy enough to do any appreciable good. Stock are looking fairly well.—*H. O. M. Christie.*

PAHIATUA.—Rainfall for the month, 1·27 in. on nine days, the heaviest fall being 0·28 in. on the 23rd February. Rainfall for month, 1912, 5·02 in., on ten days. The intermittent showers and the heavy dews have done a lot of good, giving the pastures a start, also all root crops. Referring to root crops, a settler in the Pongaroa district had a half-acre of Californian thistle, which was dug last spring, and swedes sown in November. He has fully 20 tons of turnips, and not a thistle to be seen on the patch.—*T. Bacon.*

NORTH WAIRARAPA.—The past month has been favourable, both from a pastoral and agricultural point of view—showers intermixed with warm weather, which had a beneficial effect on pastures. Turnips, rape, and all green crops have improved, except where the blight has completely destroyed the crops. Factory-suppliers state that the average is well maintained. Stock of all descriptions are looking well and, if this favourable weather continues, should winter well. Grain crops, by all accounts, are going to thresh out well up to the average.—*J. S. Rankin.*

MASTERTON.—We had exceptionally hot, dry weather during last month, and the pastures are very brown. On the 15th we had a touch of winter, and the Tararuas were capped with snow. Rain fell on the 21st, 22nd, and 23rd, but did not improve the pastures much, though it did a great amount of good to rape and turnips. All grain crops have been harvested in good condition, the yield in oats so far being from 70 to 80 bushels. This, of course, is not equal to last year, when as high as 110 bushels was obtained, and 60 to 75 bushels for wheat. The wheat has not been threshed yet. Some good crops of swedes and mangels are noticeable in the district, and there are some very good crops of potatoes practically free from blight. The Hessian fly is reported to have done considerable damage in some parts of the district. Though some of the maize crops were sown late, they are looking well and promise good yields. There are some good crops of peas in most parts of the district. Tomato crops have been badly affected with blight, and only with persistent spraying have the larger crops been saved. All stock are looking very well. I have noticed in several parts of the district a blight—Californian-thistle rust (*Puccinia suaveolens*)—on this thistle. This prevents the thistle from seeding. Some landowners are endeavouring to spread it from one patch to the other.—*T. C. Webb.*

SOUTH WAIRARAPA.—The weather during the past month was seasonable, there having been refreshing rains, which has brought away fresh growth. Practically all

crops are now harvested, the late crops having been very much stunted through the early drought. The rape crops have not been too good this season, owing to the dry weather, except in the low-lying lands. Stock in general are looking well.—*S. C. Ivens.*

WELLINGTON.—Generally, mild hazy weather was the rule during February. Steady beneficial rains fell on several days, freshening up hill pastures, which are now good, especially on coastal runs, and winter feed is now fairly assured. Oat crops were good and were stacked in good condition. Maize and rape are looking well, also stock. Advantage was taken of the favourable weather to burn out scrubby and fern patches for regrassing. A favourable month for farmers.—*G. H. Jenkinson.*

BLENHEIM.—February was a very dry month and very windy. Rain fell on two days during the third week; but, owing to the hardness of the ground, there was not enough to penetrate very far, and more rain is very badly needed.—*F. H. Brittain.*

WESTLAND.—The weather continues most unpropitious for this time of the year. February, which as a rule is the hottest and driest month, proved the very reverse. We had several very cold snaps from the south, and snow fell on the high country. The result, as might be expected, was disastrous in regard to haymaking, whereas, on the other hand, the growth of grass is phenomenal. Stock in consequence are looking sleek, and the deliveries to the dairy factories are, as a result, very satisfactory indeed. —*H. J. Walton.*

KAIKOURA.—The harvesting of grain crops was practically completed during the month, and the bulk of the crop was stacked in good condition. The crop as a whole is good and above the average of former years. Wind and rain laid several of the heavy crops of oats about the beginning of the month, but these were pretty well ripened, so did not reduce the yield. Turnips are coming on nicely, and promise well for winter feed. Pastures have made good growth during the month.—*William S. Goodall.*

RANGIORA.—All green crops suffered for the want of rain in the early part of last month. Aphis had attacked the swedes, turnips, and rape, but the heavy showers at the end of the month washed a good many away and revived the crops. Threshing has been going on steadily through the month, mostly from the stook; but rain stopped operations for a short period. The weather has been seasonable. Sunshine, 185 hours 35 minutes. Rainfall for month, 2·15 in.—*A. Hughes.*

LINCOLN.—With the exception of a severe north-west gale on the 11th of the month good harvest weather prevailed until the 20th, when the weather broke. It continued showery for some days, but little harm resulted to the grain then remaining in stook. On the other hand, the rains have greatly benefited green crops and pastures. Turnip crops generally are now in a very healthy condition, and rape has been freshened up. Where already threshed, white clover has yielded fairly well. Red clover promises a fair yield. The cocksfoot crop, both as regards quantity and quality, is a satisfactory one. On the higher country on the Peninsula, however, the threshing has not been completed.—*J. G. Scott.*

ASHBURTON.—Harvesting was greatly delayed through the wet weather, and the sample of grain is very shrivelled, yielding only about half of that of last year. Turnips, rape, and grass have been greatly benefited through the rain, and good autumn and winter feed is now assured. Frost cut back a lot of the late potatoes, and the heavy nor'-westers denuded a lot of the fruit-trees. The total rainfall for the month was 3·44 in., and there were 7 degrees of frost.—*C. Branigan.*

FAIRLIE.—Very dry weather was experienced during the first half of the month, crops ripening quickly and pastures being burnt up. Water was very scarce in some parts of the district. Rain came on the 20th, 3·20 in. being registered. Pastures and root crops freshened up, and there is a good prospect for the winter. A good deal of crop has been harvested and threshed, and yields are very poor. Potatoes will require to be dug at once, as the second growth has appeared.—*W. B. Manning.*

TIMARU.—The weather for the month has been very varied—a heavy north-west gale doing a lot of damage to standing grain and crop in stook, being followed by a heavy fall of rain delaying harvest-work, and a hard frost which cut down a lot of the potato crops. The pastures have a great growth of grass all through the district, and there should be good winter feed if the frosts keep off.—*J. C. Huddleston.*

KUROW.—The past month was very unfavourable for harvesting operations, owing to heavy winds. The crops received a very severe shaking before cutting, which will affect the average yield considerably. Farmers state that their crops will not pan out

so well as last year, and that the wheat is shrivelled and light. Potato crops are also reported to be poor, owing to the dry season. A large number of lambs have left the district during the month, although the slaughtermen's strike is affecting the demand for fat sheep. Heavy rains during the latter end of the month gave root crops and grass a fresh start, and the country is commencing to look green again.—*G. Reid.*

OAMARU.—The weather of last month was variable, and has changed rapidly most of the time. The harvest is now general, and farmers are finding that crops are showing very uneven yields. A bad north-west gale caused a certain amount of damage on the 13th instant, but luckily the greater part of crop was in the stook. Green crops are looking very well, and the country has derived considerable benefit from recent rain.—*W. F. Flower.*

PALMERSTON SOUTH.—During the month weather-conditions were varied, excessive heat being followed by cold wind and rain. Heavy gales about the middle of the month did considerable damage to standing crops. Total rainfall, 1·30 in., 88 points falling since the 25th, which, although hindering harvest, has helped the turnip crop greatly, and these are now looking well. Stacking is the order of the day, a few farmers having threshed. Although the crops are below the average some good samples are to be found. One farmer has threshed 78 and 64 bushels per acre of Garton autumn-sown oats. The Hessian fly has made its appearance in wheat crops, but to no serious extent.—*C. S. Dalgliesh.*

DUNEDIN.—The weather for February was most unseasonable—in fact, some of the worst on record. Gales of wind and cold rain were experienced nearly every day. The dairy-farmers have had difficulty in securing their crops of oats, which in any case are very light. The pastures, not being heavily stocked, are very good. Mangel crops are practically a failure. Turnips also, with few exceptions, are a very light crop, the dull, windy, cold weather having retarded all growth. Potatoes promise a fair yield, and blight is not showing to any extent.—*J. R. Renton.*

