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ERGOT.

An Experiment to test the Toxic Properties of Ergot towards Cattle, and, in Particular, the Production of Gangrene of the Feet by its Ingestion (so-called "Ergotism").

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ON the 29th June, 1911, two young cattle, a steer aged eighteen months and a yearling bull, were selected at the Wallaceville Laboratory for the purpose of carrying out the above experiment. Both animals were carefully examined beforehand, and found to be in normal health and in moderately good condition.

Taylor, in his classic work on "Poisons," remarks, in reference to the effect of ergot on the human subject, that "it does not easily cause death in one large dose, but its fatal operation appears to be more strikingly developed by its long-continued use in small or medicinal doses." In this experiment it was therefore decided to commence with the medicinal dose, gradually increasing it if considered necessary. For convenience of dosage the liquid extract of ergot, B.P., was employed. This preparation

represents a solution of ergot in the strength of 1 in 1. Each animal received daily, in the form of a drench, 4 c.c. (about 1 dram) of the liquid extract mixed with half a pint of water, this dose being doubled on the 7th July, eight days after the commencement of the experiment. On the 18th July the dose for the bull was again increased to 16 c.c. (4 drams), that for the steer remaining at half this quantity. On the 24th July the dose for each animal was fixed at 16 c.c. (4 drams).

On the 8th August, forty days after commencing the experiment, no symptoms of poisoning nor other ill effect had been induced. The steer had lost condition slightly, but this was probably the result of bad weather and scarcity of grass-feed. The condition of the bull was very good, so that in his case the dose was further increased on the 16th August to 30 c.c., and finally, on the 9th September, to 40 c.c. (10 drams) daily. The maximum daily dose for the steer remained at 16 c.c. (4 drams). These quantities of the Liquid Extract of Ergot were given every day (with the exception of three days from the 8th August, when the experiment was unavoidably held over pending the arrival of a fresh supply of ergot, which had failed to come to hand when ordered) until the 26th September, covering a period of eighty-nine days for the entire experiment. No toxic symptoms having been set up throughout that time, it was decided to discontinue the dosage.

The steer, which, it will be remembered, was receiving the smaller dose, at one time suffered from diarrhœa, lost condition, and showed slight swelling of the hocks, but these symptoms were attributed to the presence of internal parasites (*Strongylus ostertagi* and *S. cervicornis*), and gradually disappeared on the nutrition of the animal being improved by means of additional dry feed.

Altogether the bull calf received 65 oz., or $3\frac{1}{4}$ pints, of Liquid Extract of Ergot, extending over a period of nearly three months, the steer receiving for the same length of time 2 pints. The climatic conditions prevailing at the time were not favourable to the resistant powers of the animals, the weather for the most part being cold and often very wet. At no period of the experiment was any lameness apparent, nor were any signs of disease of the extremities shown.

In order to ascertain whether the ergot produced any topical effect when brought into contact with an abraded surface, a quantity of the Liquid Extract was applied to a scarified area between the claws of a yearling heifer. This treatment was repeated for twelve days without producing any ill effect, the scarified portion at the end of that time having healed.

Remarks.

In his work on "Veterinary Medicine," Finlay Dun states the dose of Liquid Extract of Ergot for cattle to be 1 to 2 drams. The drug is pre-

scribed medicinally in order to check hæmorrhage after calving, to promote contraction of the womb, and to hasten the expulsion of the afterbirth. The same authority writes that ergot given experimentally, in large or continued doses, causes ergotism, a condition characterized by derangement of the stomach and bowels, nausea, and diarrhœa. Its effect upon the circulation causes dry gangrene, chiefly involving the extremities, ears, and tail, and may also produce inco-ordinate spasms, and sometimes epileptiform convulsions. Under "Toxic Effects," Dun mentions that these are not so marked in horses, cattle, sheep, and rabbits, as in men and dogs.

The following experiment is quoted in illustration of the above: "Thirty cows amongst them took daily with impunity 37 lb. for three months; two milk-cows had between them 9 lb. daily, with no further evil effect than that the butter was badly tasted. Twenty sheep amongst them ate daily for four weeks 9 lb. without injury. Dogs, on the contrary, suffered violent illness after receiving 6·12 drams, while 3 oz. proved fatal to a terrier bitch in twenty hours. Chronic poisoning occurs, especially in patients placed in unfavourable sanitary surroundings. . . . Gangrene of the extremities is not, however, produced so readily as in man."

Gilruth in 1905 carried out feeding-experiments on cattle and sheep, using a commercial sample of the dried ergot sclerotia for this purpose. The ergot was fed to the experimental animals mixed with damp chaff. In forty-five days a calf consumed 10½ lb. of ergot, and in the same period a sheep ate 1½ lb., while another sheep took ¾ lb. of the ergot-spurs. No ill effects followed.

Although insufficient in extent to be conclusive, the result of this present experiment goes to indicate that the effects of ingestion of ergot by cattle are not as appreciable as popularly supposed. It serves also in the same measure to support the conclusions arrived at concerning the cause of gangrene of the feet, a condition shown to be associated with the presence of a specific organism. (See Annual Report, Department of Agriculture, 1910.)

In connection with these experiments it is worthy of note that the unstable character of the active constituents of commercial ergot is generally recognized, many preparations and samples of the drug being found quite inactive. In view of this it is evident that further work is necessary, and it is proposed to carry out more feeding-experiments with freshly collected ergot if sufficient be obtainable, with the object of testing the matter under more natural conditions. The results will be published in due course.

At the close of July foot-and-mouth disease existed on no less than 31,926 farms in Germany.

REGISTERED PEDIGREE COWS.

TESTING THE ANNUAL PRODUCTION.

W. M. Singleton.

One of the greatest accomplishments of modern times is the advancement made in the productive character of dairy stock, as evidenced in the cows which are the world's greatest producers of milk and butter-fat. Whether this success of the breeder has been obtained by means of providing suitable environment for the cow and her ancestry, or whether advantage has been taken of certain mutations which have appeared as suggested by the Mendelian theory, matters not. Certain families possessing special dairy qualities have been built up by taking advantage of the prepotency of an animal possessing such qualities in a marked degree and capable of transmitting them to its offspring. It is now generally known that among all the dairy breeds certain families stand out as possessing the best qualities of the breed in a special degree.

Those dairy cattle known as "purebreds" are, as a class, generally considered to possess certain fairly well-fixed and desirable qualities, which the keeping of the breed in a pure state, tends, when accompanied by judicious selection, to propagate and strengthen. The power of transmitting these qualities is thereby intensified, and the breed made more valuable, so long as these qualities transmitted have a monetary value.

As factory dairying extends, as land-values increase, and as more intensive dairying becomes necessary, the monetary value of the dairy cow has relegated the æsthetic consideration to the background, and now "handsome is as handsome does," and the cow prized most highly is the one that "delivers the goods" and has this propensity so fixed in her through inheritance from a long line of ancestors of the one type that, according to the law of chance, she is likely to transmit the same desirable qualities to her offspring. And while this quality is prized so highly in the dairy cow, even from the view-point of offspring alone, it must be remembered that the cow's offspring will, each year, number usually not more than one, whereas the male may be parent of many times this number. How much more important is it, therefore, that the dairyman should be positive that the head of his dairy herd has by inheritance received those dairy qualities which the herd-owner is striving to fix in his herd!

These dairy qualities are now very much abbreviated, and may be summed up as "the ability to get offspring which, if females, will produce a large quantity of milk and butter-fat economically." At one period of the development of our dairy herds the numbers of breeders who might excel according to the then standards was more or less restricted to those who had a special endowment or natural aptitude along that line. In these later days, when the productive capacity of the dairy cow is considered of premier importance in successful dairying, the field is enlarged, and a lover of dairy animals who is gifted with fair judgment and energy, a kindly nature and infinite patience, may, by using the scales and fat-test to provide him with exact data, make a success of dairy-farming. This door has been opened to the greater number very largely through testing and recording of the yields of purebred cows, and by the records of purebred bulls, as seen in the number of their daughters which have distinguished themselves in this record of yields or performance. By consulting this record for purebred cows, the beginner in the older dairy countries can for himself select dairy stock from those families of which the females are heavy milk and butter-fat producers. The prospective dairyman can ascertain whether the bulls of any particular family are transmitting enhanced milking-qualities to their offspring, for it is only through the good records of his daughters that a bull's name is admitted to the registry. With such information at his disposal even the uninitiated may make an intelligent selection of good dairy stock. As the associations of the various breeders of dairy stock admit only purebred males and females to their Record of Performance and Advanced Registry, the security which these records offer the purchaser is certainly valuable.

Records of Performance or Advanced Registry.

Official records were not instituted until some considerable time after the herd-books were established. As the numbers of purebred dairy stock increased and competition became keener, the records of performance came to the fore, and control of these records was taken up by the breeders' associations for each breed. It then became quite fashionable for breeders with long purses to make a hobby of rearing record-breaking dairy cows and heifers, and the number of records which have been made and broken is surprising. The development in the dairy stock necessary to keep pace with this record-breaking line of work has been equally amazing; but, while these extremely high records are interesting as showing what the possibilities of some dairy cows are, they are not so necessary from the view-point of the practical dairyman or practical breeder.

For some time the short tests were all that were demanded. Official one-day, two-day, seven-day, or thirty-day tests were considered quite sufficient to indicate the productive capacity of the purebred dairy cow;

and many breeders affirm that in the interests of the dairy cow's constitution she should not be kept up to record-breaking pitch throughout an entire lactation period. While many agree with this line of argument, they are not satisfied to accept the record of a seven-day test as a true indication of a cow's producing-capacity for a lactation period. Many cows may milk exceptionally well for a time, but may not be possessors of that all important quality known as " persistency." The tendency amongst practical dairymen who are breeding for yearly returns, as well as with the object of selling stud stock, seems to be more along the line of discarding the short-period official tests and extending the tests to take into consideration the cow's full milking-period. This class of testing is likely to popularize itself, for, while the dairy cows are not expected to break records, they are under this system expected to do fairly good work throughout the whole milking-period, and the figures indicating the cow's production in this manner are much more intelligible to the average dairyman, and at the same time are a more faithful indication to the dairyman of the cow's comparative worth.

The breeders of Holstein-Friesian cattle claim the credit of being the pioneers in connection with the taking of advanced registry official records, while the breeders of the Guernsey claim to be the first to adopt semi-official records for the whole lactation period. The various associations of breeders have accepted this style of record, while at the same time many continue the official record for the short period.

Semi-official Records.

In the making of the short-period official records, the supervisor or testing officer (who is usually an appointee of an experimental station or an Agricultural Department) remains at the farm during the time of such test. He weighs and samples for testing each and every milking, and the yield for the period is figured accordingly. While this is necessary for short tests, it is not so necessary for the test of the whole period. In this semi-official test for the full lactation period the owner is required to weigh, or cause to be weighed, the milk of the cow for each and every milking, and to keep a record of the same. A record of these weights must be supplied each month, and at the end of the lactation period the yearly record must be forwarded by the owners, and must be accompanied by an affidavit sworn before a Justice of the Peace or Notary Public declaring the weights to be accurate. The Government officer in charge of the testing is expected to visit the farm once a month for about two days. He is to weigh the milk during his visit and compare it with previous weights, and take samples for testing for fat. The production of fat for the month is figured by taking the weight of milk for the month as found by the farmers and figuring this at the test found by the Government officer. The lacta-

tion period must not extend over 365 days, and each cow must drop a calf within, say, fifteen months from the time her test commenced.

Cows are classed as "two-year-olds," "three-year-olds," "four-year-olds," and "mature cows." Unless an animal produces up to a certain minimum of milk and butter-fat stated as the standard for her class in the semi-official test, she is not admitted to the record of merit. These standards vary with different breeds, but are usually within the following limits :—

	Maximum.		Minimum.	
	Pounds Milk.	Pounds Fat.	Pounds Milk.	Pounds Fat.
Two-year-olds	7,500	255	5,500	198
Three-year-olds ..	8,500	289	6,500	234
Four-year-olds	9,500	323	7,500	270
Mature cows	10,500	357	8,500	306

It is suggested that the time is opportune in New Zealand when semi-official testing might be commenced with profit to the dairying communities of this country and to the breeders of purebred dairy stock. Dairymen about to purchase purebred bulls will pay more for those descended from ancestry of known merit. The extra price will more than repay the cost of taking the weight of milk daily. A semi-official record of a cow for one year may be legitimately quoted by the breeders when selling any progeny of this cow ; and the one season's testing may influence very materially the price of some seven or eight sons and daughters, not to mention the influence on animals whose relationship is farther removed.

To the dairymen of our Dominion who are endeavouring to improve their herds, such records would be invaluable. At present many dairy-farmers desire to get purebred sires from known good milking strains, but while many purebred sires are offering, little is known of their capacity to get good milk-producing progeny. For supplying this knowledge, semi-official records of the bull's dam and grandams are necessary, and their absence constitutes the "missing link" in New Zealand breeding of high-producing dairy stock. The testing of the yield-production of the individual cows which constitute our ordinary crossbred herds is extending, and is creating a demand for purebred sires ; but to an equal extent this herd-testing is creating a demand for the milk and butter-fat records of the sires of such dam and grandams. It is only by the use of sires whose quality is assured by such records that the most intelligent improvement can be made in our dairy herds. The time is not far distant when our most progressive dairymen will, when purchasing a head for their dairy herd, demand not only a pedigree but records such as has been described above.