MOSGIEL.—The month was mild up till the 12th, when it blew a south-west gale, which did considerable damage to any ripe crops standing. The 13th was the severest day felt in the district for many years, when a south-west gale blew, with cold rain-showers, snow falling on the surrounding hills, and this continued over the next day. The oldest settlers in the district have not seen snow so low down on the Maungatua in a February before. The storm knocked the crops about so much that they can only be cut one way, thus causing delay and expense to the farmers. Early turnips are looking well, but those late sown are backward. So far they are free from blight. Mr. A. Birtles, Momona, sprayed a paddock of potatoes five times with Bordeaux mixture, and the crop is free from blight, while the adjoining crops not sprayed are blighted. Mangels are looking well, and so are all pastures. There is abundance of feed on the flat and hill country. Harvesting is in full swing, but labour is hard to get. The mills have started to thresh out of the stook in the West Taieri district.—*H. McLeod.*

MANIOTOTO.—From the 1st to the 10th fair weather prevailed, but from the 11th to the 13th heavy gales raged, doing much damage to any crops not cut. In Paerau district, crops—turnips and oats—and pastures are looking exceptionally well. Stock in general is healthy, and is in good condition.—*A. T. N. Simpson.*

CLYDE.—The weather for February was very dry. We were treated to one or two showers, but what rain there was produced no growth of any sort. Crops that were being harvested looked very well until the 13th instant, when we had a terrific gale which played havoc. The heads of some standing crops were stripped clean off, and others were blown clean out by the roots. Stacks were overturned in all directions. Turnips, rape, and potatoes are pretty well a failure owing to dry and windy weather.—*Thomas N. Baxter.*

LAWRENCE.—The weather for the month was very changeable. High winds were experienced, with snow low down on the hills, also slight frosts at night. Some almost ripe crops were severely shaken, and in some cases comparatively green ones were badly knocked about by a gale of wind on the 14th and 15th. Turnips and rape have suffered a good deal from fly and grub. Harvest is now general. The oat crop is on the light side, but wheat has withstood the changeable weather better and will be a fair crop.—*R. Barron.*

OWAKA.—The weather for February was changeable, the first half of the month being very good and the latter part stormy. Harvesting has commenced, but the crops are short in most cases, although there are some heavy crops in parts of the district

Blight has not made much headway among the potatoes, and indications point to a satisfactory return. Turnips are looking healthy, and grass is abundant everywhere.—*R. McGillivray.*

TAPANUI.—The weather has broken and much rain has fallen, which, although interrupting the harvest, which is now in full swing, will do an immense amount of good in freshening pastures and helping along turnips, rape, and young grass. Cereals are much below the average of former years, and the oat crop is not so well filled. Barley is below the average, both in quantity and quality. Turnips have been damaged both by fly and grub, but are recovering since recent rains, and, given fair growing-weather, may yet be a fair crop.—*W. J. McCulloch.*

GORE.—The weather during the past month was most unfavourable for harvesting, being more like winter than the early autumn. Harvesting is now general, and some very good crops are to be seen in stook. The second week of the month was exceptionally rough, the gales we experienced causing considerable damage to the green crops. In some cases farmers estimate their loss from this cause at about 10 bushels per acre. Pastures are holding out well, and both the turnip and potato crops are looking well.—*B. Grant.*

LUMSDEN.—The weather for the month of February was anything but seasonable. During the first week of the month we had some nice warm sunny days, followed by a regular winter snap—very stormy, with high wind and rain, with snow on the high country—greatly interfering with the grass-cutting and doing a lot of damage to the grass in stook. During the last week of the month we have been favoured with nice warm days, allowing the farmers to make headway in cutting the wheat and oat crops. All white crops this season will be light. Turnips appear to be doing very well, and should be plentiful. Potatoes, although not dug, look well. Pastures still continue to have plenty of feed.—*W. S. S. Cantrell.*

INVERCARGILL.—The weather during February was very changeable, with a fair amount of rain. About the middle of the month we experienced high winds and heavy hail-showers, which did a considerable amount of damage to crops. Grass is getting scarce, and turnips and rape are now being fed off in some instances. Oats are now being cut, and grass is still to be seen in stook.—*J. R. Whyborn.*

OTAUTAU.—The weather for the month was wretched, and harvest has been at a standstill in consequence. Many farmers have grain in stook, but have not been able to lead it in owing to the continuous rain. The 13th of the month was one of the worst experienced for a long time, hail and rain falling all day, doing a good deal of damage to standing crops. The grass-seed harvest is proving very light. Turnips and potatoes are looking remarkably well throughout the district, and food is plentiful.—*H. F. Dencker.*

QUEENSTOWN.—The weather for the month was very changeable up till within the last week or ten days, during which we experienced fine weather. Cold winds were very prevalent, which have had the effect of retarding the fall growth somewhat, but the whole district has improved wonderfully in the matter of pastures, crops, &c., since the rains of a month ago. Harvesting is well on now, but spring-sown crops are yet to cut, and in most cases are poor.—*A. Clarke.*

PEMBROKE.—The weather during last month was very unseasonable, and harvesting operations could only be carried out with great difficulty. A considerable amount of lost time was occasioned through the almost incessant strong gales, which at times were followed by cold rain and snow on the higher country. About the middle of the month an extra strong gale was experienced throughout the district, which damaged trees and crops.—*J. A. Griffith.*

Mr. J. G. H. Moore has been appointed Honorary Representative of the New Zealand Government in Argentine. Mr. Moore may be consulted by New Zealand traders as to the financial standing and general reputation of firms in the Argentine. His address is Colle Corrientes 758, Buenos Aires.

THE FRUIT CROP.

OFFICERS of the Orchards, Gardens, and Apiaries Division report as follows on the condition of the fruit crop at the end of February :—

WHANGAREI.—Apples, medium crop; lemons, medium; nectarines, light crop; peaches, medium crop of late varieties; pears, heavy crop; plums (English), light; tomatoes, average crop; oranges, medium crop.—*J. W. Collard.*

AUCKLAND NORTH.—Apples, good crop; lemons, crop looking well; peaches, fair crop; pears, good crop; plums (English), crop nearly over; tomatoes, nearly done.—*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), crop finished; tomatoes, good crop.—*N. R. Pierce.*

HAMILTON.—Apples, fair average crop, ripening well; lemons, short crop; nectarines, good average crop; peaches, fair crop, ripening freely; pears, good crop; plums, rather scarce; plums (Japanese), light crop; tomatoes, fair crop; walnuts, very light crop.—*T. E. Rodda.*

POVERTY BAY.—Apples, crop below average; lemons, poor crop; peaches, good average crop; pears, heavy crop; tomatoes, good crop.—*W. R. L. Williams.*

MANAWATU AND WAIRARAPA.—Apples, very medium crop; nectarines, fairly good crop; peaches, good crop; pears, average crop; plums, heavy crop; tomatoes, medium crop.—*George Stratford.*

HASTINGS.—Apples, moderate; nectarines, heavy crop; peaches, heavy crop, late varieties suffering from dry weather and rust; pears, heavy crop, some varieties damaged by scab; plums (English), heavy crop, which is almost ended; plums (Japanese), heavy crop, almost ended; tomatoes, very fair crop; walnuts, good crop.—*J. A. Campbell.*

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

NELSON.—Apples, good crop; nectarines, good crop, which is just about finished; peaches, good crop; pears, heavy crop; plums, good crop, nearly over; raspberry crop good, but now quite finished; strawberries, second crop light, and fruit small owing to dry weather; tomatoes, good crop, still picking well. The weather during the month was hot and dry until the 20th, when heavy rain fell. All fruit has come along well, and I should say is quite a fortnight in advance of last season's.—*J. H. Thorp.*

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

TIMARU.—Apples, light crop; pears, fair average crop only; plums (English), harvest almost completed; plums (Japanese), crop almost done; tomatoes, good crop; walnuts, good crop. Owing to the heavy toll taken by the exceptionally severe winds experienced on the 13th and 14th instant, the apple crop is exceptionally light for the district.—*A. B. Mansfield.*

DUNEDIN.—Apples, good crop, looking very well; pears, good crop; plums (English and Japanese), harvest practically over; tomatoes, good crop. The heavy winds on the 1st and 13th did considerable damage among fruit-trees, breaking down trees and blowing off apples and pears. A beneficial rain fell in Central Otago on the 20th and 21st.—*W. T. Goodwin.*

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 postion of these, for the month of February:—

AUCKLAND.—Throughout the month of February large quantities of locally grown fruit were handled daily, and compared with previous months the quality is very fair. Apples and pears are of a better size now that early varieties are over, and methods of grading and packing have been considerably improved. Black-spot is still very much in evidence, but, generally speaking, diseased fruit has been reduced to a minimum. It was found necessary to issue only five warning notices in respect of diseased fruit sent to the auction-rooms. This compares favourably with the forty-six notices issued during the previous month. There was a good demand throughout the month for all classes of seasonable fruit, and prices were as follows: Apples, choice dessert 5s. to 6s. per case, medium-quality dessert 4s. to 5s. per case; pears, choice dessert 5s. to 7s. 6d. per case, medium quality 3s. to 5s. per case; peaches, choice 3s. to 5s. per 20 lb. case, medium 2s. to 2s. 6d. per 20 lb. case; nectarines, 4s. to 6s. 6d. per 20 lb. case; apricots, 4s. 6d. to 7s. per 20 lb. case; plums (English), 3s. to 5s. per 20 lb. case; tomatoes, choice 2s. 6d. to 3s. 6d. per half-case, second class 1s. 6d. to 2s. per half-case; choice forced grapes, 1s. to 1s. 6d. per lb.; second-class grapes, 5d. to 9d. per lb.; outdoor grapes, 5s. to 7s. 6d. per 20 lb. case; quinces, 4s. to 4s. 6d. per bushel.—*C. Craigie.*

WELLINGTON.—Supplies of fruit and vegetables have been very heavy during this month. There is a vast change and improvement in the grading, packing, and labelling of cases, and buyers have already noticed the improvement. The prices ruling during the month were as follows: Apples, dessert 5s. to 7s. per bushel case, cooking 3s. 6d. to 4s. 6d. per bushel case; pears, choice 7s. to 8s. per bushel case, ordinary 5s. to 6s. 6d. per bushel case; quinces, 2s. 6d. to 3s. 6d. per bushel case; peaches, choice 3s. to 4s. 6d. per bushel case, ordinary 2s. to 3s. per bushel case; nectarines, 3s. to 3s. 6d. per bushel case; plums are in short supply, and are realizing 2s. 6d. to 4s. per case; blackberries, 2½d. per lb.; cape gooseberries, 5d. to 5¾d. per lb.; grapes (Lower Hutt), 6d. to 8d. per lb.; Nelson grapes, 5d. to 7d.; tomatoes are coming in freely, and the prices have eased slightly, Hutt lots selling at 2s. 9d. to 3s. 9d. per half-case, and Nelson 2s. 6d. to 3s.; cucumbers (hothouse), 1s. 6d. to 2s. per dozen; mushrooms sold at 10s. per bushel case; cabbages, choice, good demand at 4s. to 5s., others 2s. to 3s. 6d. per sack; vegetable marrows, 1s. 6d. to 3s. 6d. per sack; pumpkins, 4s. to 5s. per sack cauliflowers, choice 7s. 6d. to 9s., ordinary 3s. to 6s. per sack; turnips (white), 2s. to 3s. per sack; swedes, 2s. 6d. to 3s. 6d. per cwt.; green peas, 8d. per peck; carrots, 2s. 6d. to 5s. per sack; French beans, 1s. 6d. to 3s. per half-sack; parsnips, 3s. 6d. to 5s. per sack; lettuce, 1s. 6d. per case; rhubarb, 3s. 6d. to 5s. per dozen; onions, £7 to £9 per ton; potatoes, £8 to £11 per ton.—*T. C. Webb, jun.*

CHRISTCHURCH.—Apples were in good supply, dessert varieties bringing from 4s. 6d. to 5s. 6d., and cooking 3s. to 4s. 6d. per case. Australian grapes, 4½d. to 5d. per lb.; New Zealand grapes, 7d. to 9d. per lb.; lemons (Italian), 22s. 6d. per case; nectarines, 2¾d. per lb.; peaches, 2½d. per lb.; pears, 1d. to 1½d. per lb.; plums, 1½d. to 1¾d. per lb.; greengages, 2d. to 3d. per lb.; mushrooms, 6½d. to 7d. per lb.; tomatoes, 2¾d. to 4d. per lb. Ordinary vegetables were in fair supply.

DUNEDIN.—The markets were fairly well supplied with both fruit and vegetables. Large quantities of peaches came forward, the main supplies being from Hastings. At the beginning of the month a few lines of apricots and nectarines came to hand, but the supply of this fruit is now over. Apples and pears are plentiful and in good con-

dition. In some instances more care could be taken with the packing and grading. Several warning notices had to be issued for fruit affected with scale, scab, and codlin-moth. The following list gives a fair average of the prices ruling for the month: Tomatoes (hothouse), 5d. to 8d. per lb.; outdoor tomatoes, 7s. to 9s. per half-case; choice tomatoes in crates, 6d. to 7½d. per lb.; peaches, 3d. to 4d. per lb.; plums, 2d. to 3¼ per lb.; apples, dessert 6s. 6d. to 9s., cooking 4s. to 5s. per case; pears, 5s. to 7s. per case; grapes, 9d. to 1s. per lb.; apricots, 3d. to 4d. per lb.; extra choice apricots, 5d. per lb.; nectarines, 4s. per half-case; raspberries, 6½d. per lb.; cucumbers, 4s. 4d. per case; cauliflowers, 5s. to 7s. per sack; potatoes, 6s. to 7s. per cwt.; cabbages, 1s. 6d. to 2s. 6d. per sack; turnips, 2s. 6d. per sack; lettuces, 6d. to 9d. per case; peas, 1½d. to 2¼d. per lb.; French beans, 2d. per lb.; rhubarb, 5s. to 6s. per cwt.; cape gooseberries, 4d. per lb.; marrows, 6s. 6d. per dozen. The shops were fairly well stocked with both local and imported fruits, which were in good condition. Practically no diseased fruit was found in shops.—*E. T. Taylor.*

BLUFF.—A large quantity of New-Zealand-grown fruit was on this market during February. Although the supply was large it was not equal to the demand, and prices were high compared with previous years at this season. All parcels arrived at the auction-rooms in good order, and the majority were well packed. A feature of the market this season was the shipments from Hawke's Bay. I noticed only one line of diseased fruit, and it consisted of Southland-grown apples affected with black-spot. A warning notice was sent to the grower. The following is a list of the average prices ruling during the month: Tomatoes, hothouse 5d. to 1s. 1½d., outdoor 5d. to 9d.; peaches, 2½d. to 6d.; apricots, 3d. to 5d.; plums, 2d. to 4½d.; pears, 2d. to 3½d.; apples, 1½d. to 3d.; grapes, 10d. to 1s. 8½d.; potatoes, 5s. to 9s. per cwt.; onions, 7s. 6d. to 9s. per cwt.; cabbages, 1s. per dozen; cauliflowers, 2s. to 3s. per dozen; cucumbers, 4d. to 6d. each; rhubarb, 1½d. to 2d.—*Robert 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.—The honey yield on the average is good in the Auckland District, and prices are about the same as last season.—*G. V. Westbrooke.*

WELLINGTON.—Good average honey prospects in Taranaki; Wellington Province, fair; Hawke's Bay, fair; Poverty Bay, medium. The quality of the produce from the above districts this season is good, and should command an advanced price.—*F. A. Jacobsen.*

CHRISTCHURCH.—The honey season is gradually coming to a close, and the main flow of nectar is over, although the bees are still gathering a little. This should help beekeepers to get their remaining supers fairly well completed. Prices are lower than last season. I would warn all beekeepers against taking all the honey, as brood nests are found on examination in most cases to be very short of stores for winter.—*L. Bowman.*

DUNEDIN.—A fortnight of good weather has resulted in a fair average honey crop in Southland. Beekeepers are not, however, extracting bare, preferring to leave an excess of stores. In North Otago a record crop of honey has been obtained. The quality of this season's extraction is excellent, and is realizing top prices.—*E. A. Earp.*

MOTUEKA FRUIT DEVELOPMENTS.

THE following figures showing the quantity of fruit exported from Motueka district are instructive. They are obtained from the Motueka Harbourmaster's returns:—

FRUIT (BUSHELS).

1877.	1882.	1887.	1892.	1897.	1902.	1907.	1912.
3,923	7,494	5,639	19,665	15,236	48,234	86,460	144,086

THE WEATHER.

DISTRICT NOTES DURING FEBRUARY.

D. C. BATES.

Chiefly from Telegraphic Reports.