Dry weather experienced in July is expected to have an appreciable effect on the season's output of cheese, but the quantity of cream exported to the United States during the present season is very much less than it was in 1910.—*Canadian Census and Statistics Monthly.*

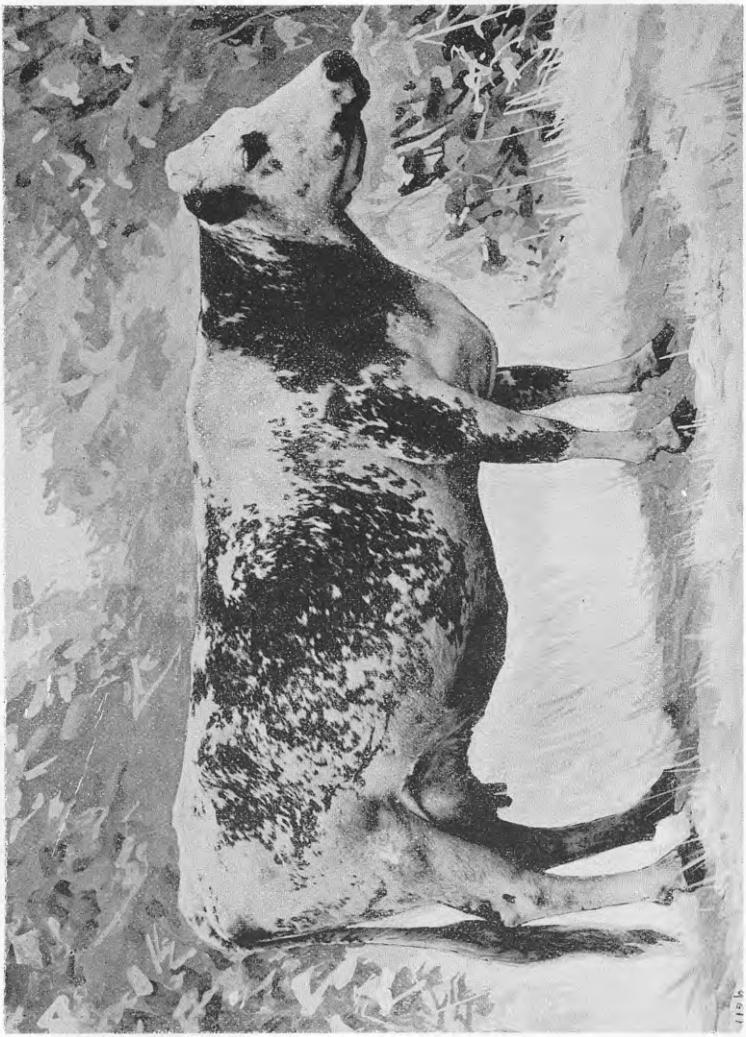
HERD-TESTING.

A STRIKING LESSON FROM THE WORK OF THE PAST SEASON.

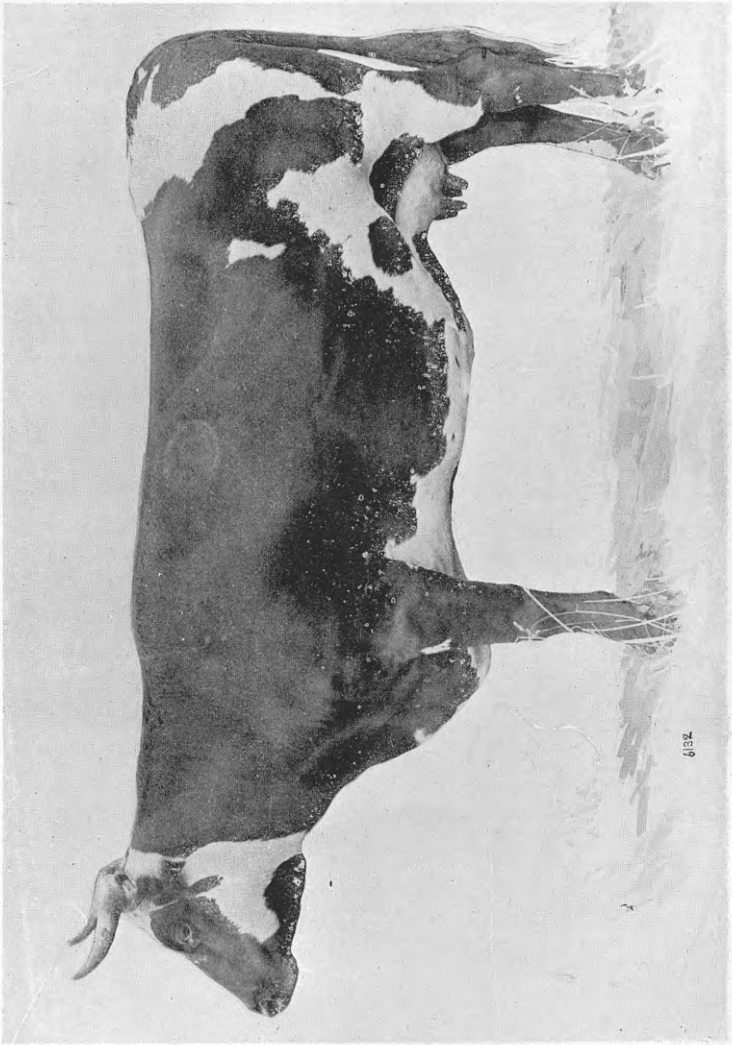
THE two pictures of cows on the following pages afford a striking object-lesson of the value of herd-testing work. On form there is little to choose between them, and many a dairy-farmer would find it a difficult matter to decide which of the two was the better milker. Yet the year's test has demonstrated that No. 1 produced more than double the amount of butter-fat of No. 2. The relative value of the two beasts is thus fully six to one, for the cost of production would be about the same in each case. The cows illustrated are not extreme types—there were a number of better cows than No. 1 and many worse than No. 2 in the model testing associations—but are medium animals to be found in the majority of herds in the Dominion. The best cow of those tested under the association scheme gave 11,740 lb. of milk and 507 lb. of fat. The two instances are sufficient to demonstrate the vast sum of money being lost to the dairy-farmers of New Zealand by the milking of unprofitable cows.

THE LATE MR. SABIN.

IT is with regret the death of Mr. W. T. Sabin, M.R.C.V.S., Veterinary Supervisor for the Southland District, is chronicled. Mr. Sabin contracted pneumonia, and succumbed after an illness lasting some three weeks. The deceased gentleman joined the Department of Agriculture in October, 1904, having previously been for several years engaged in private practice at Hastings, Hawke's Bay. He was a most capable and trustworthy officer, well versed in his profession, and he did a great amount of valuable and effective work in a quiet and unostentatious manner. His death s a severe loss to the Department. Mr. Sabin studied at the London Veterinary College, graduating in 1870. On entering the Government service he was first appointed to Ashburton as Veterinary Inspector at the Canterbury Frozen Meat Company's freezing-works there, and in January, 1905, was transferred to Pareora as Veterinary Inspector at the same company's works there, about a year later being transferred to Invercargill, where he subsequently held the position of Veterinary Supervisor for the Southland District until the date of his death.



No. 1. Yield, 8,598 lb. of Milk, containing 437 lb. of Fat.



No. 2. Yield, 6,122 lb. of Milk, containing 213 lb. of Butter-fat.

ABORTION.

C. J. Reakes, D.V.Sc., M.R.C.V.S.

It is a matter for extreme satisfaction that the work done during the past few years in combating this disease has given such good results. It is still necessary, however, for farmers to exercise vigilance and care in preventing the possible reintroduction of contagious abortion into their herds, and to continue the exercise of preventive measures generally.

As regards failure of cows to conceive, this is, on the whole, giving more trouble at the present time than is abortion itself. The fact of it being so commonly found associated with the presence of contagious abortion in a dairy herd has led to the opinion being formed that it is in some way the result of infection by the same specific organism. Certainly it is undeniable that careful and proper irrigation of the womb and vagina has generally resulted in the cows holding to the bull after the next service, provided care has also been taken to properly apply an antiseptic wash to the bull's organ. Sometimes, however, the trouble has persisted in spite of treatment, but here it has not unfrequently been found that the treatment has not been properly carried out, in that the womb itself has not been washed out. In empty cows, unless newly calved or aborted, the tubing recommended for use cannot be easily introduced through the neck of the womb. It is necessary for the farmer, after locating it, to carefully dilate it with his fingers (which must be thoroughly clean), and then guide the end of the tube through it. The opening can be detected easily by its structure—it feels like a sort of rosette of fleshy leaves with the opening in the centre. Its dilatation must be made slowly and carefully, and, if the constriction be great, smearing with belladonna ointment will be of assistance. An interval of twenty minutes should elapse between the application of the belladonna and the resumption of the attempt at dilatation.

Trouble of a serious nature has arisen in some cases through the excessive use of corrosive-sublimate solution in washing out heifers or cows which have repeatedly failed to conceive. One farmer in particular treated several of his cows to so excessive an extent that an acute inflammatory condition of the lining membrane of the vagina was set up, the animals being rendered useless for breeding purposes for at any rate some months to come, and having to be fattened for beef. But it is evident that a large number of cases exist in which bad management on the part of farmers

is really responsible for failure of conception in some of their cows or heifers. The too prevalent practice of allowing the bull to run at large with the cows results in the animal becoming stale and overworked, as a consequence either of his having too many cows to deal with, or of his unnecessarily frequent attentions to individual cows. This is especially the case when, as is frequently observed, young bulls often only two years old are used. It is far better to provide a special small paddock for the bull, and to bring the cows to him as they become ready, removing them again when properly served.

One not unfrequently observed cause of failure of cows to conceive lies in the improper use of corrosive-sublimate solution in irrigating the vagina, &c., immediately before service. At least two days should elapse between the time of irrigation and the time of service, and it is better to carry out the irrigation just before the cow is due to come in season than to wait until the condition has become easily noticeable.

Another cause of failure to get in calf from time to time met with is an attack of septic metritis (inflammation of the womb) following calving. Though the cow apparently recovers, the clinical symptoms disappearing with usually the exception of a slight discharge from the vagina, often overlooked by the owner, some weeks, perhaps months, may elapse before the womb thoroughly regains its normal healthy condition. Evidence on this point was afforded by a number of specimens sent by Mr. Young, Veterinary Supervisor. These consisted of portions of the womb obtained from cows sent in for slaughter in consequence of their failure to get in calf after repeated services. These had been selected on account of the naked-eye appearances presented, and on examination showed circumscribed areas of chronic inflammation. In cases where a cow has suffered an attack of septic metritis it is advisable to wait three months at least before allowing her to go to the bull, and, further, to irrigate her at intervals with a mild antiseptic solution, such as an ounce of lysol to a gallon of warm water.

That the bull, by acting as carrier of infection from cow to cow, is often an important factor in disseminating trouble among the herd is clearly shown by the practical experience obtained, and, so far as circumstantial evidence can go, indicates that many of those numerous cases of failure of cows to conceive which cannot be attributed to his being overworked, and consequently rendered temporarily impotent, are the result of infection of the cow by the specific organism of contagious abortion. It may be that the presence of this organism has the effect of destroying the virility of the spermatozoa, or that the impregnated ovum is aborted shortly after its entrance into the womb. It is an undoubted fact that trouble of this kind has persisted when the owner, though carefully irrigating all his cows, has omitted to treat the bull, but has disappeared when

this omission has been rectified, and the entire herd, including the bull, has been treated.

Some stockowners now use lysol, or one of the preparations derived from coal-tar which are used for sheep-dipping purposes, and usually described as "non-poisonous" sheep-dips, instead of corrosive sublimate, for the purpose of treating contagious abortion and failure of conception on both preventive and curative lines. The evidence available points to these preparations being effective, when properly used, and they are certainly less irritating. At the same time practically the only drawback to the use of corrosive sublimate lies in the excessive irritation it temporarily produces. There can be no doubt as to its effectiveness.

One point which may be noted here is the desirableness of keeping the tubing used for irrigation perfectly clean. The fluid used will ensure that the interior is cleaned each time it is used, but there is a tendency on the part of some farmers to allow the outside to become extremely dirty, which is a bad thing.

Finally, I would impress upon farmers the necessity for continued care and vigilance in the exercise of preventive measures. Where irrigation as a preventive measure alone is adopted, lysol in a 1-in-80 dilution, or non-poisonous dip in a 1-in-60 solution, may be used instead of corrosive sublimate, but where the disease is actually present in a herd it is best to use corrosive sublimate as being the most certain and reliable antiseptic, though the others are really good, and would doubtless give satisfactory results. The continued careful exercise of preventive measures is necessary, especially in dairying districts. No newly purchased bull who has done previous service should be allowed access to the cows until he has been properly irrigated; and no newly purchased cow should be admitted to the herd, or to service by the bull, until she has been thoroughly washed out with an antiseptic solution.

Where abortion has occurred, even though from other causes than contagion, I would emphasize the necessity for finding, and effectively destroying, not only the aborted calf, but the "cleansing," either by burning or deep burial, and, further, of properly dealing with the ground-surface on which it has been dropped. Preferably it should be burned where it lies, as this will also dispose of the infection which exists on the ground; if not, a fire should be built and kindled over the spot; or, failing that, non-poisonous sheep-dip or quicklime distributed over it, and then the ground-surface deeply dug over. Further, it is essential to bear in mind that the discharges which come away from a cow after aborting consist of infective material, hence the animal should be placed where these discharges cannot contaminate the paddocks, &c., and thus prove a source of danger to other cows in the herd. The cow should be kept so isolated until the discharge has entirely ceased, and be well washed out before being allowed to rejoin the herd.

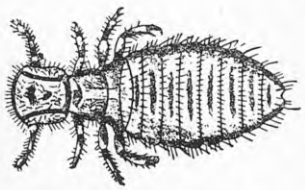
THE SHEEP-LOUSE.

ITS EFFECTS, DETECTION, AND SUPPRESSION.

A. T. P. Hubbard.

Since the eradication of scab from the flocks of the Dominion owners may congratulate themselves upon the comparative immunity which their sheep enjoy from pests generally. Apart from the tick and louse, our sheep are practically free from external parasites. The presence of these, however, entails serious loss both in wool and carcase, and should therefore command the earnest attention of all sheepowners. That considerable apathy exists on the part of many farmers, particularly in regard to lice, cannot be denied, and it is with the hope of removing this, and stimulating renewed energy in combating these vermin, that this article is written.

The tick being larger and consequently more conspicuous than the louse, it is perhaps regarded by many as being the more harmful, whereas the louse is really a much more serious menace to the welfare of the sheep. Reduced vitality, loss of condition, and injury to the fleece, are each directly attributable to the ravages of the louse, dependent as it is for its sustenance partly upon the blood it extracts from its victims and partly on the yolk of the wool. Owing to continual restlessness of the sheep, caused through irritation, its vitality and condition are rapidly reduced, proper growth of wool is retarded, and the fleece is seriously damaged through constant rubbing against fences, logs, &c. With reduced vitality the louse-affected sheep naturally becomes a prey to other ailments. In this connection I am of the opinion that much of the difficulty experienced in this country in raising young sheep would be overcome if owners exercised greater care in ensuring that their lambs are maintained free of lice. The rigour of the winter months demands that every endeavour should be made to rid the lambs as far as possible of anything calculated to undermine the constitution.



Sheep-louse, Female (*Trichodectes Sphaeroceyhalus*). Magnified 20 diameters.

Method of Detection.

As many sheepowners freely admit that they "don't know a louse when they see it," nor know how to look for it, a few remarks in this direction

will perhaps be of some value. In the majority of cases where sheep are affected with lice there are generally outward and visible signs of the trouble, consisting of poorness of condition, dry, hungry, or scoured appearance of the wool, and the fleece is also often broken and tufted, portions having been torn out by the sheep rubbing themselves against fences, logs, &c., in the endeavour to allay the irritation set up by the vermin.