District.

1. Fine weather predominated during the month, and the rainfall was slight, the percentage below the average, varying from 50 to over 90 per cent. in parts.

2, 4. The rainfall was everywhere below the average, ranging from 16 to as much as 65 per cent., the greater portion falling as showers between the 11th and 25th. No particularly heavy rain occurred, fair weather prevailing usually, and light to moderate westerly and northerly winds. Smoke haze from bush-fires was frequent.

3, 5, 6. From 60 to 70 per cent. less than the average rain fell in these districts, the wet days occurring usually between the 18th and 28th. Fine and bright weather usually prevailed, although on several days smoke haze was experienced.

7, 8. Very little rain fell in these two districts, the month being characterized by warm and dry weather.

9, 10. Although hazy and cloudy skies were frequent, fair and dry weather prevailed, less than the average rain falling by about 50 per cent. An electrical disturbance accompanied with heavy rain occurred in parts on the 21st, otherwise precipitation was in the nature of showers only. Northerly winds predominated, and, with the exception of a gale on the 13th, were of little force.

11, 12, 13. The departure from the normal rainfall varied greatly in all the west coast districts, some stations recording an excess and others less than the average. Heavy rain fell in parts on the 21st and 23rd, but usually the rainfall was of a showery nature.

14, 18. Most of the rain fell between the 20th and 24th. and the total for the month was slightly less than the average. During the remainder of the month the weather was warm and dry. Electrical disturbances were experienced in parts on the 21st and 23rd.

15. About the average or slightly less than the average rainfall was recorded in this district. On the 13th a north-west storm was experienced, and heavy rain fell, but usually the wind was not of more than moderate force. Showers were frequent on the western slopes.

16. Dull and showery weather was frequent, causing a rainfall slightly in excess of the average at most stations. High winds occurred on the 13th and 17th.

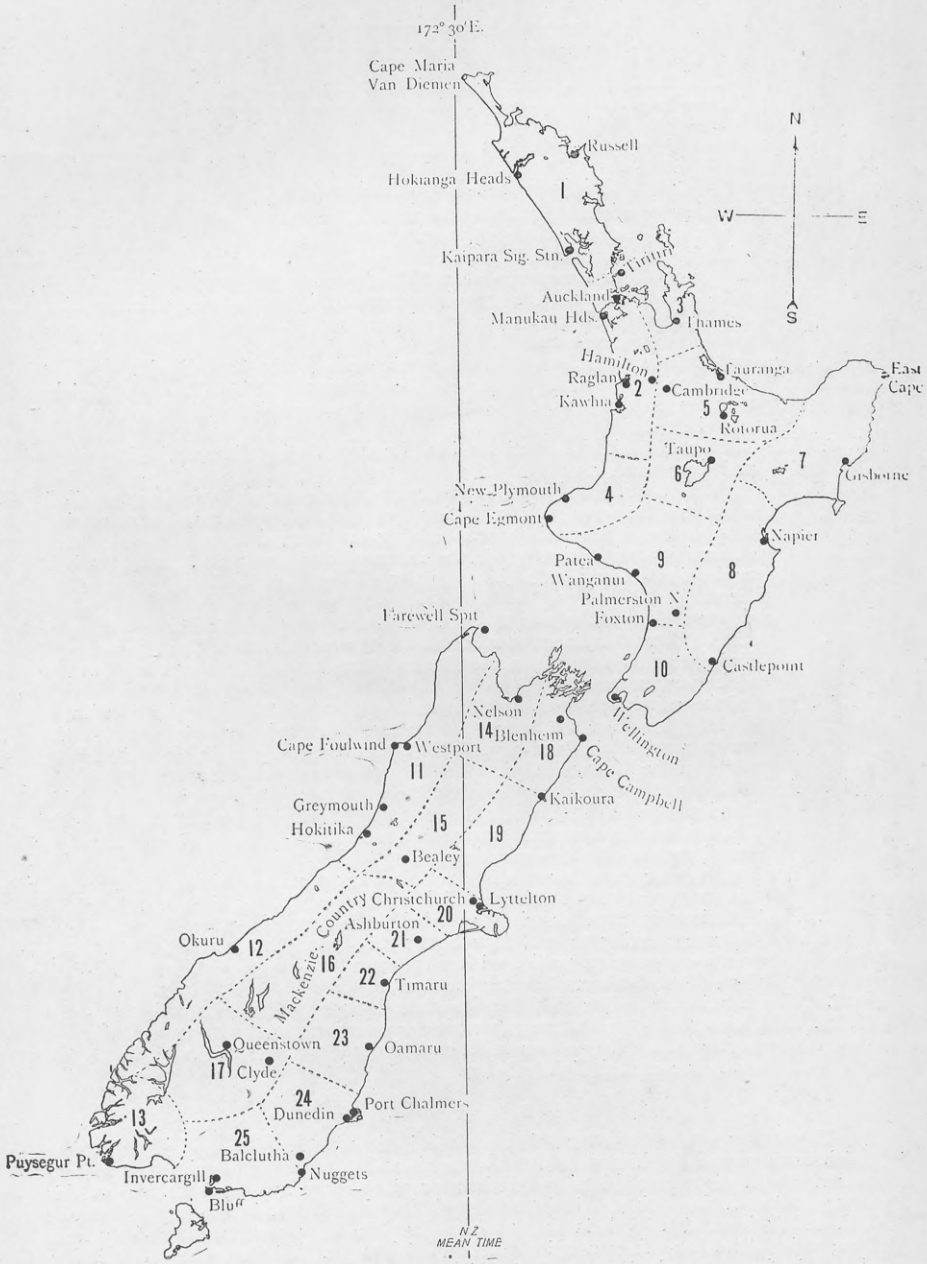
19–22. Most stations in these districts recorded more than the average rainfall for February, owing to two days heavy rain—viz., the 21st and 23rd. The weather was changeable, with a temperature-range greater than usual. Several gales occurred during the month.

23. Weather similar to district 22, but less than the average rain recorded.

24, 25. Cold, changeable, and showery weather was experienced, with several days of high winds. The total rainfall exceeded the average generally, but a few stations recorded slightly below.

SUMMARY.

The most remarkable feature of the month is the number of westerly disturbances which have passed southwards of New Zealand, and though the weather has in consequence been very unsettled in the southern province, yet only one disturbance of this nature, between the 10th and 14th, enveloped the whole Dominion. Snow fell on the 13th and 14th on high levels in the South. The wireless reports received daily from Macquarie Island have thrown quite a flood of light upon this occurrence of storms in high latitudes. A cyclonic movement which passed through Cook Strait on the 21st brought heavy rain in and southwards of Cook Strait, as well as snow in Mackenzie County, and some beneficial rain also fell in the North. During the month conditions were unusually warm and sultry in the North, but also misty and foggy at times in all parts of the Dominion.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Auckland
Manukau Hds.
Thames
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Raglan
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Cambridge
Tauranga
East Cape
Rotorua
Taupo
Gisborne
New Plymouth
Cape Egmont
Napier
Patea
Wanganui
Palmerston N.
Foxton
Castlepoint
Wellington
Farewell Spit
Nelson
Blenheim
Cape Foulwind
Westport
Cape Campbell
Kaikoura
Greymouth
Hokitika
Bealey
Christchurch
Lyttelton
Ashburton
Okuru
Mackenzie Country
Timaru
Queenstown
Oamaru
Clyde
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Port Chalmers
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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.

COW TROUBLE.

MR. ARTHUR BUSH, Henderson, writes,—

Could you let me know through the *Journal of Agriculture* what is wrong with my cow, and the best treatment to follow? She calved on the 29th August, 1912. Before calving she was rolling fat, and apparently in the best of health. She calved some time during the night, and in the morning when I went to see how she was I found her on her back unable to rise, seemingly unable to pass the afterbirth. I gave her a Sykes drench, and she passed the afterbirth with pieces of flesh adhering to it. For two days she was unable to stand up, and when at last she got up she was only able to stand for a few minutes. From this on she improved considerably, although she bled from the womb for a week. Her improvement continued so that she could graze as well as the other cows, but instead of thriving she has steadily got thinner. Although I have drenched her with salts on several occasions they seem to have done no good, or very little good, until now she is a walking skeleton, and is getting stiff in the joints as though she had rheumatism. I may mention that she has always had more than she can eat, and that the other animals are all fat.