In order, however, to definitely satisfy oneself as to the presence of lice, a closer examination is necessary, and for this purpose the sheep must be caught. After being turned towards the best available light the wool should be parted, so as to expose the skin to view, and the sheep examined carefully, especially the parts surrounding the brisket, neck, and well up about the ears. Vermin is often found in the ears when nowhere else, owing to want of thorough immersion of the sheep when being dipped, the ears thus escaping treatment and remaining a breeding-ground and starting-point for fresh infection. Lice will generally be found well down on the skin, and in badly affected cases the skin is scaly and lacks that pink colour characteristic of the clean, healthy sheep.

Sheep-dipping.

That dipping in many instances is carried out in a very perfunctory manner must be admitted. Carelessness, want of knowledge, and limited means are the main factors operating in this direction. For the successful suppression of vermin in sheep it is obvious that dipping must be universally done, and on thoroughly effective lines. Of the many dipping preparations on the market some perhaps are more effectual than others; but while the material used is often blamed for unsatisfactory results it is very often the method employed that is at fault. Proper mixing of the dip and thorough immersion of the sheep are the fundamental essentials of successful dipping.

Where circumstances permit and a large number of sheep have to be dealt with, the 60-ft.-long dip is perhaps the best, but where a small flock is kept a less expensive dip, and yet just as effectual, may be constructed by adopting the semicircular type of bath. This class of dip is in use on many small farms, and gives entire satisfaction. It is generally built about 10 ft. long by 5 ft. across its greatest width. This holds about six sheep at one time, and permits them swimming about freely, until the draining-pen gate is opened and they are released. By this method thorough dipping is accomplished; whereas in the short straight dips, so often found on small farms, the sheep cannot be retained sufficiently long to ensure proper immersion, and consequently little good results.

As regards the best time to dip, there is a diversity of opinion, but the best solution of that problem is, I consider, to dip twice—that is, firstly "off the shears," or soon after shearing, and again later on, but during

the statutory dipping-period. The first operation costs comparatively little, owing to the shortness of the wool, and it rids the lambs of the parasites which desert the older sheep as soon as shorn. The second dipping will destroy the vermin hatched from eggs which perhaps survived the first immersion, and results in the flock being in good clean condition to face the winter months. Where this practice is adopted a poisonous dip is considered preferable for the second dipping on account of its more lasting effect.

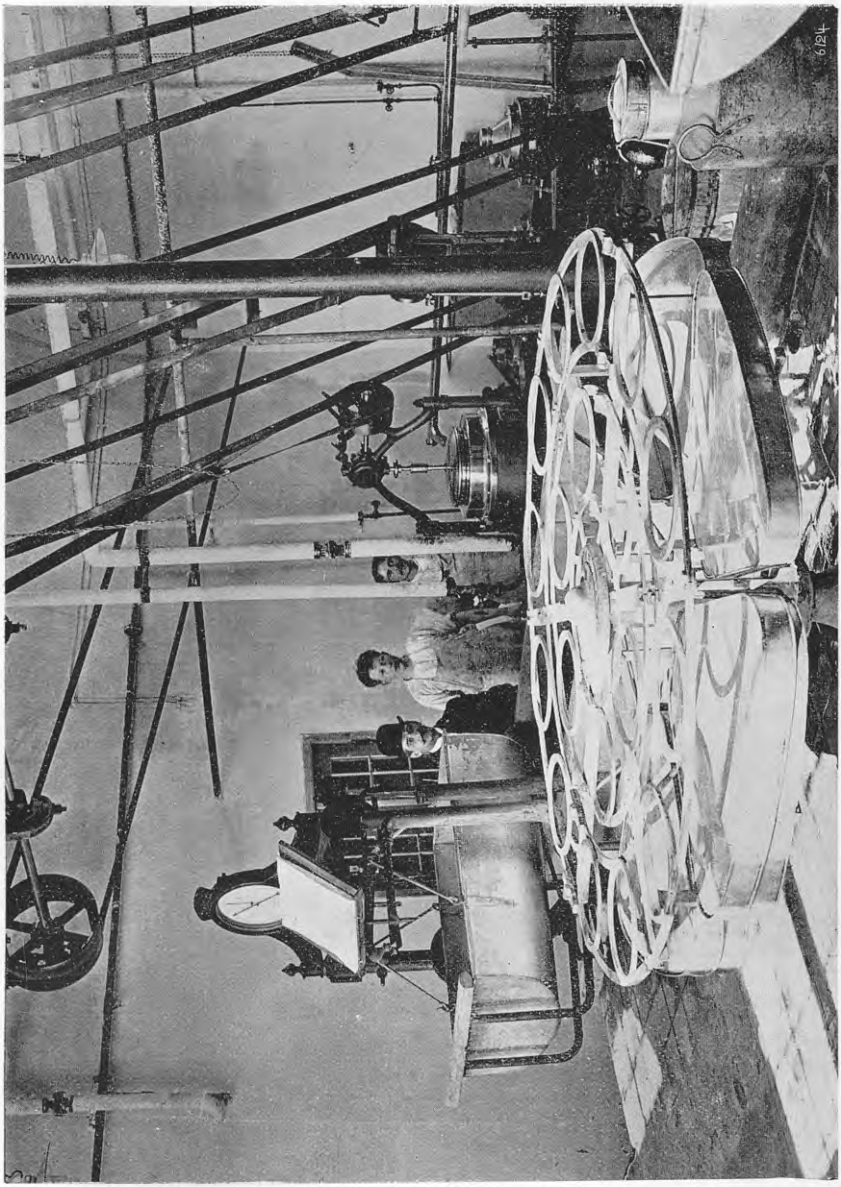
The idea which largely prevails amongst sheepowners—that vermin are a necessary concomitant to poverty—is entirely erroneous. Neither lice nor ticks can arise spontaneously. Low condition is certainly conducive to the increase of vermin, but if a sheep was absolutely clean and was not exposed to infection from others it would not develop vermin, no matter how poor in condition it became.

Legal Requirements.

The Stock Act of 1908 requires that all long-wool or crossbred sheep must be dipped annually between the 1st January and the 31st March in the North Island, and elsewhere between the 1st February and the 30th April. Also, that if at any time lice or ticks are found in a flock the owner may be called upon to dip. Lice-affected sheep must not be driven along any highway without an Inspector's permission, nor must such sheep be exposed for sale.

THE THRIFTY DANES.

To New-Zealanders who have personally investigated the dairy-factory work of Denmark the only feature which has appealed to them as being in any measure in advance of the system of co-operative buttermaking in vogue in the Dominion was the attention to small details, economies in apparently minor matters, which in the aggregate represent a not inconsiderable reduction in cost of manufacture. An instance of this policy of thrift is the use in some Danish butter-factories of a milk-draining stand, illustrated on the opposite page, on which the milk-cans are inverted as soon as these are emptied of their contents, in order that every drop of milk may be saved. Danish authorities declare that the cost of these draining-stands, well-made appliances, have been covered by the saving effected in only a few months, and that the annual economy effected a good reduction in the expenses of management. This conveys a good idea of the very careful work of the industrious Dane. While, however, it may pay in Denmark, where the individual milk-supply is small (often as many as 140 suppliers being necessary for a daily output of a ton of butter), and labour is cheap, it would be impracticable under our conditions.



THE MILK-CAN DRAINER IN A DANISH BUTTER-FACTORY.

CO-OPERATIVE EXPERIMENTS.

THE MARTON PLOTS.

G. de S. BAYLIS.

THE following report gives the treatment and results of the experiments carried out during the past season at the Marton Junction experimental plots:—

WHEATS.

Area: Except where otherwise stated, all odd-numbered plots, such as 1 or 1x, were half an acre in extent, and the even-numbered plots were one-eleventh of an acre each.

Lime: The northern half of every plot received a dressing of 5 cwt. of ground limestone per acre, the southern half being left unlimed.

Cultivation: The land was ploughed out of oat stubble at the end of May; disced on the 4th July; and again at the end of the month. The whole area was harrowed on the 6th July, and again on the 3rd August. The unlimed portion required two harrowings, while the limed portion only received one.

Seeding was at the rate of 2½ bushels per acre in wheats, and all plots were sown in August.

Manures: Slightly over 1½ cwt. per acre of a mixture, the composition of which is appended, was drilled in with the seed in the ordinary way.

Plot.	Name.	Remarks.	Date sown.	Date harvested.	Yield per Acre: Bushels.
1	Yandilla King	From New South Wales. Third season in New Zealand	Aug. 9	Jan. 16	39⅓
1x	John Brown ..	From New South Wales. Second season in New Zealand	,, 10	,, 7	34½
2	Red Marvel ..	An Anglo-French wheat. Second season in New Zealand	,, 15	,, 24	22
3	Hard Straw Tuscan	From South Island	,, 10	,, 16	40
3x	Red Tuscan ..	,, ...	,, 10	,, 14	40
4	Red Marvel ..	Anglo-French	,, 15	,, 24	22
5	Pearl ..	From South Island	,, 15	,, 31	22¾
5x	Hunter's ..	,, ...	,, 15	,, 31	29½
7	White Marvel..	An Anglo-French wheat. Second season in New Zealand	,, 16	,, 31	26

Plot.	Name.	Remarks.	Date sown.	Date harvested.	Yield per Acre: Bushels.
7x	Comeback ..	From New South Wales. Third season in New Zealand. It has obtained first place in the milling test especially made for the New Zealand Department by Mr. J. C. Brunnich of the Agricultural Department, Brisbane. It matures about ten days earlier than most varieties	,, 16	,, 6	$25\frac{1}{10}$
9	Velvet Ear ..	From South Island	,, 17	,, 24	$30\frac{1}{2}$
9x	Federation ..	From New South Wales. Third year in New Zealand	,, 17	,, 10	$28\frac{1}{2}$
11	Bone ..	Pedigree wheat from Svalof, Sweden. Germinated badly	,, 17	Did not mature	..
11x	Grenadier ..	Ditto	,, 18	Feb. 15	$12\frac{1}{2}$
13	Pearl Spring ..	,, ...	,, 18	,, 15	4

Notes on the Wheats.

Of the varieties grown, Comeback proved to be the first to come to maturity, reaching that stage some nine to ten days before the Tuscans, although it was sown six days later. John Brown, sown on the same date as Red Tuscan, was harvested a week before it. Federation, sown seven days later than Red Tuscan or Hard Straw variety, was harvested four or six days earlier than they were. Comeback and Federation, having very little leaf and not stooling much, could be sown considerably thicker than the ordinary variety of wheat.

Both Red and White Marvel appear to shake out readily, and are much damaged by birds if not cut directly they are ready.

As the land at Marton was taken over somewhat late in the season, it was impossible to pay as much attention to the preparation of the seed-bed as would have been desirable, but, judging from results and general characteristics of wheats tested, the following would appear well worthy of more extended trial in the different districts of the North Island :—

South Island wheats: Hard Straw Tuscan, Red Tuscan, Hunter's Wheat, and Velvet Wheat. Australian wheats: Comeback, Federation, John Brown, Yandilla King. As these varieties have also been grown by some farmers co-operating with the Department in experimental work, acclimatized seed can doubtless be procured from them by others wishful to grow them. They should, however, ascertain that the seed procured is true to name and unmixed with any other variety.

OAT VARIETIES.

The same notes as to cultivation apply to these trials as given under wheat. The same manurial mixture was used, at the rate of slightly

over 1½ cwt. per acre: Seed sown at the rate of 3 bushels per acre at the end of September.

Plot.	Name.	Remarks.	Date sown.	Date harvested.	Yield per Acre: Bushels.
13x	Beardless Propstein	Introduced from Svalof, Sweden, last season. Germination fair	Aug. 26	Jan. 16	31
15	White Ligowo..	From Svalof. First season in New Zealand. Germination fair	,, 26	,, 12	31
15x	Victory ..	Ditto	,, 26	,, 12	37
17	Triumph ..	From England. Second season in New Zealand. Said to have stronger straw than any other variety	,, 27	,, 11	44
17x	Algerian ..	From Rangitikei	,, 27	,, 6	39

Barley Varieties.

Cultivation given was as for previous crops. These varieties were sown only in small plots in order to obtain acclimatized seed for further trial on larger areas during the coming season.

Plot.	Name.	Remarks.	Date sown.	Date harvested.	Yield per Acre: Bushels.
6, 8	Cape	Local	Aug. 31	Jan. 7	..
10, 12	Hennchen ..	From Svalof, Sweden ..	,, 31	,, 2	..
14	Swanneck ..	From Svalof	,, 31	,, 10	..

Peas.

Varieties: White Ivory, Blue Imperial, Prussian, Early Minter, and Partridge.

Cultivation: The cultivation given was the same as in the case of the wheat plots up till the 3rd August. In September the land was well harrowed and the crops were sown.

Seed: Sown through the drill from every other coulter at the rate of just over 100 lb. per acre, with the exception of White Ivory, which, by mistake, was sown only at the rate of 80 lb. per acre.

Manures: 150 lb. of a mixture, the composition and cost of which is appended, was applied at the time of seeding through the drill in the usual manner.

Lime: As with the cereals, to half of each plot ground limestone at the rate of 5 cwt. per acre had been applied when the land was ploughed.

Area: All plots bearing even numbers were half an acre in extent; those designated by odd numbers were one-eleventh of an acre in area.

Plot.	Name.	Remarks.	Date sown.	Date harvested.	Yield per Acre: Bushels.
18	White Ivory ..	A white-flower early variety ..	Sept. 10	Jan. 6	19¼
21	Blue Imperial..	A larger variety in growth than Prussian White Flower. Pods were forming on 1st December	,, 12	,, 10	16½
21x	Prussian ..	A white-flower variety, somewhat earlier than Partridge	,, 12	,, 17	17
23	Early Minter ..	Takes much the same time to mature as the Partridge. Flower mauve-colour. A dun pea	,, 13	,, 17	24½
23x	Partridge ..	The common brown variety ..	,, 13	,, 17	23½

Owing to faulty drainage in the centre, there was little crop on that part, and therefore the largest portions of these amounts were really produced on half an acre instead of an acre. The yield on the better land must have been nearly double the above figures, since the amounts obtained are calculated for the whole acre. Sorrel was troublesome, but had got too great a hold before a suitable implement could be obtained to intercultivate, for which purpose the crops had been sown in wide drills. The land having been broken late in the season, and the season proving a dry one, was also much against the pea crop on such stiff soil as composes the Marton plots. The limed portion showed a marked improvement upon the unlimed, the peas remaining green and continuing to grow long after those on the unlimed portion had ripened off. The limed portion also required less cultivation to prepare the seed-bed than the unlimed portion.