The Live-stock and Meat Division replies,—

It would be impossible to say what is the matter with the cow without examining her. As she seems to have had a bad time calving, it may be that there is some womb trouble causing her present condition. She might, however, be suffering from tuberculosis. Cases are of frequent occurrence where tuberculous animals are apparently healthy and fat prior to parturition, and waste away rapidly afterwards. I am asking the Inspector of Stock for your district to visit your place and examine her.

DISC PLOUGH.—TANEKAHA TIMBER.

MR. TIEKE RATARIKI, Oreti, Raukokore, *via* Opitiki, writes,—

I would be glad if you would answer the following questions through the pages of your *Journal*:—

1. What disc (single) plough do you consider most suitable for turning over manuka-stumps up to 3 in. in diameter, using bullocks? The soil is of a light friable nature, easily brought to a fine tilth. The country is flat, but rather rough with pig-rootings.

2. Can you give me any definite information as to the lasting-qualities of tanekaha timber in the ground, used as posts?

The Fields and Experimental Farms Division replies,—

1. Disc ploughs, from the original Spalding-Robbins to those now in use, have been carefully observed at the experimental stations and on other farms, and on almost every description of land, but none has been seen suitable for turning over manuka-stumps up to 3 in. in diameter. The discs are thin; they naturally cannot withstand the strain and shock of ploughing over stumps of that size. The usual practice where timber of that size is met with is to stump it. It is probable that on the land in question the greater number of the stumps will be of smaller dimensions. These can be dealt with by a strong single-furrow mouldboard plough, provided the heavier stumps are removed.

The Orchards, Gardens, and Apiaries Division replies,—

2. There is some diversity of opinion *re* the durability of tanekaha. Personally I have seen it stand excellently. The following authentic particulars show the durability of heart-wood to be excellent: Piles driven in the Waikato coal-mines showed perfectly sound heart-wood after being down nine years. Railway-sleepers were stacked on the ground in 1865 and left there until 1873. The bottom layer was composed of tanekaha sleepers placed directly on the earth. On the stacks being removed after eight years these sleepers came through the severe trial excellently, being, with the exception of some small patches of sap-wood, perfectly sound.

DEPRAVED APPETITE IN CATTLE.—ANGORA GOATS.

MR. T. SMITH, Ihuraua, Mauriceville, writes,—

Could you kindly inform me through your *Journal* what is required for cows (three) that are very fond of licking old bones? They have access to plenty of rock-salt. The three cows are in splendid condition, and are milking well; they calved early last August. The bones are on the track to the bail, and as soon as the cows see them they (one especially) regularly run to the bones.

Angora goats: Would you also kindly inform me what country is adapted for Angora goats? Do they require any special herb? Will the nannies breed if they have not had a kid up to six-tooth, owing to a billy not being procurable? Is there any demand for Angora goats? What weight of wool do they clip? When should they be shorn? Are they affected with lice or ticks, and, if so, should they be dipped the same as sheep?

The above queries are practically answered in the August (1911) and September (1912) *Journals*, pages 165 and 333 respectively; but in regard to cows licking old bones the Live-stock and Meat Division would add the following:—

You might try in these cases daily half-ounce doses of compound syrup of iron and phosphates (Parrish's chemical food) or phosphate of lime. This last agent should be obtained from a chemist, and may be given mixed with bran and dry food. The dose is about half an ounce, given twice a day for about a fortnight. Then miss a similar period, and if the animal is no better, repeat.

BLINDNESS IN COLT.

MR. ANDREW WILSON, Hangatiki, writes,—

I have a colt fifteen months old, which was castrated three months ago, and was found to have gone blind in both eyes about three months after the operation. His eyes were bulged out as if there was a great pressure behind them. The tension does not seem to be so great now, but the animal is still stone blind. Perhaps some of your many readers, or some of your able officers, may know of a similar case, and will know what chance there may be of a recovery. I may say the colt was dealt with along with several other two-year-olds, because he was the only yearling on the place and we wanted to make one job of it. He was turned out along with the others in a sheltered paddock, but he had not been running with these colts previously, and whether they knocked him about or not I cannot say, but he showed no external wounds. The colt is in splendid health and good condition otherwise.

The Live-stock and Meat Division replies,

It is impossible to say what really is the cause of the trouble without a careful examination. The condition you describe may be due to some disease of the thyroid glands—exophthalmic goitre. These glands are two oval-shaped

bodies placed on each side of the upper part of the windpipe, and are especially well seen in thoroughbred and well-bred horses. In the disease in question they are enlarged, especially the left one. You had better communicate with the Inspector of Stock for your district, and inquire when a veterinary officer is likely to be in your neighbourhood, and ask him to see the colt.

KERRY CATTLE.—GRASSES.

MR. P. MCKENNA, Ahaura, writes as follows:—

1. Some four or five years ago the Department of Agriculture imported some Kerry cattle, and I see by the report of the Manager of Moumahaki, Mr. F. Gillanders, in the Annual Report for 1908, that they were doing well, but I have not seen anything about them since. Would you kindly let me know through the *Agricultural Journal* whether they have been a success or not?

2. Would you also kindly let me know which of the two following grasses are of the best feeding-value in poor country—Yorkshire fog, or red-top?

The Fields and Experimental Farms Division replies,—

1. The Kerry cattle were maintained for some years north of Auckland. They did not, however, prove so acceptable to the farmer as other breeds of milking-cattle. They have not been continued as a pure breed.

2. Red-top is usually accepted as the more valuable of the two grasses mentioned.

HEIFER TROUBLE.

K. J., Morrinsville, writes,—

We have a two-and-a-half-year-old heifer which has partially lost the use of her hind legs. We noticed this first about six weeks ago, when the trouble was only slight, and could be noticed when running. However, she has gradually got worse, and now has difficulty in getting on to her hind legs, frequently knuckling over at the joints. She has had no injury that we know of, and has never had a calf. Could you advise any treatment?

The Live-stock and Meat Division replies,—

It is impossible to say what is the cause of the symptoms shown without personal examination of the animal. Even with this it is not certain whether a correct diagnosis could be given. It is probable that she has received an injury you are not aware of, probably in the region of the loins. If she is no better it would be as well to destroy her. You do not say whether she has recently been mated. Cases showing similar symptoms are not uncommon after service with a heavy bull.

BRONZE BEETLE.

C. W., Takapuna, Auckland, writes,—

Many of my apples this year are damaged by a dark stain or scab, sometimes extending to about one-fourth of the entire surface. I do not think it is made by the bronze beetle. Can you advise me what spray to use to cure it, and when to apply? I am sending specimens.

The Orchards, Gardens, and Apiaries Division replies,—

The apples forwarded have been attacked by bronze beetle in the early part of the season, with the result that later the fruit has cracked, and decay set in. The effectiveness of arsenate of lead for the control of the beetle can be increased by adding a small quantity of resin-solution to the mixture.

BEEKEEPING.

MR. E. DUCKWORTH, Hendley, Patoka, Hawke's Bay, writes,—

Will you please tell me which is the best month to double up colonies of bees? I also wish to know the name and address of the secretary of the Hawke's Bay Beekeepers' Association. The bees are doing exceptionally well here this year.

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

March is about the best time for doubling up your colonies, which should be done in the following manner: Kill the queen in the weaker hive of the two you wish to unite, then place a single sheet of newspaper between the supers of the two colonies. In a short time the bees will gnaw through the paper and unite peacefully. The Hawke's Bay Beekeepers' Association is now non-existent, but the secretary used to be Mr. Currow, Health Food Depot, Napier. There are beekeepers' associations at Pahiatua and Gisborne.

WEATHER AND MILK-TEST.

MR. E. W. NEWTON, Mokotua, Southland, writes,—

Would you kindly inform me through your *Journal* if the weather-conditions have any effect on milk in regard to testing: if, for instance, a cold snap following a spell of mild weather would have the effect of bringing the test down, although the cows gave less milk during the cold spell? Also, if a continued spell of cold, wet weather would have the effect of keeping the test down, even though the quantity of milk comes down considerably also. To quote a case: The daily quantity of milk of one supplier dropped from about 40 gallons to about 30 gallons in about a fortnight, yet the test during that period was 0·5 lower than for the preceding period, though one would naturally expect it to be higher. Would the cold weather account for this?