On examination, excepting in one or two instances on the limed portion, no nodules were found upon the roots of the peas in any of the plots. The same remark applies to a plot of Tick beans, which grew well and looked healthy, but yielded a very poor crop of beans, whereas on the limed portions on the pea-plots an occasional plant might be found showing very small nodules, although very little of them. No nodules could be found anywhere upon the roots of the beans, and it is probable that before really good crops of peas or beans can be grown upon this land a small quantity of soil must be taken from another field in which these crops thrive well and be distributed thereon, thus introducing the necessary bacteria, which, now that the land has received a dressing of lime, should quickly spread therein. It may be presumed that if this soil can be made to produce a good healthy crop of peas or beans both the quality and quantity of the wheat grown therein afterwards would be vastly improved. The experiments with peas and beans upon the Marton plots would seem to clearly suggest three things—the need of drainage, the

benefit of lime, and the necessity of including frequently in the rotation some one or other of the leguminous crops.

Mixed Forage Crops.

Plot 19 received the same cultivation as the wheat-plots, and in September the land was again well cultivated. 116 lb. of Algerian oats and 73 lb. of Partridge peas were sown in 7 in. drills on the 10th September with 200 lb. of the same manure as was used for the pea crops. The season, however, proved a dry one, and the oats for the most part obtained possession, while the peas did not make the growth that could reasonably be expected. On the 1st December the peas were in flower and the oats heading. On the 6th January this plot, which was an acre in extent, was cut, the oats being quite ripe and the peas very nearly ripe. These were cut into chaff at the end of January and yielded 1 ton 16 cwt. 2 qr. 15 lb.

Plot 27: *Maize and Peas.*—Ploughed at the end of June and disced again on the 24th November, and also harrowed and rolled. 40 lb. of Canadian Yellow Flint maize and 37 lb. of Blue Prussian peas were sown on the 24th November through the drill with a maize manure mixture, the composition of which is appended. Owing to drought, the maize did not make much growth, and in this section where the crop had been sown in 7 in. drills the maize wilted considerably during the dry season, while on the others, sown in 14 in. drills, more growth was made, and the maize did not suffer so much from drought. On the 22nd January the maize in this plot was from 2 ft. to 2 ft. 6 in. high, and the peas were nearly ripe. On the 6th March the yield of dry forage after threshing was about 1,600 lb. per acre. The yield of peas therefrom was 25 bushels per acre. The area of this plot was just under half an acre.

Plot 27B.—On this plot 40 lb. of Virginian Horsetooth and 32 lb. of Partridge peas were sown to the plot on the 4th November, together with the maize manure mixture at the rate of 155 lb. per acre. This section was sown in 14 in. drills, and the area of the plot was a trifle over half an acre. The crop was harvested on the 18th March, the yield of Partridge pea straw and maize being, after threshing, at the rate of 2,028 lb. per acre, while the peas yielded at the rate of 19 bushels per acre, or, including the peas in the dry forage, 2,768 lb. of dry forage were obtained. It must be remembered that these crops had hardly any rain from the date of sowing until harvested, and the maize in consequence did not make much growth. Under favourable circumstances there is little doubt a very heavy crop of maize and peas can be grown for a mixed forage crop. I should, however, be inclined to suggest sowing a medium-early maize in drills 3 ft. apart, and cultivating until a fair growth had been obtained, and drilling in the peas with either a small hand-

drill or cultivator at the time that the last cultivation was given to the maize.

Plot 28: *Early Amber Cane Sorghum.*—The land was ploughed in June and disced in September. On the 18th November it was ploughed again, disced well and harrowed on the 29th November, and 16 lb. seed sown in 24 in. drills to the acre with the maize mixture at the rate of 154 lb. per acre. It was again lightly harrowed after sowing. The weather was unfavourable, and on the 8th December it was only just appearing above the ground. On the 22nd January the Amber Cane had attained a height of 4 ft. (average), and was coming into flower, proving the ill effects of the long period of dry weather, as by this date it should have been 5 ft. 6 in. to 6 ft. or more high, which length was attained only at the time of harvesting on the 2nd March, when it yielded at the rate of just under 10 tons per acre. A light grubber was twice run along the drills during the growth of the crop.

Plot 29.—Ploughed in June out of stubble, and disced on the 16th September. It was reploughed on the 18th November, disced on the 25th November, and harrowed and rolled once. It was sown on the 25th November.

Red Cob Ensilage was sown thinly in double 7 in. drills 28 in. apart with the maize mixture at the rate of 140 lb. per acre. It yielded only 8 tons per acre of green feed. The heavier seeding gave 15 tons per acre. There was hardly any rain after the sowing of the maize, and the average height was from 4 ft. 6 in. to 5 ft. 6 in.

Thoroughbred White Flint.—This was another variety tested, and was found to be a good leafy forage variety maturing earlier than Red Cob Ensilage. It appears like most Flint varieties to do with less moisture than do the Dent varieties. The yield was much the same as that given by Red Cob Ensilage.

Brazilian Flower Corn.—This is a species of bread maize, and is a very good forage variety in suitable soils. It appeared to suffer more from the drought than did the two preceding kinds. This crop had been intercultivated twice during the growth of the crop, and the maize upon another plot to which no intercultivation had been given attained a height of about 2 ft. The leaves then wilted, testifying to the severity of the drought in this soil, and the benefit derived from intercultivation in preserving the moisture for the use of the crop.

Plot 30.—Upon this acre, sections had been sown broadcast with manure and harrowed in according to the usual method. The crops experimented with were maize, sorghum, and Japanese Barnyard millet. The effects of the drought upon these broadcasted crops, as compared with the ones drilled, was very noticeable, and the yields obtained by this method, owing to the dry weather, were not worth recording. This

again proves the benefit of sowing maizes, &c., in drills and giving a little cultivation as against the broadcast method.

Various Plots.—Soya beans were sown on the 26th November. They germinated fairly well, and if sown earlier would, I think, produce a fair crop. The hares, however, did great damage, and as, owing to drought, all growth was at a standstill no beans were obtained this season. Soya beans are probably more suited to a light soil—a soil lighter than that of Marton Junction.

Velvet Beans and Cow Peas were also sown about the same date, but owing to the season experienced it is impossible to report upon them.

THE SOILS ROUND MARTON JUNCTION

consist of a medium loam, which in many parts was to no great depth upon a stiff cold clay. The winter causes them to become sodden and sour, and little growth is made once that condition has been reached. In spring the undrained land is wet, and cold, and sour, and growth is late to start, while upon the advent of dry weather the soil speedily parts with its moisture and a hard, dry, baked pan is the result. This was what took place upon the ill-drained portion of the pea-plots at Marton. Such conditions materially limit the variety of crops which can be grown successfully upon such a soil should the winter prove a rather wet one or the summer somewhat dry. Especially is this the case with oats or wheat, which make half their growth during the autumn or winter and complete the same before the advent of summer. Should the subsoil be untractable and poor, some farmers maintain that therefore it should be left undisturbed, and in consequence from 4 in. to 5 in. remains the depth of cultivated soil upon such a farm. Taken as a whole the top soils of New Zealand are somewhat shallow, and little solid improvement will be made therein until the necessity for deepening the top soil becomes not only an acknowledged fact but also a principle of practice in New Zealand.

There are several ways of deepening a top soil: one is by turning up with the plough just a very little every year. It is not, however, necessary to bring it to the surface and to mix it with the true soil until it has in some measure altered its character. When the land is ploughed by a special attachment to the plough, the subsoil may be only stirred and left where it is; the plough-drains should be put in sufficiently deep to allow of the same being done without damage to them. By such a method a portion of the subsoil becomes sweeter and better drained. Seeking after moisture in dry weather, the plant-roots penetrate this sweetened and pulverized area, and it thus becomes mixed with root matter, and fitted to be brought to the surface by deeper ploughing without material injury to the true top soil, and consequent diminution of the crop. By

the occasional growing of leguminous crops, and by the occasional ploughing in of as much crop debris every season as can well be managed, the vegetable mould in the soil will be increased, and also the natural drainage capacity of the surface soil. By the use of deep-rooting grasses, clovers, and forage plants when laying down to grass, instead of so much perennial rye, the depth of top soil, on land thus treated, could be largely increased within quite a limited number of years. By doubling the depth of the cultivatable soil in the Marton Junction area, and by drainage, it is safe to predict that the yield of the crops obtained could be likewise doubled if given intelligent cultivation; and, since the moisture-content of the soil in its present condition is so small during the summer months, this fact must necessarily restrict the variety of crops it is capable of producing in a satisfactory manner, until, by gradually deepening the top soil and by subsoil drainage, the present conditions have been materially altered, and both the quality and capacity of the land thereby improved.

Manure Mixtures.

Maize, &c., Mixture.—Superphosphate, 300 lb.; Wanganui bonemeal, 50 lb.; Gear blood manure, 50 lb.; sulphate of potash, 50 lb.; sulphate of ammonia, 50 lb.—Approximate cost, 7s. 5d. per 100 lb.

Cereal Mixture.—Gear blood manure, 100 lb.; Wanganui bonemeal, 100 lb.; imported superphosphate, 50 lb.; sulphate of potash, 12·5 lb.—Approximate cost, 6s. 9d. per 100 lb.

Peas, &c., Mixture.—Gear blood manure, 50 lb.; imported superphosphate, 100 lb.; Wanganui bonemeal, 75 lb.; sulphate of potash, 25 lb.—Approximate cost, 5s. 11d. per 100 lb.

The rough weather in the early part of October affected the fruit crop to a serious extent only in the North Canterbury district, where all fruits were badly damaged. The frosts on the morning of the 15th of the month severely cut plums, strawberries, and apricots.

The Homestead and Byre on a Danish Farm.

FODDER CROPS.

T. W. Lonsdale.

At the present time there are probably no crops of so much importance to the dairyman as fodder crops, and none have received so little attention. Happily it is now recognized that these are of vital importance, as they supply the herd with succulent food during protracted periods of drought, and may fitly be termed "salvation" crops.

The lack of making provision for the herd by growing supplementary crops has been keenly felt during the last few years, but probably not to such an extent as last season, when, owing to the extremely dry weather, many herds rapidly failed in milk-production. When we consider the great loss individually and the enormous loss to the Dominion collectively, a loss which by a little forethought and preparation could be avoided, it may be fairly conceded that it is time to adopt improved methods.

Sorghum and Millet.

A variety of crops are at our command. That which is receiving most attention is maize. In many parts of the Dominion it is probable that this will continue as the premier fodder-plant, yet in districts subject to late and early frosts, and also light precipitation, the maize crop is precarious. Other crops suitable for such districts are sorghum and millet. These are common plants of China and Turkestan, and it is estimated that nine-tenths of the Natives of these countries and India subsist on the grain of the sorghum.

In the semi-arid parts of the Western States of America, sorghum has in recent years become prominent, in some instances leading maize, which hitherto had been the greater in cultivation, in the extent of its production. So much has been written and is already known about the cultivation of maize that information on the subject is not so necessary.

Preparation of Land.

As for all crops, thorough cultivation prior to seeding is essential; the seed, being small, requires a fine, clean seed-bed, and should be lightly drilled. The operation can be performed with an ordinary grain-drill, using all the coulters; or, if it is desired to grow stronger plants, alternate coulters may be used, or the seed can be sown in drills 26 in. apart, to allow for cultivation with a horse-hoe.

Cultivation after the seed has germinated is essential, and can be effected by harrowing at intervals with tine harrows, the process being repeated until the plants have become too high.

Harrowing has a twofold effect—weed-control and the conservation of moisture—both essential to the young plants. When the plants are established and too high to allow of further cultivation the crop may safely be left to take its course, and will grow rapidly during hot and dry weather.

Varieties to grow.

Probably *Sorghum imphee* and *Sorghum saccharatum* are the best varieties. These produce heavy crops of succulent fodder. Early Amber Cane is also a good cropper. It should be cut before the stalks become woody. Japanese millet, White French millet, and Egyptian millet are suitable varieties. White French does not produce as much fodder as the other varieties, but grows rapidly and matures earlier.

Manures and Seed.

It must be remembered that these crops are gross feeders, hence liberal manuring is requisite. A combination of bonedust, superphosphate, and sulphate of potash makes a suitable manurial mixture, and the quantity applied will be decided by the grower. About 20 lb. of seed per acre is a liberal quantity if broadcasted, but, if drilled, 5 lb. will be sufficient.

When to cut.

Millet may be cut immediately after flowering; if left later hard seed-heads are formed, and the stalks become fibrous and unpalatable. Sorghum should not be used until the plants are in tassel, as previous to this stage the plant may prove injurious.

Summary.

Other crops may be grown for the purpose of supplying fodder during times of scarcity. Lucerne and vetches are invaluable; but, as the virtues of these crops have already been expounded, it is not intended to deal with them in this article. The object of the writer is to bring to the notice of dairymen throughout the Dominion the great importance of fodder crops in general.

A VALUABLE LUCERNE.

A small quantity of seed of the frost- and drought-resistant Siberian lucerne (*Medicago falcata*), collected by Professor Hansen in Siberia, has been received by the Department from the United States Department of Agriculture. This lucerne, which grows naturally in localities of very limited rainfall and where the winter temperature falls as low as 30 degrees below zero, will probably prove of value in the cold and arid region of Central Otago. It is proposed to grow this plant in the experiment farms until a sufficient amount of seed is available for demonstration work.

CO-OPERATIVE FIELD EXPERIMENTS.

SOME WHEAT TESTS.

A. Macpherson.

Manurial and variety tests with wheat were conducted on the farm of Mr. K. McKenzie, Geraldine. The land on which the experiments were carried out was a sharp loamy soil with sandy clay subsoil, on the flat, near Geraldine. In 1906 the land was in English grass, in 1907 in wheat, in 1908 in turnips, in 1909 in wheat, and in 1910 in green oats with rape fed off. On the 2nd May, 1910, the land was ploughed to a depth of 7 in., on 25th May it received one stroke of the tine harrows and one stroke of the disc harrows, and on the 26th May was tine-harrowed three times. On the 9th June the wheat was drilled in and harrowed, the crop being rolled on the 30th September.

Variety Test.