The Dairy-produce Division replies,—

Weather-conditions frequently have a very marked effect upon both the quantity of milk given by a cow and its percentage of butter-fat. The amount of milk, as well as its butter-fat test, may be reduced as the result of very cold or very hot weather, or through many other causes. Some cows are affected to a greater extent than others by variations in the weather. The variation you quote is quite common—in fact, much greater variations are experienced by dairy-farmers, up to even 1 per cent. and over in some instances. In actual experience it is found that the fat-percentage in milk rises and falls at times without any apparent reason.

ORCHARD QUERIES.

MR. R. S. LEVESQUE, Cambridge, *via* Goodwood, writes,—

There are three things I would like to know about:—

(1.) The best mixture of manures to make for gooseberry-bushes. (I had thought of mixing slag and kainit in equal parts.)

(2.) The best method of pruning. If I summer-prune, shall I have to prune again in the winter?

(3.) Would you advise me to spray with the Bordeaux mixture or sulphur spray?

The Orchards, Gardens, and Apiaries Division replies,—

(1.) A dressing at the rate of 3 cwt. to 4 cwt. per acre of basic slag, to be followed in early spring by a dressing of superphosphate at the rate of 2 cwt. per acre is recommended.

(2.) Fruit-trees benefit by both summer and winter pruning.

(3.) The Bordeaux mixture has proved a very effective spray for the control of fungus diseases, and on the whole less likely to injure foliage than the sulphur spray.

MIXING OF FERTILIZERS.

"FARMER," "The Pa," Cambridge, writes as follows:—

Would you kindly inform me through the *Journal* whether there would be any chemical loss through mixing superphosphate and carbonate of lime in equal parts? Would this be a slow- or quick-acting mixture?

The Agricultural Chemist replies,—

When mixed with carbonate of lime superphosphate will be reverted to a form insoluble in water (dicalcic phosphate). The resultant mixture is slower-acting than superphosphate, but quicker-acting than guano or rock phosphate (tricalcic phosphate) on most soils.

FERTILIZERS.

MR. FRED. H. WHITE, Tahuna, writes,—

In a recent issue of the *Journal* (September number, page 339) you compared Christmas Island guano and basic slag, in answer to a question from one of your readers, and it was most interesting. Would you state the relative solvency of bonedust, Christmas Island guano, Surprise Island guano, Malden Island guano, Ocean Island guano, and Seychelles guano? Are any of these guanos more easily dissolved than others, and, if so, which? I have used these guanos with good results on newly-broken-up scrub land.

The Agricultural Chemist replies,—

Bonedust cannot be compared with guano, as it contains a quantity of intimately mixed organic matter, which affects the subsequent fate of the phosphates in the soil. The guanos can all be compared from a knowledge of the total phosphoric acid in each, the solubility in solvents being similar.

SEEDSMEN.

"DARWINIAN," Karamea, writes,—

Will you kindly give me the addresses of Messrs. Sutton and Sons and Messrs. Webb and Sons, English seed-merchants, in the next issue of your *Journal*.

The Fields and Experimental Farms Division replies,—

The following are the addresses asked for: Messrs. Sutton and Sons, Reading, England; Messrs. Webb and Sons, Wordsley, England.

BLACKBERRY-SPRAY.

MR. WILLIAM T. BELL, "Woodlands," Clevedon, writes,—

What material is used for spraying blackberry on the railway-line sides near Auckland? Is it poisonous to stock, how is it applied, and in what quantities? Could it be sprayed on with the ordinary knapsack spray-pump?

The Fields and Experimental Farms Division replies,—

The material used by the New Zealand railways for spraying blackberries on the railway-line near Auckland is known as "Pintch's gas-tar." It should not be dangerous to stock, as they usually avoid tar. The mixture is applied with a watering-can, being too thick for distribution through a spray-pump. It is applied as received from the vendors, undiluted. This specific kills for only one season. Some gorse was sprayed this season with this mixture, and the Inspector who witnessed the spraying reports that a new growth has already commenced. The following

is a recipe also used by the Railway Department—this also is a season killer: 80 lb. arsenic dissolved in 200 gallons of boiling water. Add 200 gallons cold water. This makes a 2-per-cent. solution. Weeds are first cut down by hand and the solution is sprayed on in two applications. 400 gallons of the solution is sufficient to spray twice a quarter-mile of railway-track 12 ft. wide.

INOCULATED SOIL.

MR. K. W. DALRYMPLE, Parewanui, Bulls, writes as follows:—

Would soil that has had lucerne growing in it for the last five years be inoculated? Although the lucerne has been growing well, it is being smothered out with rank grass, and is now rather thin. Can it be found by testing whether the soil is inoculated?

The Fields and Experimental Farms Division replies,—

It is accepted that soil from a lucerne-field planted five years ago would contain sufficient organisms to ensure inoculation. The presence of considerable numbers of tubercles or nodules on the roots would be a sufficient indication.

FAT-HEN.

MR. T. E. MAUNSELL, Carterton, writes as follows:—

Would you kindly advise me through your columns of the most effective method of eradicating fat-hen. I have some area of rich alluvial soil infested with the weed, and find it gives no end of trouble. I have some lucerne planted in part of it, which is growing strongly, but honours are about equal at present between it and fat-hen. The latter I am endeavouring to keep from seeding by periodical mowing. The rest is in maize and mangels.

The Fields and Experimental Farms Division replies,—

The control of the weed fat-hen can be obtained by repeated cultivation, or possibly by the use of covering-crops, such as rape, swedes, or peas in drills, that are kept free from weeds until the crop is so well advanced that the foliage will thickly cover the ground. Periodical mowing is the usual control.

GOAT'S MILK.

DR. LEWIS, Medical Superintendent, Te Waikato Sanatorium, writes,—

I should be glad to learn from you the composition of goat's milk, and the proportion of the various constituents. I should also be glad if you could let me have your opinion as to its assimilibility and nutritive value.

The Dairy-produce Division replies,—

The composition of goat's milk is very similar to that of cow's milk, with the exception that the fat-content is frequently a little higher, and the same may be said for the casein and albumen. Henry Droop Richmond, F.I.C., gives a comparative analysis of average goat's and cow's milk as follows:—Goat's milk: Water, 86·04; fat, 4·63; sugar, 4·22; casein, 3·49; albumen, 0·86; ash, 0·76. Cow's milk: Water, 87·10; fat, 3·90; sugar, 4·75; casein, 3·0; albumen, 0·4; ash, 0·75. Usually the milk from goats is of a somewhat strong flavour, and is not liked by users at the commencement. The nutritive value is considered equal to that of cow's milk, and some authorities even contend that it has superior qualities in this respect. A feature of this milk is that the butter-fat is very white in colour.

LONDON WOOL SALES.

THE High Commissioner reports as follows on the last London wool sale, under date of 15th January :—

The first of the series of colonial-wool sales for 1913 opened yesterday. The attendance, while good, was not equal to that at the opening of the previous series, when the number of persons present was larger than I had seen on any former occasion. However, competition was particularly animated, and all lots offered met a general and active demand. Merinoes of all classes were specially bid for, and values of this quality were slightly higher than a month ago. Fine crossbreds were also, if anything, a shade higher, but coarser qualities, light in grease, were kept at about the same price as at last sale, while heavy and inferior classes were less eagerly competed for, with the result that their values were slightly in the buyers' favour.

In the catalogues submitted yesterday there was a fairly representative selection offered for sale. Consequently it was possible to get a fair indication of the position of the market. The quantity of wool available for the present series is considerably less than a twelvemonth ago, being 134,900 bales, as against 181,500. This, taken in conjunction with the fact that trade is booming everywhere, and that woollen-manufacturers are busy and full of orders to keep them occupied for some considerable time, justifies the belief that the present high range of prices will be maintained, or that possibly they may advance. There is little to indicate a decline. The expectation of lessened supplies, together with the belief that there may shortly be a reduction of duties on wool entering America, are strong points in favour of an advance. Of course, present prices are already so high that naturally buyers may be cautious. The fact remains, however, that wool is required, and competition for all coming forward is bound to be good.

The outlook is decidedly promising. At the present moment, however, there are two factors which bear unfavourably on trade, one being a threatened strike in the woollen districts in Yorkshire and Lancashire, and the other the Balkan trouble. It is not expected that the former will develop to any extent, however, but, of course, in regard to the latter the position is more uncertain. If the dispute between Turkey and the Balkan States were settled, there would be every prospect of a further advance in values.

For the present series 33,500 bales of New Zealand wool are catalogued.

THE DOMINION'S FLOCKS.

A COMPARATIVE TABLE.

Year.	Number of Owners.	Number of Sheep.	Number of Breeding-ewes.	Percentage of Breeding-ewes.	Exported and locally consumed.	Percentage withdrawn from Flock.
1907	19,977	20,983,772	10,736,846	51·12	6,156,471	29·33
1908	20,693	22,449,053	11,244,041	50·08	6,011,587	26·33
1909	21,858	23,480,707	12,370,346	52·68	5,913,515	25·18
1910	21,522	24,269,620	12,515,380	51·07	6,544,171	26·90
1911	21,493	23,996,126	12,324,463	51·35	7,447,704	31·03
1912	21,471	23,750,153	12,277,029	51·69	6,307,398	26·55

THE DOMINION'S EXPORTS TO BRITAIN.

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,	1913	326,337	403,698	12,666	89,098	81,733	127,968	..	..	..	12,520	4,295	7,973	64 carcases pork.
"	*1912*	*208,424*	*273,246*	*13,052*	*101,544*	*62,398*	*106,074*	*607*	..	..	*6,831*	*1,615*	*1,056*	..
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*	..

BRITISH PRODUCE IMPORTS.

THE QUANTITIES AND VALUE OF CERTAIN LINES OF PRODUCE IMPORTED INTO THE UNITED KINGDOM FROM ALL COUNTRIES DURING THE YEARS 1907, 1908, 1909, 1910, 1911, AND 1912.

Year.	Total Quantity imported.	Value.	From Foreign and other Countries.		From New Zealand.	
			Quantity.	Value.	Quantity.	Value.
			WOOL.			
	lb.	£	lb.	£	lb.	£
1907	759,237,245	32,693,011	600,830,990	25,035,998	158,406,255	7,657,013
1908	719,044,881	27,997,328	559,345,459	22,055,563	159,699,422	5,941,765
1909	803,432,548	31,886,375	626,975,398	24,850,944	176,457,150	6,935,431
1910	797,418,403	33,811,537	607,737,552	25,284,780	189,680,851	8,526,757
1911	795,091,310	33,001,622	620,970,681	25,525,611	174,120,629	7,476,011
1912	806,855,687	33,235,015	622,615,232	25,533,651	184,240,455	7,701,364
			MUTTON AND LAMB—FRESH AND REFRIGERATED.			
	Cwt.	£	Cwt.	£	Cwt.	£
1907	4,578,523	8,687,407	2,573,445	4,691,179	2,005,078	3,996,228
1908	4,385,771	8,140,029	2,648,165	4,687,445	1,737,606	3,452,584
1909	4,761,838	7,839,195	2,783,815	4,340,142	1,978,023	3,499,053
1910	5,405,923	9,802,858	3,301,750	5,564,685	2,104,173	4,238,173
1911	5,337,451	9,588,646	3,355,984	5,661,895	1,981,467	3,926,751
1912	5,021,529	9,698,785	2,856,096	5,142,999	2,165,433	4,555,786
			BEEF—CHILLED AND FROZEN.			
	Cwt.	£	Cwt.	£	Cwt.	£
1907	5,735,003	10,397,102	5,343,704	9,830,519	391,299	566,583
1908	5,631,989	10,308,380	5,284,117	9,766,780	347,872	541,600
1909	6,140,522	10,293,406	5,686,154	9,633,087	454,368	660,319
1910	7,015,498	11,745,146	6,482,668	10,947,611	532,830	797,535
1911	7,362,434	11,136,223	7,104,499	10,761,958	257,935	374,265
1912	8,014,805	13,692,059	7,752,524	13,261,613	262,281	430,446
			BUTTER.			
	Cwt.	£	Cwt.	£	Cwt.	£
1907	4,210,156	22,417,926	3,896,293	20,828,700	313,863	1,599,226
1908	4,211,195	24,082,537	3,989,800	22,832,326	221,395	1,250,211
1909	4,062,812	22,424,962	3,784,231	20,952,743	278,581	1,472,219
1910	4,325,539	24,493,450	3,962,865	22,492,057	362,674	2,001,393
1911	4,302,956	24,602,111	4,026,510	23,106,869	276,446	1,495,242
1912	4,005,159	24,354,193	3,656,147	22,206,001	349,012	2,148,192
			CHEESE.			
	Cwt.	£	Cwt.	£	Cwt.	£
1907	2,372,233	6,905,509	2,179,932	6,316,834	192,301	586,675
1908	2,306,086	6,684,203	2,041,091	5,883,072	264,995	801,131
1909	2,390,090	6,829,863	2,021,559	5,716,151	368,531	1,113,714
1910	2,456,340	6,809,876	2,002,555	5,499,326	453,785	1,310,550
1911	2,348,322	7,139,942	1,950,477	5,930,393	397,845	1,209,549
1912	2,308,799	7,414,126	1,764,882	5,531,286	543,917	1,882,840
			HEMP.			
	Tons.	£	Tons.	£	Tons.	£
1907	123,273	4,037,264	100,048	3,291,298	23,225	745,966
1908	111,524	2,949,648	96,057	2,539,113	15,467	410,535
1909	109,908	2,640,815	100,537	2,425,428	9,371	215,387
1910	124,003	3,031,495	106,656	2,605,762	17,347	425,733
1911	134,685	3,173,229	119,612	2,861,379	15,073	311,850
1912	144,619	3,694,675	127,839	3,327,255	16,780	367,420

HEMP AND TOW GRADING RETURNS.

FEBRUARY, 1913.

Hemp.—The total number of bales graded was 16,082, as compared with 9,291 for the corresponding month of last year, an increase of 6,791 bales. For the twelve months ending 28th February, 1913, the number of bales graded was 112,332, as compared with 85,611 for the previous twelve months, the increase being 26,721 bales.

Tow.—During the month 5,710 bales were dealt with, as compared with 2,737 for the corresponding month of last year, an increase of 2,973 bales. For the twelve months ending 28th February, 1913, the number of bales graded was 36,172, as compared with 23,235 for the previous twelve months, the increase being 12,937 bales.

HEMP, TOW, AND STRIPPER-SLIPS GRADED THROUGHOUT THE DOMINION DURING THE MONTH OF FEBRUARY, 1913.

Hemp.

Port.	Superior.	Fine.	Good-fair.	Fair.	Common.	Rejected.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	..	..	544	2,739	280	22	27	3,612
Napier ..	..	..	..	..	..	..	..	..
Foxton ..	..	..	1,129	3,232	211	7	..	4,579
Wellington ..	..	161	2,694	2,111	122	7	..	5,095
Blenheim ..	34	90	76	..	..	..	..	200
Picton ..	..	140	40	188	..	..	..	368
Lyttelton ..	..	..	14	..	..	..	..	14
Dunedin ..	..	40	276	229	67	..	..	612
Bluff ..	..	..	295	1,279	28	..	..	1,602
Totals ..	34	431	5,068	9,778	708	36	27	16,082
Percentages of totals	0·21	2·68	31·52	60·80	4·40	0·22	0 17	100

Tow.

Port.	First Grade.	Second Grade.	Third Grade.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	43	637	975	128	1,783
Napier	..	..	..	..	..
Foxton	83	539	375	14	1,011
Wellington ..	317	978	285	28	1,608
Blenheim ..	34	54	..	..	88
Picton	23	66	41	..	130
Lyttelton ..	..	118	..	..	118
Dunedin ..	..	122	120	..	242
Bluff	..	262	433	35	730
Totals ..	500	2,776	2,229	205	5,710

Stripper-slips.—Passed for shipment: Auckland, 76; Foxton, 509; Wellington, 707; Picton, 26; Lyttelton, 16; Bluff, 127—total, 1,461. Condemned: Auckland, 14; Foxton, 76; Wellington, 36; Bluff, 11—total, 137.

STOCK EXPORTED.