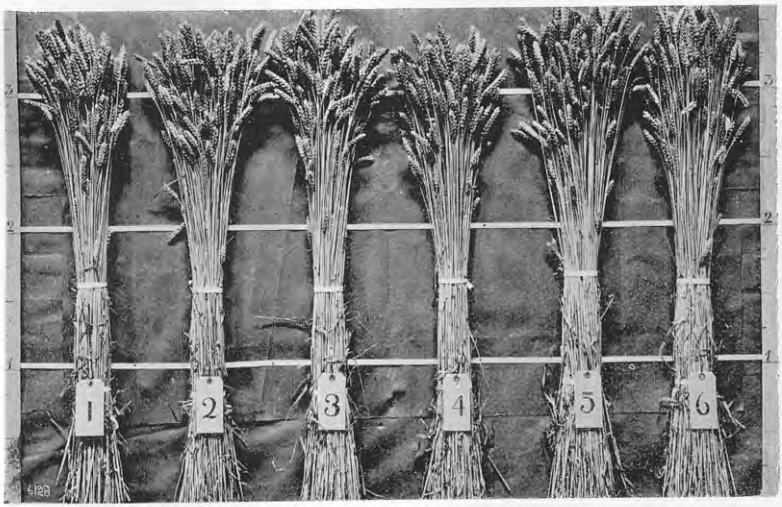
This test was carried out in the same field as the manurial one and adjoined it. The land received the same working. The varieties of wheat were sown and harvested on the same dates as the manurial tests. Six varieties of wheat were sown without fertilizers in plots of one-tenth of an acre each, the seeding being at the rate of $1\frac{1}{2}$ bushels per acre.

Following are the results :—

Plot.	Variety sown.	Grain-yield per Acre : Bushels.	Plants and Stalks to a Square Yard.	
			Plants.	Stalks.
1	De Noe	16·76	58	302
2	Pearl	41·46	91	284
3	Red Chaff	38·46	80	269
4	Solid-straw Tuscan	42·46	105	360
5	Bordier	35·16	76	246
6	Velvet Chaff	42·16	80	230

All varieties ripened about the same time, and were subject throughout their period of growth to the same unfavourable weather-conditions as the manurial tests. Small birds did very little damage. Bordier was slightly affected with Hessian fly. De Noe shelled out badly with the high winds, quite 50 per cent. being shaken out. Bordier also shelled out, but to a less degree. All the other varieties stood the high winds well. The Pearl variety produced the best straw.

SHEAVES FROM THE VARIETY TEST.



SHEAVES FROM THE MANURIAL TEST.

MANURIAL TEST.

The area consisted of six plots, each one-tenth of an acre. The seeds and manures were drilled in under favourable conditions. The soil throughout was uniform in character. The seed sown was Velvet Chaff, the seeding being at the rate of 1½ bushels per acre. The scheme of fertilizers was designed by the Chief Agricultural Chemist. An early spring was followed by exceptionally dry and windy weather during summer. Consequently yields below the unmanured, or standard, plot have to be recorded in all manurial plots, showing that, through the want of moisture during the growing period of the plants, the fertilizers applied under such weather-conditions did injury, and lowered rather than increased the yield of grain. With the exception of one or two winds during harvest time, which shook out the overripe or easily shelled varieties, the weather was good for a safe ingathering. Birds did very little damage. All plots ripened about the same time, and were harvested on the 21st January, 1911.

Following are the results :—

Plot.	Manure applied per Acre.	Cost of Manures per Acre.	Grain.		Plants and Stalks to a Square Yard.	
			Yield per Acre : Bushels.	Gain or Loss by Use of Manures : Bushels.	Plants.	Stalks.
		s. d.				
1	¼ cwt. superphosphate ..	1 4	35·96	Loss 6·2	106	226
2	½ cwt. superphosphate ..	2 7	41·26	Loss 0·9	123	269
3	1 cwt. superphosphate ..	5 3	40·46	Loss 1·7	84	241
4	No manure	..	42·16	..	80	230
5	1 cwt. superphosphate, ¼ cwt. sulphate of potash, ¼ cwt. seed-gypsum	9 6	37·96	Loss 4·2	107	298
6	1 cwt. superphosphate, ¼ cwt. nitrate of soda, ¼ cwt. seed-gypsum	9 9	37·10	Loss 5·0	118	315

Twenty years ago the flocks of Germany included 25,000,000 sheep ; to-day they represent a bare 5,000,000 : this while the consumption of wool has increased from 50,000 tons in 1873 to 200,000 tons, absorbing a fourth of the world's total wool-production.

H.M. Minister at Buenos Aires, in reporting on the condition of agriculture in Argentina in 1910, states that the year was an unfavourable one both for crops and cattle, owing chiefly to drought. The shortage of the rainfall, which has been severely felt in the southern districts for three years or more, extended more into the south-western camps of the Pampa, where immense damage was done to lands cultivated for a large part in a poor way by emigrants who had no funds wherewith to face a bad season.

REVEGETATION OF DEPLETED COUNTRY.

A. Macpherson.

Experiments in Mackenzie Country.

Sawdon Run.

The following information is compiled from notes furnished by Inspector Manning (Fairlie) of inspection of plots in experimental area made by him on the 11th July last, before the snow fell, and before there was any growth; therefore the results recorded are of grasses and other plants which appeared to be weathering the severity of the frosts up to that date.

Grasses and other Plants sown in Small Plots.—Cocksfoot, prairie-grass, white clover, chicory, sheep's burnet, sheep's parsley, and lucerne have stood the frosts very well. Rhodes-grass is now blackened and withered with the frost. Of the other grasses and plants very little can be said at present, as they are all cut down with the frost.

Grass-plants.—Phalaris commutata and *Phalaris canariensis* have done well, the frosts having had no effect on these.

Haldon Run.

An inspection of plots in the experimental area was made on the 17th August last.

Grasses and other Plants sown in Small Plots.—Those doing well are cocksfoot, prairie-grass, white clover, chicory, yarrow, sheep's burnet, kidney-vetch, and Rhodes-grass—the last, to a certain extent, cut down with the frosts. The grasses sown last autumn on this experimental area have made a splendid strike. It is yet too early in the season to make any definite report regarding the grasses, &c., until warmer weather sets in, and the plants have an opportunity of making headway.

Central Otago Experiments.

The following is compiled from a report furnished by Inspector Baxter, of Clyde, dated 23rd September last:—

The weather has been very frosty in the Clyde district up to about fourteen days ago. Very little rain has fallen, consequently there is not much moisture in the ground. These experiments were initiated on the 2nd November, 1910.

Trial Tests of Grasses and Fodder Plants.—Plot 1, cocksfoot, growing well; 2, smooth-stalked meadow-grass, not showing; 3, Chewing's fescue, 4, hard fescue, 5, sheep's fescue, and 6, red fescue, growing fairly well, plants are far apart; 7, *Danthonia pilosa*, very little showing; 8, prairie-grass, growing well, and seeding freely; 9, birdsfoot-trefoil (minor), growing fairly well; 10, fiorin, not doing well; 11, white clover, growing well; 12, crested dogstail, some few plants; 13, chicory, coming away fresh and healthy; 14, yarrow, growing well; 15, awnless brome-grass, good, but thin; 16, sheep's burnet, growing fairly well; 17, Bokhara clover, looking well; 18, kidney-vetch, growing well; 19, red-top grass, not done well; 20, tall oat-grass, comparative failure; 21, sweet vernal, very few plants; 22, sheep's parsley, not much growing; 23, various-leaved fescue, comparative failure; 24, lucerne, growing well; 25, Rhodes-grass, evidently killed by frost; 26, blue-grass (native), some growing very well.

Special Grasses from the Agricultural College, New Mexico.—Plot 1, *Chaetochloa candanta* (*Setaria*), badly nipped by frost, but appears to be springing again; 2, *Bontilona cantipendula*, also frosted, but growing again; 3, *Panicum plenum*, frosted, not much to be seen; 4, *Panicum bulbosum*, apparently a failure; 5, *Bontilona oligostachya*, apparently a failure; 6, *Sporobolus Wrightii*, apparently a failure; 7, *Sporobolus cryplandrus flexuosis*, apparently a failure; 8, *Septoochloa dubia*, has been growing, but badly frosted.

Grasses planted in Drills.—Festuca dumetorum, growing; *Chloris cayana*, growing; *Phalaris canariensis*, growing; buffalo-grass, failure; *Phalaris commutata*, growing.

Mixtures of Grasses, &c.—Plot 1, looking fresh, and the following are coming on well: Cocksfoot, yarrow, prairie-grass, and chicory. Plot 2, yarrow, cocksfoot, lucerne, and chicory doing best. Plot 3, five varieties of fescue growing well, and have a very healthy appearance.

Trial Test of Grasses and Fodder-plants (initiated, April, 1911).—Plot 1, cocksfoot, growing well; 2, smooth-stalked meadow-grass, fair; 3, Chewing's fescue, very fair; 4, hard fescue, very fair; 5, sheep's fescue, fair; 6, red fescue, fair; 7, *Danthonia pilosa*, apparently a failure; 8, prairie-grass, growing extremely well; 9, fiorin, looking well; 10, crested dogstail, growing well; 11, awnless brome-grass, very good, growing well; 12, red-top grass, good; 13, tall oat-grass, very good; 14, various-leaved fescue, not good; 15, Rhodes-grass, apparently a failure; 16, birdsfoot trefoil (minor), a little showing; 17, white clover, growing very well; 18, Bokhara clover, fair; 19, chicory, fair; 20, yarrow, coming well; 21, sheep's burnet, growing well; 22, sainfoin, making rapid growth; 23, kidney-vetch, very good; 24, sheep's parsley, growing slowly; 25, lucerne, very good; 26, rib-grass, making good headway; 27, blue-grass (native), fair.

Mixture of Grasses, &c.—Plot 1, looking very well, best being sainfoin, chicory, cocksfoot, kidney-vetch, prairie-grass, and sheep's burnet. Plot 2, very good, best being sainfoin, cocksfoot, and sheep's burnet. Plot 3, fescues all coming on well.

The date of inspection of the experiments was rather early in the season to definitely determine the failure or success of some of the crops, but the showing so far made indicates that sainfoin, prairie-grass, lucerne, and tall oat-grass are the best in the autumn sowing, and cocksfoot, prairie-grass, yarrow, chicory, and lucerne the best in the spring sowing.

GRASSING HILLY COUNTRY, WEST COAST, SOUTH ISLAND, EXPERIMENT.

From an inspection made on the 15th September of an experimental area on the Blue Spur Road, Hokitika, where grasses were sown in plots on both sides of a valley, the following notes are made of the growth of individual grasses, &c., which were sown on the 15th March, 1911 :—

Cocksfoot, growing well on northern and southern aspects; crested dogstail and meadow foxtail, doing very well on both aspects; meadow fescue, coming away fairly well on northern aspect; New Zealand tall fescue, growing well on southern aspect; timothy, growing well on both aspects; fiorin, one of the best on both aspects; rough-stalked meadow-grass, fair on northern, but better on southern aspect; wood meadow-grass, fairly good, particularly on southern aspect; white clover, growing splendidly on both aspects; alsyke, fairly thick, but backward; lotus major, not showing very well; burnet, growing in patches; yarrow, growing well on both aspects; lucerne, growing fairly well on southern aspect; Rhodes-grass, patchy; but plants vigorous, not touched by frost.

Mixture of Grasses, Plots 1 and 2.—Grasses in both plots doing well; the plants are yet too young to permit of a definite report being made.

An agency of the Tourist Division of the Department has been established at Wanganui, in Taupo Quay.

Domino III, a member of the Weraroa Experimental Farm herd, has just given 113 lb. of milk in the day. Her test ranges from 3·3 to 3·9 per cent. of butter-fat.

The total wheat-yield of the country is estimated at 204,634,000 bushels, or 81,849,000 bushels more than last year at the same date. The average per acre is 19·50 bushels, or 6·30 bushels more than last year.—*Canadian Census and Statistics Monthly.*

BUSH DISEASE.*

B. C. Aston, F.I.C.

The evidence adduced by Veterinary Officers of the Department over the period of fourteen years that they have been cognisant of the matter goes to show that the condition in stock known locally as "bush disease" or "bush sickness" which occurs in the Rotorua, Matamata, and Tauranga Counties (long. 176° E., lat. 38° S.) is not a disease in the proper sense of the term, but a physiological condition resulting either from—(*a*) a food-supply wanting or deficient in some essential nutrient, which therefore results practically in starvation; or (*b*) a food-supply containing naturally or adventitiously (1) some toxic compound, or (2) some normal constituent present in abnormal quantity, resulting in chronic poisoning.

Assuming, therefore, that the pathologists have satisfied themselves that there is no abnormal micro-organism present; that there is no sign of acute disease in a wasting animal (which commences to recover as soon as it is removed on to unaffected country); that the disease is not communicable to other (healthy) animals either by contact or by transfusion of blood or by other inoculation tests; and that the sickness is confined to a definite area of country outside of which it does not spread, but on which it always in time develops in cattle and sheep, the problem must be one connected with the food-supply, and therefore one for the chemist to elucidate by research.

The following questions naturally suggest themselves: (1.) Is there any poison present in the animal, in the food, or in the soil? (2.) Whether such poison (if present) is there in amounts which would be injurious under the conditions prevailing on the "sick" country. (3.) Is there a want of balance in the food-constituents, organic or inorganic, which would result in the condition complained of?

Bush sickness has been described by Professor Gilruth as "progressive anæmia." Specimens of the dried blood (including clot and serum) of cattle analysed have always shown a great increase in the inorganic salts of unhealthy over those of healthy blood; or, to put it in what is physiologically a better manner, there is a diminution in the organic matter of the unhealthy blood compared with healthy blood. In the unhealthy blood there is roughly only half the normal amount of iron-oxide, and

* The term "bush sickness" is quite a misnomer. The condition may develop on land that has been cleared of bush or forest for over twenty years.

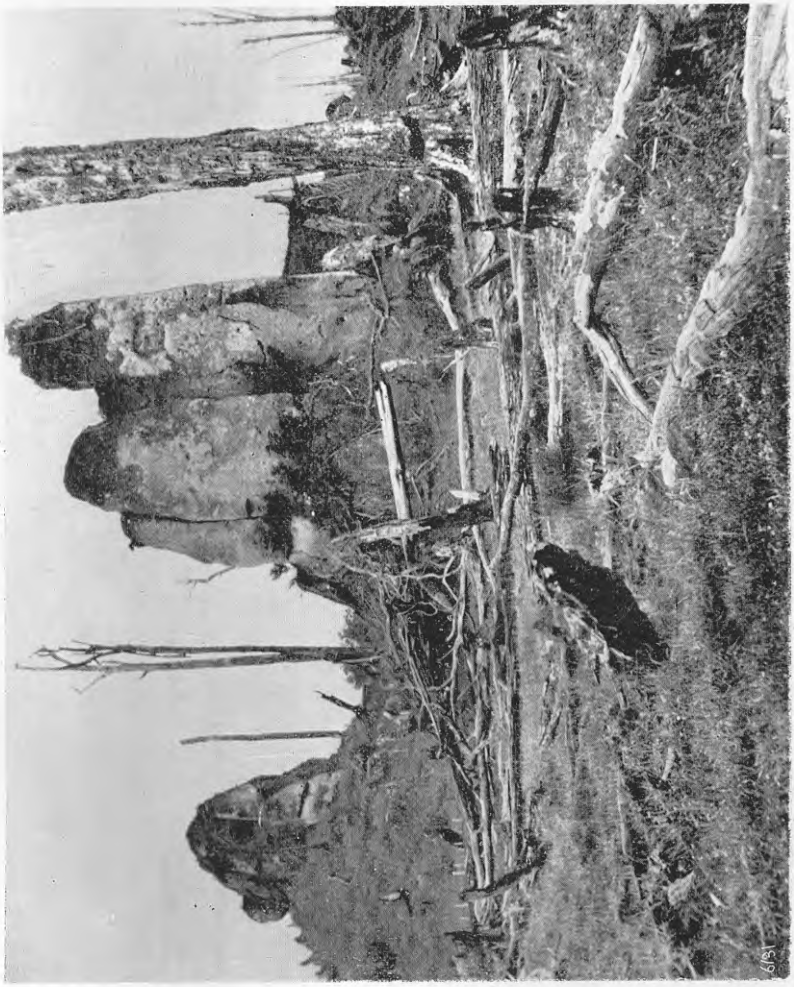
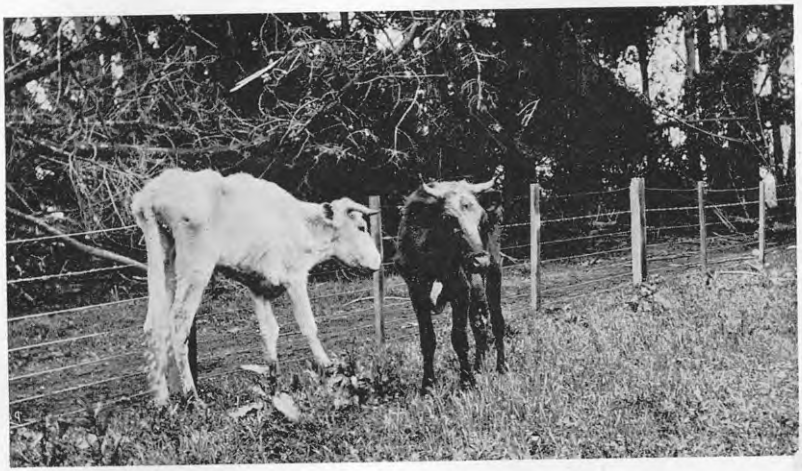


Photo by B. C. A.] TYPICAL "BUSH-SICKNESS" COUNTRY.

greatly diminished amounts of phosphorus and potash, the characteristic inorganic constituents of the blood-cells (corpuscles). The chemical analyses point strongly to a deficiency of the blood-cells. Blood-counts by Mr. H. A. Reid, F.R.C.V.S., show conclusively that anæmia is always present in animals suffering from "bush sickness."

What causes this anæmia? The conditions already described point to something connected with the food-supply as the cause. Now, the food-supply is the last thing that the farmer would suspect, consisting mainly, as it does, of a luxuriant growth of cocksfoot and red and white clovers —staple fodder-plants upon which thousands of stock are yearly successfully raised both in this and in other countries. Stock may, moreover, apparently suffer and die from the sickness either in paddocks where there is nothing but red clover or where there is little but cocksfoot. This would seem to discount the possibility of an organic compound being the cause, as one would hardly imagine the same organic poison being formed in two such widely separated families as *Leguminosæ* and *Gramineæ*. In the event, however, of some poisonous element occurring in the soil in a form which would allow its compounds to be taken up by the plant, it is possible that an inorganic poison might be the cause. The nitrogen-content of the hay and grass from the affected country negatives the idea that there may be a deficiency of proteids in the grass. The inorganic-food ratio requires further investigation; but the fact that young animals from other districts experience a decidedly beneficial effect from the change, and may be fattened on the suspected pasture if not kept on too long, does not afford much hope for the suggestion that there may be a deficiency in any of the necessary nutrients, organic or inorganic.

Concerning the proper ratio of inorganic foods for stock, little is definitely known. It has, however, been clearly demonstrated by Bunge that all purely vegetable feeders, including some races of men, require a mineral ration which includes salt (sodium-chloride). He considers that the sodium salt is necessary to eliminate the potassium salts taken up with the vegetable food. Salt is, of course, known to be a necessity in keeping stock in the best condition. Boussingault experimented with six oxen, three of which had salt and three had no salt. In the course of the second month the difference in the two lots was visible even to the unpractised eye. The hair on the oxen which had salt was smooth and shiny, and on the other lot it was dull and erect. After a year the signs were still more prominent. On those which had no salt the hair was matted and the skin in places devoid of hair. Those which had salt, on the contrary, retained the look of stall-fed beasts. Their briskness and frequent indication of a desire to leap contrasted strongly with the heavy gait and cold temperament observed in those which had no salt. It would be interesting to know the ultimate condition of stock continuously fed on a ration deficient in sodium salts and as rich in potash as is the herbage of the unhealthy country



AFFECTED BEASTS.

Photo by B. C.A.]

DYING IN A BED OF CLOVER.

Photo by B. C. A.]

Would a condition in any respect resembling bush sickness result? Could this be referred to such a cause it would be fairer to attribute the sickness to unsatisfactory farming than to any defect of the soil or food.

Any variation in the food is probably due to a variation in the composition of the soil: hence analyses of the soils might afford valuable information. But here we are met by this fact: The mineral (inorganic) constituents of the soil are not taken up by plants in the same ratio as they occur in the soil. The plant selects certain constituents in preference to others. Thus silica, alumina, and the iron-oxides are the most abundant constituents of the soil, and of the weak acid (1 per cent. citric acid) extracts of pumice soils, but, although these three constituents total some 80 per cent. of the soil, the clover ash only contains some 20 per cent. of them; but, on the other hand, the ash contains some 27 per cent. of potash, which only exists to the extent of 1 or 2 per cent. in the soil. This selective action of plants extends to other elements, at least one* of which may be toxic.

So far as one can learn, there is no other country having similar soils under similar climatic and agricultural conditions; but the writer is open to correction on this point, and would be glad to learn whether any similar unhealthiness has appeared on pumice soils growing cocksfoot and clovers in a temperate climate with a rainfall of 50 in. in other parts of the world. Soils are almost invariably formed by the weathering and disintegration of rock, a slow and gradual process whereby much of some of the original constituents of the rock is dissolved out and washed away in the drainage-water. The soils of this "sick" country, on the contrary, have not been weathered to the same extent. They are invariably soils consisting largely of pumice and other ejectamenta comparatively recently blown out of the bowels of the earth, and scattered by the wind over a large area of country. Pumice is an acidic (containing a large excess of silica or silicic acid) lava which has been frothed up when in the molten state, and so intimately mixed with the gases of the volcano that the apparent specific gravity of the rock is very much lessened, and, owing to the entangled gases, the solidified pumice is enabled to float on water, or to be wafted considerable distances by air-currents. It is a well-known fact that recently ejected volcanic mud will not grow crops until the sul-

* Copper is the element here referred to. The liver of a sheep suffering from "bush disease" always contains an amount of copper which is abnormally high when judged by the experience of European authorities, but investigation has shown that this is an abnormality shared with healthy sheep killed for consumption in other parts of New Zealand, there being found as much as 0·065 per cent. in two healthy sheep examined. By adding copper-acetate to the food of another from the same flock, in three months' time the copper-content of its dried liver (healthy) was found to be 0·417 per cent., others of the same flock remaining healthy under the same dosage. From 0·02 to 0·04 per cent. of copper (Cu)—calculated on the liver dried at 100° C.—is apparently quite a usual amount to find in healthy sheep of the North Island. "Sick" cattle have not such a high copper-content, and are sometimes in accord with what is accepted as normal.

phides, which are poisonous to crops, have been oxidized into harmless sulphates. It is possible that pumice will not grow animals from some similar reason.

In investigating an obscure disease one must not expect immediate results, or be impatient if some definite answer is not at once forthcoming from experiments. In a case such as this, where the onset of the ailment is so long delayed, taking perhaps months, it is only reasonable to suppose that the abnormality in conditions which is the cause is not very greatly removed from absolute normality, and it is this fact which inspires most hope that a practicable remedy may be found—*i.e.*, by altering the animals' diet in some way the cause of the wasting may be counteracted. Mr. Clinkard has satisfied himself that by adding a certain amount of bran, a substance very rich in inorganic (mineral) food, the trouble may be postponed but not altogether avoided. Now, if we can find by experiment which particular organic food it is that caused this desired effect, we may be able to apply that food in some more concentrated form and so obviate the present injurious results of feeding on the affected pastures.

Field experiments, including the feeding of sheep and cattle on pasture which has been dressed with various kinds of fertilizers, are being conducted according to schemes recommended by me on four farms in the unhealthy country. On one of these no salt is supplied as a "lick" for the stock. On other two salt is supplied *ad libitum* to every paddock, including in one case the control paddocks, this being only what is consonant with good farming. On the fourth farm the pasture has been laid down with salt as a top-dressing.

One often meets with the question, Why should ruminants be affected and non-ruminants always remain perfectly healthy? Perhaps the most suggestive fact which may be quoted in endeavouring to elucidate this aspect is the great difference in the time taken to digest the food in the two classes of animals—four or five days in ruminants, and less than half this time in non-ruminants.

In concluding this report I would ask the settlers of the district to hide nothing, and to render what assistance they can to the departmental officers who are endeavouring to fathom the problem. It has been actually denied in the public Press that any trouble exists. Any such attitude of secrecy or of dissimulation on the part of those interested must hinder the work of the Department and render more remote the possibility of a solution. To those who may carp at the want of finality in the reports on "bush sickness" I would refer these facts: That obscure diseases in human beings have taken commissions of experts giving their whole time to the matter years of work to discover the causes, and it is unreasonable to expect an immediate result in the case of diseases of animals. It is barely twelve months since a sufficient sum has been voted for the purposes of the research.

BORDEAUX MIXTURE.

R. Waters.

Introduction.

This wash has now been in use for nearly thirty years, having first been employed in the French town of Bordeaux, whence it derived its name. Since 1882 its value as a fungicide has become more and more generally recognized, and at the present day its use is almost universal. Yet success is by no means the constant result of its application; indeed, there is little doubt that a quantity of the mixture is annually used in cases where it is of no avail; a certain amount is wasted through defective or untimely application; and a large amount is, at the outset, improperly prepared. In the following notes mention will be made of the commoner reasons for failure and of certain aids to success. The subject of preparation will be reserved for a subsequent article.

Uses of Bordeaux Mixture.

It is not an insecticide, nor is it the wash for lichens. The sphere of its usefulness is confined to certain fungus diseases of plants—as a spray and as a dip. To fungus diseases, such as Irish and other blights of the potato, black-spot of the apple, and a host of kindred plant-diseases, it is especially adapted. It is, however, not presented as a remedy for such diseases so much as a preventive of them. In other words, it should generally be applied before rather than after the appearance of disease.

The Nature of Fungi.

It would often seem to be a waste to spray the foliage of perfectly healthy plants, yet nothing is more convincing of the necessity for it, or more conducive to efficacy in practice, than a clear understanding of what a fungus really is. The fungi we are considering are low forms of plants that grow amongst the tissues of the higher plants. They are unable to draw their food-supply from the soil, as the higher plants usually do, and are obliged to take it from either living or dead organic matter. In the former case they are called "parasites," in the latter "saprophytes." It is their microscopic size that renders them difficult of comprehension, their presence being indicated more often not by the appearance of their own forms, but by the occurrence of markings due to the disorganization

they have created in the affected portions of their host-plants. Small as they are, they consist of masses of tubes which correspond to some extent with the parts of the higher plants. Certain of these tubes, or hyphæ, as they are called, may constitute a more or less tangled mass amongst the tissues of the stem, leaf, or fruit on which they are growing. These play the part of roots, and are spoken of collectively as the "mycelium." Others grow above the surface of such leaf, &c., giving rise to minute ovoid or globular bodies; these tubes correspond with the stems of higher plants, and are called "aerial hyphæ," while the bodies to which they give rise coincide with the seeds and are termed "spores." The spores, which depend largely on the wind for their dissemination, are the chief means by which the fungi perpetuate their kind, though they may do so by portions of the mycelium. The spores are developed during the growing season in enormous numbers, and are launched into the atmosphere, where they float about or are blown by the wind, sometimes for great distances. It is well known that certain fungi show a preference for particular plants; thus black-spot is particularly partial to the apple and pear, while it fails to grow at all on many other fruit-trees. All, therefore, that the spores require is that they shall alight on their own host, and that climatic conditions shall be favourable, when they will soon proceed to germinate and "take root." Spores produced later in the season often adhere during the winter months to the stems of plants, resuming their activity on the advent of spring.

Fungicidal Action of Bordeaux Mixture.

This brings us to the point where the use of Bordeaux really comes in. The special feature of Bordeaux mixture is not to exterminate the mycelia of fungi; in many cases it would be quite impossible for it to do so without at the same time destroying the tissues of the host. The main object of its use is to kill the spores before they have penetrated the surface on which they are lodged. Bordeaux should therefore be in position before or as soon as the spores. It is well to point out, however, that in the early stages, or in mild forms of fungoid attack, Bordeaux mixture most certainly has its use.

After its application Bordeaux mixture undergoes a considerable change: the water of which it is composed evaporates off, and there is left a bluish powdery deposit on the surfaces to which it is applied. This is a copper compound which under the influence of dews and light rains slowly dissolves, keeping the surfaces continually supplied with a protective film. So long as this condition is maintained alighting spores are destroyed.

When to spray.

In the orchard undoubtedly the most important time to spray, generally speaking, is when the trees are leafless. At this time mixtures

of considerable strength (10 lb. bluestone, 10 lb. lime, 40 gallons water) may be applied without fear of injury. The pruning of fruit-trees in the autumn, after the falling of the leaves, and the burning of the clippings in itself frequently rids the trees of some of the sources of reinfection; for in affected areas the dead terminal shoots often harbour mycelia which rapidly give rise to spores in the spring. It is therefore a favourable opportunity to follow up the attack on the fungi after the pruning. Spraying performed at this time is, however, generally in connection with very persistent diseases as, for instance, peach die-back (*Clasterosporium carpophilum*), which requires two applications, the first as soon as possible after the leaves have dropped, the second when the buds show signs of swelling. Such applications are rendered more important in the case of the peach from the fact that its delicate foliage renders summer spraying unsafe: this equally applies in the case of the foliage of the Japanese plum. With those diseases that need only one dressing the best time is just as the buds are swelling. This is the latest attack that can be made on fungi with the winter strength (10-10-40). Should this spraying be performed too late, much damage may result to the developing buds, which previously were protected by scale leaves. In the summer a much milder strength of Bordeaux is used in the orchard (4 lb. bluestone, 5 lb. lime, 50 gallons water), to avoid injuring the leaves. Generally speaking, it should not be applied until the delicate process of pollination and fertilization has been accomplished; the time is therefore roughly marked by the falling of the petals of the flowers. The number of, and the time for, subsequent applications varies according to the nature of the disease, the kind of plant affected, the surrounding conditions in respect to disease, the weather, &c.