FEBRUARY, 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	2	40	..	..	22	..	214	..	..	2
Gisborne	..	..	..	..	..	..	..	..	..	..
Napier	..	..	..	..	..	20	..	..	..	..
Wellington	18	..	..	..	..	10	8	25	..	..
Lyttelton	2	2	..	..	..	..	..	..	..	..
Timaru	..	..	..	..	..	..	..	..	..	..
Dunedin	21	..	..	..	..	2	..	..	..	..
Bluff	..	..	..	..	..	4	..	..	..	..
Totals	43	42	..	..	22	36	222	25	..	2

The following are the particulars of the horses shipped : 2 thoroughbred stallions, 4 thoroughbred mares, 6 thoroughbred geldings, 7 pony mares, 6 hacks and light-harness horses (geldings), 28 mares, 20 draught stallions, 5 half-draught mares, and 5 geldings.

PRODUCE IMPORTED.

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

Item.	Quantity.	Value.
		£
Bran	Nil	..
Butter	Nil	..
Cheese	8 cwt.	51
Chaff	2 tons	14
Fruits, fresh, all kinds	2,098,497 lb.	12,017
Barley	Nil	..
Oats	6 centals	4
Wheat	Nil	..
Onions	556 cwt.	196
Pollard and sharps	Nil	..
Potatoes	7 tons	44
Seeds, grass and clover	5,582 cwt.	18,288
Total values imported ..	..	£30,614

NEW ZEALAND-VANCOUVER TRADE.

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

—	"Marama," 27th Sept.	"Makura," 25th Oct.	"Zealandia," 22nd Nov.	"Marama," 20th Dec.	"Makura," 17th Jan.	"Zealandia," 14th Feb.
Butter, boxes ..	4,428	9,777	5,945	11,377	10,960	5,205
Eggs, " ..	8	226	..	..	..	..
Beef, quarters ..	..	..	..	580	716	..
Veal, carcases ..	..	..	..	393	276	181
Frozen sundries, packages ..	..	12	5	12	..	39
Wool, bales ..	..	..	6	20	30	..
Grass-seeds, beans, &c., sacks ..	..	50	177	..	..	54
Hides and skins, sacks, &c. ..	657	721	559	595	329	583
Onions, cases ..	..	..	..	..	14	1,572
Sheep-skins, bales	..	138	..	..	24	112
Jam, cases ..	..	125	100	50	50	75
Sundries, packages	5	21	329	92	313	250
Potatoes, crates ..	..	23	..	165	20	..
Kauri-gum, packages ..	69	46	53	21	..	176
Hemp, bales ..	..	..	..	..	246	129

BUTTER AND CHEESE EXPORTS.

THE following figures show the exports of butter and cheese from 1st April, 1912, up to 28th February, 1913, and the exports for the corresponding period of last season :—

To London.		To Vancouver.	To South Africa.	
Butter.	Cheese.	Butter.	Butter.	Cheese.
1911–12.		1911–12.	1911–12.	
275,162 cwt.	363,723 cwt.	19,708 cwt.	3,932 cwt.	2,610 cwt.
1912–13.		1912–13.	1912–13.	
259,266 cwt.	408,141 cwt.	51,847 cwt.	11,922 cwt.	4,628 cwt.

EXPORT OF EGGS.

THE experimental shipment of eggs made to the London market by the Government in December last arrived in excellent condition, and was successful in demonstrating its objective—that New Zealand eggs can be shipped successfully to distant oversea markets if carried in a cool-chamber at a temperature of about 45 degrees. The eggs met a poor market, and realized 8s. per 120 wholesale (9½d. per dozen). Reporting on the shipment, Messrs. H. C. Lane and Co., the London agents, state that the eggs when tested were found to be in splendid condition. Judging by the analysis they could be fairly described as new laid. They compared very favourably with eggs sent to Britain from Denmark and Russia. Hardly an egg in the 300 was broken. "From our point of view," the London agents conclude, "the experiment has been entirely successful."

NEW ZEALAND–SAN FRANCISCO SUBSIDIZED STEAM SERVICE.

THE following are the shipments of produce for San Francisco, Rarotonga, and Tahiti, and transhipments for Vancouver from New Zealand, since November last:—

—	"Tahiti," 8th Nov.	"Moana," 6th Dec.	"Aorangi," 3rd Jan.	"Tahiti," 31st Jan.	"Moana," 28th Feb.
Gum, packages	..	13	..	20	20
Seeds, sacks	10	..	..	..	..
Grain, &c., sacks	61	79	343	69	324
Meats, cases	475	413	523	272	100
Onions, cases	2	3	6	52	1,759
Potatoes, sacks	20	26	11	24	2
Sundries, packages	240	562	948	126	54
Butter, boxes	8,413	7,410	5,894	7,782	7,281
Hemp, bales	393	281	173	296	282
Frozen lamb, carcases	..	..	..	3	2
" veal "	..	..	..	71	..
" beef, quarters	..	..	..	489	150
" sundries, packages	..	..	..	..	2
Timber, pieces	..	..	..	1,440	..

A COMPARATIVE STATEMENT.

THE following figures show the main lines of agricultural products exported from New Zealand and Australia during the past twelve years:—

Year.	New Zealand.			Australia.		
	Wool.	Mutton and Lamb.	Butter.	Wool.	Mutton and Lamb.	Butter.
	£	£	£	£	£	£
1901 ..	3,699,103	1,857,920	882,406	15,235,704	726,186	1,447,882
1902 ..	3,354,563	2,190,636	1,205,802	12,743,013	543,422	379,244
1903 ..	4,041,274	2,788,828	1,318,067	13,997,233	489,934	1,213,177
1904 ..	4,673,826	2,468,923	1,380,460	17,115,334	657,361	2,460,661
1905 ..	5,381,333	2,431,440	1,408,557	19,822,216	1,111,969	2,331,595
1906 ..	6,765,655	2,482,266	1,560,235	22,645,769	1,095,120	3,238,304
1907 ..	7,657,278	2,864,460	1,615,345	28,891,830	1,377,502	2,890,261
1908 ..	5,332,781	2,682,364	1,171,182	22,913,660	1,219,107	2,386,548
1909 ..	6,305,888	2,950,801	1,639,380	25,483,110	1,231,035	2,399,693
1910 ..	8,308,410	3,134,149	1,811,975	28,777,187	2,161,513	3,951,131
1911 ..	6,491,707	3,085,735	1,576,917	26,071,193	1,633,622	4,637,362
1912 ..	7,105,583	3,498,990	2,088,809	26,332,617	1,592,278	3,343,240

The value of the cheese export of New Zealand increased from £238,685 in 1901 to £1,680,393 in 1912.

STOCK IN QUARANTINE.

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

No.	Breed.	Sex.	Port of Origin.	Owner or Agent.	Address.
			MOTUIHI ISLAND (AUCKLAND).		
1	Wire-haired fox-terrier	Female ..	London ..	C. L. Thomas ..	Napier.
1	Ditto ..	Male ..	" ..	" ..	"
1	Red-polled Angus ..	Bull ..	" ..	N.Z. Loan and Mercantile Agency Co.	Auckland.
3	Shorthorn ..	Heifers ..	Sydney ..	Ditto	"
			SOMES ISLAND (WELLINGTON).		
1	Hereford ..	Bull ..	London ..	E. Short	Feilding.
1	" ..	Heifer ..	" ..	" ..	"
2	Jersey ..	Bulls ..	" ..	J. R. Corrigan ..	Hawera.
2	" ..	Heifers ..	" ..	" ..	"
5	Ayrshire ..	Bulls ..	" ..	National Dairy Association	Wellington.
1	Southdown ..	Ram ..	" ..	J. Balsillie ..	Palmerston North.
5	" ..	Ewes ..	" ..	" ..	Ditto.
1	" ..	Ram ..	" ..	Ellis Bros. ..	Bull's.
4	" ..	Ewes ..	" ..	" ..	"
			QUAIL ISLAND (LYTTELTON).		
2	Guernsey ..	Bulls ..	London ..	George Gould ..	Christchurch.
4	" ..	Heifers ..	" ..	" ..	"
1	Oxford Down	Ram ..	" ..	F. C. Herbert ..	Fairlie.
1	Shropshire Down	"	" ..	L. White ..	Rakaia.
2	Southdown ..	" ..	" ..	Pyne and Co. ..	Christchurch.
1	Collie dog ..	Male ..	" ..	C. S. Hay ..	Wanganui.
1	Collie ..	Female ..	" ..	" ..	"
3	Collie pups (dropped on voyage)	..	..	" ..	"
1	Collie ..	Female ..	London ..	James Lilico ..	Lochiel.
3	Collie pups (dropped on voyage)	..	..	" ..	"