Potatoes are first sprayed when they have attained a height of from 6 in. to 9 in. and again when in flower—in bad localities, however, as often as every ten days—the under-surfaces of the leaves being especially covered. Use is made of the ordinary summer formula (4-5-50) for the first spraying. In the cases of the second and later sprayings, and of crops already grown, where the foliage is toughened, a stronger wash (6-4-40) is sometimes used.

Tomatoes, owing to their tender nature, are not sprayed until they have established themselves after transplanting and are 9 in. to 1 ft. high, the treatment then being with a comparatively weak wash (3-3-50). Fortnightly applications are made, the later strengths being increased (4-5-50).

It would be quite impossible in an article of this nature to give the precise requirements of each fungus and the precautions necessary for each plant, but enough has been said to show the importance of knowing exactly when to spray and what strength to use. The Department is, of course, always glad to advise as to the requirements of individual cases.

MAIZE.

PLANTING FOR GREEN FEED.

J. Drysdale.

In growing maize the first consideration should be to select good land —new land if possible, well sheltered from the prevailing wind. To get the best results it is most essential that the land should be of good quality. To sow in poor soil or land that has been overcropped would be a waste of time and labour.

I would recommend the sowing of the medium early varieties, such as Clarence Wonder, Large Yellow Morgane, Ninety Days, and Red Hogan. As regards analysis, it has been arranged to have analyses made of a large number of varieties this season, and next season we shall be in a position to give feeding-values of these. With regard to dates of sowing, I would recommend the first sowing to be made early in October; further sowings at intervals up to January. This would allow the maize to be fed during the whole season at about the same stage, and would also give the small farmer an opportunity of preparing his ground in small sections, so that his land would be in better form for producing a good crop. Maize being a vigorous grower under favourable conditions—such as good soil, well worked and free from weeds, with a liberal application of manure—it will not give the weeds a chance to grow, thereby doing away with the necessity of wide sowing, when scarifying or cultivating is imperative. On the other hand, if the soil is of poor medium quality and good cultivation neglected the growth will be much slower, thus allowing the weeds to make headway and retard the growth of the plant. Scarifying and cultivation under these conditions are a necessity. To enable scarifying to be carried out the rows should be at least 2 ft. 6 in. apart. The corn could be sown with the ordinary grain-drill, shutting up the required number of coulters to get the proper width. With close sowing the grain could be sown out of every second coulter: this would be 14 in. wide. Under favourable conditions as mentioned above close sowing will give the heaviest yield per acre; but in regard to feeding-value this can only be determined by analysing the same variety, close *versus* wide sowing. This will also be undertaken at Weraroa this year.

The influence of various fodders upon the quality of milk produced will require careful investigation. With the number of varieties on the

market, and the absence of analyses of varieties with regard to feeding-value, it is a difficult matter to advise as to the most profitable varieties to sow. There are recognized early varieties and late varieties. It is not necessarily important in all cases that early varieties should be sown if it can be found that late varieties give a larger feeding-value per acre. The greater number of late varieties will be at a feeding stage before the season would call for artificial feeding. If sown in the middle of October this would allow twelve weeks before required for feeding purposes. We have found Red Hogan and Yellow Morgane, although recognized as late varieties, when sown in October have grown to the proper stage for green fodder early in January.

I recognize that it is most important for the farmer that a few only of the best varieties should be recommended, as it is difficult and expensive to procure many early and late varieties of maize. The sowing of the most vigorous growers, apart from the analysis, will to a great extent have to be taken into consideration.

To obtain the best results of feeding maize as green fodder it would be a mistake to allow it to become too far advanced. Maize should be fed in the early stages, some time before coming into flower. The stems are then juicy and sweet, and are eaten greedily by all stock without any waste. If allowed to cob before feeding the succulence departs, and the stems becoming dry and woody are rejected by the stock. Although it is recognized that the cobs in the early stage possess a great amount of nutrition, it does not counterbalance the loss of about 75 per cent. of the fodder, as would be the case in allowing to cob. On the other hand, if maize is grown for the purpose of converting into ensilage, the cob stage is the right time to cut.

During the last six years Victoria has increased its sheep flocks by 2,040,875 head and its horses by 79,843. Its dairy cattle in the same period, notwithstanding the high percentage lost in the drought a few years back, increased by 147,165, but its beef cattle fell away by 54,815.

Among the exhibits which attract the attention of the visitor to the Roubaix Exhibition, that of New Zealand is worthy of distinction. The English colonies omit no opportunty of displaying the superiority of the methods they employ for supplying the metropolis with chilled and frozen meats. Let us remark by the way that our largest colony, Algeria, has not yet provided freezing-works and ships fitted with insulated chambers for the transport of mutton. The trials made in the year 1905 ought shortly to be renewed.—*L'Hygiène de la Viande et du Lait*, 10th September, 1911.

SOFT-CHEESE MAKING.

A PROFITABLE INDUSTRY.

Miss G. Nest Davies, N.D.D.

The making of soft cheese has been carried on in England, France, and other countries for a great many years. In England the practice is increasing considerably, and the manufacture applies not only among farmers but also to the factory system, while in some cases proprietary articles have been largely sold. This goes to prove that there is a large demand for many varieties of soft cheese.

In France soft cheeses were chiefly manufactured at first by the thrifty occupiers of small farms. The trade then developed until now it is one of the staple and most profitable industries of the country. The output of some of the largest French dairies averages during the season from one thousand to two thousand cheeses per day. A great many varieties come under the heading of soft cheese. These differ from each other in name—which is usually taken from the district in which they were first made—size, shape, method of making, and consistency and flavour; but they all resemble each other in being subjected to little or no pressure during the process of manufacture.

Some varieties—for instance, Camembert—are difficult to make, and success in the art can only be obtained after much experience; while others, such as Little Welsh, Coulommier, and cream cheese, are so simple to manipulate that their manufacture can be undertaken with fair prospect of success even by the beginner.

In many places fancy dairy-products are hardly obtainable, the chief reason probably being that those who have the means have not the knowledge of how to prepare for market the many tasty articles that can be made from milk and cream. It not unfrequently happens that there is a surplus of milk, and its conversion into butter would not be nearly so profitable as, for example, the preparation of Devonshire cream or some kind of soft cheese. If soft cheeses were placed more frequently on the market the public taste would become educated and the consumption would increase, as, indeed, it has done so enormously in England in the case of many a foreign article no better and often worse than that made at home. It is said at the present time that long dinners are giving way to short menus; but, whatever else goes, fruit, cream, and cheese remain, and

not only remain, but are substituted for something of a heavier nature. One important advantage of the cream and soft-cheese industry is that the best demand exists at the very time when milk is in the greatest abundance—viz., in the spring and summer.

Reasons for encouraging the Making of Soft Cheese.

1. It is profitable. The return for both milk and labour compares well with other methods of disposing of milk and milk-products, as the following table will show :—

Quantity of Milk.	Quantity and Kind of Cheese.	Retail Price.	
		Each.	Total.
6 gallons	12 Coulommier	8d. and 9d.	8s.
6 „	12 Camembert	8d.	8s.
10 „	12 Pout L'Evêque	8d. and 9d.	8s.
16 „	12 Miniature Wensleydales ..	1s. 3d. to 1s. 4d.	16s.
16 „	12 Little Welsh	1s. 3d. to 1s. 4d.	16s.

2. There is a speedy return. The cheese are ready for market in anything from a few days to a few weeks.

3. No expensive appliances or equipment are necessary, and many small cheeses can be made for home use.

4. The process of making is not complicated or difficult to understand.

5. Demand : There should be a considerable demand for small cheeses, or it could easily be created, as every one knows that cheese is one of the most nutritious articles of diet. There is every reason to believe that if cheese were put up in attractive packages of convenient size it would appeal greatly to the taste and requirements of the average householder. In proof of this, one has only to consider the popularity of cream cheese, Miniature Wensleydale, and Coulommier in England, and many other varieties imported from other countries. Given a first-rate article, its introduction should at once create a demand.

While the amount of butter imported into Britain in 1910 reached 4,325,539 cwt., the receipts of margarine totalled no less than 1,120,812 cwt.

The Khedivial Agricultural Society of Egypt has voted funds for the establishment of a Mendelian Experiment Station, at Cairo, Egypt, for the study of heredity in cotton. This is probably, says the *American Breeders' Magazine*, the first institution devoted to the study and application of Mendelian principles to the improvement of plants for economic purposes.

RUSSIAN BUTTER INDUSTRY.

REMARKABLE STORY OF PROGRESSION.

In the development of no rural or urban industry has co-operation played such an important part as in that of the manufacture of butter and cheese. New Zealand owes much of the present prosperity to the principle, which has been availed of by the milk-producers of the Dominion to an exceptional degree. Not only have they adopted the most modern methods of converting their raw material into a commercial product of the highest quality, but they have combined with equal success in order to reduce the cost of their butter and cheese packages, and the freezing and cooling of their produce, to a minimum. In some countries of the Old World where the small farmer is not enjoying the same measure of independence and prosperity, co-operation is playing even a more important part in individual and national progress. Russia is one of the last countries which might be expected to present an example of the beneficence of co-operation, and yet in Siberia a remarkable instance is being afforded of the value of co-operation in transforming the conditions of a community of small farmers. According to a late report of the International Institute of Agriculture there were in 1909 a total of 1,400 co-operative dairy factories in Western Siberia, against only 14 in 1898.

The relative cost of production between factories working with varying supplies of milk is shown in the following interesting table :—

Quantity of Milk annually treated.	Number of Butter-factories.	Yield of Butter.	Cost of Production of a Poud of Butter.	Price obtained.	
				For a Poud of Butter.	For a Poud of Milk.
					Kopek.
Up to 15,000 pouds ..	15	19·7	2 r. 41 k.	12 r. 93 k.	53·1
From 15,000 to 25,000 pouds	30	20·0	2 r. 12 k.	13 r. 03 k.	54·6
,, 25,000 ,, 35,000 ,,	15	19·8	2 r. 11 k.	13 r. 07 k.	55·2
,, 35,000 ,, 50,000 ,,	11	20·1	1 r. 91 k.	13 r. 01 k.	55·2
,, 50,000 ,, 85,000 ,,	8	20·0	1 r. 83 k.	13 r. 04 k.	55·9

Rouble, 2s. 1½d. ; kopek, ¼d. ; poud, 36 lb. avoirdupois.

From the above it will be seen that the larger the factory the greater the economy, and consequently the better return to the producer, although in one case the largest factories did not average quite as good returns for their butter as those having an output between 25,000 and 35,000 pouds.

The following is another instructive table. It shows that while the value of milk has considerably advanced, and is now at a satisfactory level, the annual average production is remarkably low. However, the cost of production must be on a proportionately low basis :—

——	1899.	1900.	1901.	1902.	1903.	1904.	1905.
	R.K.	R.K.	R.K.	R.K.	R.K.	R.K.	R.K.
Annual average revenue of a peasant's household from milk supplied	43·13	52·24	60·33	84·72	70·65	64·93	72·90
Annual revenue per cow ..	8·59	11·40	12·94	17·65	15·28	15·03	16·20
Annual average quantity of milk supplied per cow (pouds)	27·20	29·80	29·40	34·10	31·10	33·20	33·10
Average price obtained per poud of milk (kopeks)	34·00	41·20	44·00	46·30	47·30	44·70	48·60

DEPARTMENT'S DAIRY HERDS.

Since the last issue of the *Journal* the Department has imported some purebred milking Shorthorns and several head of milk-record Holsteins. The Shorthorns, from New South Wales, two bulls and nine heifers, are of a distinct dairy type, the females having fine heads, necks, and shoulders, with long quarters but inclined to droop. They would not appeal to the breeder of the fashionable Shorthorn, but to the dairy-farmer they possess many points to enthuse over. The older bull is inclined, as far as present appearances go, to beef, but the younger one exhibits good dairy qualities. The Holsteins, a three-year-old bull and three heifers, are from the United States. The bull exhibits dairy quality in a high degree, and should prove a valuable sire for the production of deep-milking stock. The abdominal veins are particularly well marked; he has a particularly bold carriage for a Holstein, and he is of a shapely build. Two of the heifers are of fine quality —lengthy, with fine heads and necks carried on sloping shoulders with the desirable development at the business end. They are in calf to a bull whose dam holds the world's junior four-year-old record of 142·16 lb. of butter for thirty days. The third heifer is somewhat younger, and promises to develop into a good milker.

At the Palmerston North Show sale the Department disposed of its annual draft of milk-record Holstein bull calves from the Weraroa Experimental Farm herd. The seven realized an average of 90 guineas. Two of them came third and fourth in a big class at the show, but under the hammer they realized (by reason, no doubt, of having milk-record dams) more than the calves placed above them in the show-ring. Following are the names of the dams, the year's record of these, and the prices realized: Manola, 578 lb. of fat, 140 gs.; Spot IV, 286 lb., 100 gs.; Barbe, 414·6 lb., and still milking, 100 gs.; Molly, 350·6 lb., 80 gs.; Molly, 350·6 lb., 76 gs.; Bertha, 209·4 lb., 72 gs.; Julia, 298·4 lb., 57 gs. The last two-named cows suffered from foul-foot, which seriously interfered with their milking-power.

WEATHER AND CROPS.

OCTOBER.

Officers of the Department report as follows on the weather of the past month and the condition of pastures and crops :—

Hamilton.—Occasional heavy rains, with continuous high winds. A boisterous month. Fruit-trees have suffered to a certain extent by the stormy weather, and the milk-yield from dairy cows has not been up to the average for the same reason.

Pastures and crops are looking well.—*J. Kerr.*

Kihikihi.—A wet and very windy month, with occasional frosts.

Pastures and crops are in good condition.—*C. E. McPhee.*

Te Kuiti.—A wet month, heavy showers being followed by high winds of a cold nature ; during dry weather the nights have been cold : this retarded the growth of all pastures except those in sheltered situations. Generally speaking the spring is a backward one, and dairy-farmers are complaining about the shortage of feed.

Pastures are backward, clover maturing slowly. Crops are looking well, but oats are backward.—*B. Bayly.*

Ohakune.—Very cold and wet weather, with fairly sharp frosts : in consequence everything is backward. Farmers would do well in growing winter feed in this district to guard against the long and severe winter weather that is generally experienced. Very little is done in this direction, but there are a few farmers gradually becoming aware of the fact that it is really necessary.

Pastures are very backward, the grub doing a certain amount of damage, especially on the plains.—*P. Barry.*

Gisborne.—A succession of strong winds and want of rain during the month : this has kept the pastures in a backward state, and has made the working of the land for maize-planting a very difficult matter.

Pastures are fair. Very little green food is grown, but the condition of that planted is comparatively promising.—*W. Ross.*

Wairoa.—The weather has been dry, with high westerly winds, tending to parch up the face of the country. Occasional showers have fallen, but so meagre as to be of little practical value to occupiers of pastoral country, and augurs badly for the success of this season's farming operations.

Pastures are in a very bad state for the season of the year : land only being prepared for white crops.—*T. F. Mullaly.*

Hastings.—Very dry month, and high winds ; good rain on the 27th, but much more is wanted.

A fair growth of pasturage—sufficient for sheep but insufficient for cattle. Green feed is looking well, and oats are very satisfactory.—*J. G. Parker.*

Waipukurau.—Very dry windy weather was experienced up to the 26th, when there was a good fall of rain followed by heavy winds. Good showers of rain fell on the 29th.

Pastures are looking fairly well, but not the growth there should be. There is a fair growth of green feed, under the circumstances. Winter grain is looking well, but spring wheat and late oats are exhibiting the effect of dry weather.—*H. O. M. Christie.*

New Plymouth.—This has been a very wet, cold month, with a heavy hailstorm on the 17th and 18th, and some very cold winds. The rain was greatly needed, as we had a dry winter and spring. The beneficial results expected from the rain have been counteracted by the hail and cold winds.

There are general complaints of shortage of feed, consequently there is a shortage in the milk-supply and little growth in the crops. Grass is backward.—*R. E. Fairfax-Cholmeley.*

STRATFORD.—Exceptionally heavy rainfall for the month, accompanied by snow and hail. Rain was wanted badly in the district, but the cold weather has retarded the growth of grass, and caused a marked decrease in the milk-supply. With warm weather, however, the grass should come on rapidly.

A fair amount of feed in pastures. Not much green feed grown, but what there is is showing fair development. Oats are only fair: those in exposed positions have been cut by cold winds.—*A. F. Wilson.*

HAWERA.—Following on an unusually dry spell in August and September, copious rains have fallen during the month, but the good effects have been seriously minimized by incessant cold winds.

Pastures are backward. Small plots being prepared for maize. Limited area will be sown in turnips. Mangels do well in this district: every farmer grows a few. Small areas in oats coming along well.—*A. J. Glasson.*

WANGANUI.—The first nine or ten days of the month were dry, and a succeeding dry spell appeared ominous, moisture being badly needed. However, rain fell on the 11th, and continued intermittently for four days, since when good rains have fallen periodically. Unfortunately, during the fair weather there has been a lot of cold wind, which has considerably retarded growth of grass and crops. The month ended with windy weather and indications of more rain.

Fair feed in pastures: growth slow owing to lack of warmth. Practically no green feed. Crops looking well.—*C. Watson.*

FEILDING.—The weathers has been very cold and boisterous, with occasional heavy showers: still, it should influence the development of all crops in this district, whereas without these late rains the outlook would have been serious. The present effect is beneficial, and the probable future influence should be good.

Should genial sunshine be experienced pastures should be very good. Green feed is ready to cut. Maize is looking very well. Turnips are not yet sown. Mangels are being planted, and rape is being drilled. All other crops look very promising. Oats have a splendid appearance.—*W. Dibble.*

PAHIATUA.—During the month we have had nothing but gales and intermittent showers, which have delayed the work on the farms, besides hindering the growth of crops of all kinds, especially so on country exposed to the north-west gales. Draining to prevent waterlogging of the soil is not appreciated in the district as it should be.

Pastures are unsatisfactory on poor soils and where farms have been overstocked. Green feed is not up to what it should be. Crops looking fairly well.—*T. Bacon.*

MASTERTON.—The month has been exceptionally wet, cold, and very boisterous at times, with hail and frosts; but good growing weather was experienced in the last week, and there have been some warm days lately.

While feed was plentiful in the winter, spring feed is only coming away in some sections. Generally it is a late spring. Very little green feed grown. What grain is grown is looking well.—*T. C. Webb.*

CARTERTON.—The weather has been very broken, and more rain has fallen than usual for October. During the early part of the month a cold, rough, southerly snap was experienced, with heavy snow on high country. The latter portion, however, brought warmer rains and more genial weather, generally resulting in excellent growth of all kinds.

Grass is abundant, and green feed is making good growth. Grain crops are promising.—*S. C. Ivens.*

WELLINGTON.—The copious warm rains of last week, though delaying shearing in a few cases, came when badly wanted to freshen up pastures, which were bare. A good supply of feed is assured.

Pastures are rather short, but are now growing fast. Green feed is looking well; also oats, grown only for chaffing.—*G. H. Jenkinson.*

NELSON.—The weather has been cold and squally during the month, and there has been very little growth, especially in the high country. Snow fell in places during October where none fell during the winter.

Pastures are very backward owing to the unfavourable weather, which has had a marked effect on the early pea crop, which is turning out much below the usual. The tomato crop will be late. Crops look well. Large area sown to oats, and these look promising.—*H. Cleland.*

BLENHEIM.—The weather this month has been nothing but a course of successive gales, being very cold, with three nights' frost, one of which was in places very severe,

leaves breaking off like pieces of glass. Good rain fell in the Pelorus, Wairau, Sounds, and Blenheim districts; but from the Riverlands Homestead, Vernon, and Ugbrooke to the coast the country is very dry, feed short, and rain badly needed.

Pastures were badly checked by severe weather, but with late rains and present weather they should now go ahead. Practically no greed feed grown. With the better weather, winter wheat, spring wheat, oats, and barley are looking well everywhere. Potatoes were cut by severe frosts.—*F. H. Brittain.*

SEDDON.—The weather on the whole has been too cold—dry and windy. The showers of rain that have fallen were not enough to thoroughly wet the ground. In consequence the pastures are not so good as usual, and in parts of the district are now turning yellow on the steep north faces.

Though the weather is now much warmer than it was, and the snow is disappearing off the ranges, it is too dry both for grain and root crops. Oats and barley are now coming into head, and want a good rain to mature the grain. The dry weather is having a prejudicial effect on fields of grain that were too wet in the winter. However, it is enabling the farmers to get their root crops sown, and is suiting all those who are shearing.—*G. J. Ward.*

LINCOLN.—Rain fell at fairly regular intervals during the month. Owing to the absence of heat, usual in October, growth has been slow. With the advent of warm weather feed and crops of all kinds should come away rapidly.

Except in sheltered valleys on Banks Peninsula the growth of grass has been slow; there were too many mouths to let it get ahead. Generally speaking, crops are looking well. Owing to hard feeding in winter and spring, cocksfoot has not had a good chance. During the coming season lambs should be in good demand; also dairy cows, the death-rate of which, owing to want of feed during winter, was abnormally high.—*J. G. Scott.*

KAIKOURA.—The first half of the month was very dry, with incessant north-west and easterly winds. On the 19th a good beneficial rain fell and did an immense amount of good to the crops and grass, which previously were backward. On the night of the 27th a cold southerly blizzard came up and continued for a few hours. One owner who was shearing lost a considerable number of sheep newly shorn. The remainder of the month has been nice and warm. A frost occurred on the night of the 14th instant, and frosted off the majority of early potatoes through the ground.

There is now plenty of feed for stock. Autumn-sown oats eaten off, and the stock have been shut off again. Spring wheat looking well—no grub or fly. Oats coming along splendidly. Very small areas of barley—looking well. Potatoes nearly all frosted off on night of 14th.—*W. S. Goodall.*

ROTHERHAM.—The weather during the past month has been somewhat changeable. There were two or three very cold snaps, with snow on the low country, which has been very disastrous to young lambs. This was followed by very severe frosts, which have done great damage to fruit-trees.

Pastures are coming on well, and promise to provide excellent feed. Green feed looking promising. A large area is being sown to mangels. All grain crops looking well. A large area has been sown to spring wheat as well as to potatoes.—*W. M. Munro.*

RANGIORA.—There was a very heavy frost on the night of the 14th October, which cut back the early potatoes, and did great damage to stone fruit. From the 17th to the 20th October there was heavy rain and snowstorms over the greater part of this district, but especially in the back country. About the 24th hot north-west winds prevailed and brought down the snow and flooded the Waimakariri. Not much damage resulted.

Pastures are looking well, the rain and hot weather having brought them along very quickly. Spring wheat is coming away very fast, and other grain crops are looking well.—*A. Hughes.*

ASHBURTON.—There was fine growing weather through the month. Rain fell on eight days: total rainfall, 1·92 in. Frost on twenty-two nights: highest on 17th—11 degrees. In the back country, one of the worst Octobers for a good many years. Owing to some of the runs falling in in February, lambing is earlier, and a big mortality in lambs and ewes has taken place. Rain, snow, and north-west blizzards have been more prevalent than in previous seasons.

Pastures have come on splendidly, although large bare patches, due to grass-grub, are everywhere to be seen. Old pastures of cocksfoot have suffered the least. Green feed is looking well. All grain crops looking well. Turnips not started sowing. Rape and mangels just being sown.—*C. Branigan.*

FAIRLIE.—A very unfavourable spring has been experienced. Snow fell to the depth of 2 ft. in some parts during the latter end of July, and since that date there has been a succession of snowstorms. Farming-work of all kinds has been very much delayed. Lambing percentages are very small. There will be a big shortage of lambs in this district this season.

There has been very little growth in pastures up to the present. Very little green feed. A large area being planted to turnips and rape, and a good area to mangels. A large area of winter wheat, and it is looking well. Little spring wheat sown owing to unfavourable conditions, and the growth is poor. Oats being sown on a large scale. —*W. B. Manning.*

TIMARU.—During the month there have been heavy winds, both from the north-west and south-west, with snow on the hills and late frosts. At the end of the month warm north winds and light showers gave all vegetation a good start. The season is considered late.

Good growth observable in pastures, but bare patches owing to grub. The same remark applies to winter wheat. Roots are being sown, and there is a good strike of rape. Other crops looking well.—*J. C. Huddleston.*

WAIMATE.—Rain has fallen at reasonable intervals, although the cold weather experienced has not tended to hasten growth. Speaking generally, the present prospects of the agriculturist and grazier are good. Several dry north-west winds have been experienced during the past month, but on occasions have been accompanied by rain, thus preventing any noticeable check in growth.

While young pastures suffered from overstocking in winter, there has been great improvement in the growth of grass in both high and low lands since the beginning of the month. Green feed, generally backward in growth, is receiving more consideration. Turnips are being grown more on the ridging principle, and mangels are being grown to a greater extent. Winter wheat, of which there is a considerable area, has never looked better. Spring wheat promises heavy yields, as well as oats, of which an extended area has been planted. An increased area has been sown to potatoes.

Co-operative experimental work has made a beginning, and farmers in the district are becoming more alive to the benefits to be derived from such, and more inquiries are daily being made by them. Lucerne-growing takes much of the interest, and plots of this already sown are looking encouraging. Farmers are displaying a keen interest now in lucerne—how, when, and where to sow. One hears of somewhat extensive areas to be tried next season.—*F. A. Macdonald.*

KUROW.—The weather on the Upper Waitaki has been very mixed, one warm day and the next like winter. There have been many showers, and there is a marked improvement in the look of the country generally compared with the corresponding month of last year.

Farmers are well ahead with their cultivation, and prospects look brighter than they have done for years. Grass is coming away well, and there is an abundance of feed on the back-country runs. The grub is very destructive in places. All crops are looking fairly well.—*G. Reid.*

OAMARU.—A very good month ; not so boisterous as it usually is, as there have been very few equinoctials ; things agricultural and pastoral never looked better. There were frequent good showers during the month, and something over 1 in. of rain has fallen. The crops generally are looking remarkably well, and given a moderate rainfall this coming month of November a successful season in this district will be assured.

Pastures never looked better, and feed is in abundance. Green feed is lasting out, and the general intention is to chaff it. A large area is to be planted to mangels. Crops of winter wheat are splendid : their condition points to their becoming too heavy. All other crops have an exceptionally good appearance.—*S. M. Taylor.*

CLYDE.—The month of October has been very stormy, and there has been frequent cold snaps, with a good coating of snow on the highlands. Some heavy gales were experienced. Heavy rain fell for several hours on the 25th instant, and did a great deal of good.

Grass is making satisfactory growth. Winter wheat is coming on well, but oats are rather backward.—*T. N. Baxter.*

NASEBY.—The weather this month has been very cold. There were two slight falls of snow with occasional showers and accompanied by frost. These conditions have kept back both grass and crops. The high winds have had the effect of giving the plain a very dry appearance, with the exception of the Paerau (Styx) district. The outlook at present is not bright.

Pastures are backward, and green crops are not coming away too well. Grain crops are also making a little headway.—*A. T. N. Simpson.*

PALMERSTON SOUTH.—The weather during the month has been extremely changeable—samples of midsummer and midwinter in the one day. Slight falls of snow have taken place on high country on more than one occasion. No real beneficial rain fell throughout the month, but there were frequent showers followed by winds. In consequence, except in well-sheltered places, the growth in crops and pastures is slow. Turnip lands require rain.

Though growth is slow, pastures are looking well, but the grass-grub is doing considerable damage. Autumn-sown rape has done well. Mangels are being more extensively sown. Grain crops looking fair.—*C. S. Dalgliesh.*

LAWRENCE.—Weather has been very stormy and broken, with rain, wind, hail, and snow, upon high levels especially. A good many lambs perished upon individual places. Rough weather retarded farming operations for a short time. Sufficient moisture has fallen to ensure moisture for crops up to the middle of December, providing we have no high winds.

Pastures are looking well, also winter wheat; there will probably be an excess of straw. Other crops have a promising appearance.—*R. Barron.*

SUTTON.—Owing to the want of sufficient rainfall during the past winter and spring, pastures are very backward on the plain, and the outlook for the summer is anything but promising.

Pastures are very bare, and cattle are in low condition. Grain crops have a promising appearance.—*W. Scott.*

TAPANUI.—The weather during the past month has been a succession of cold snaps, with a fair amount of moisture. Growth has consequently been slow. Farm-work is well ahead this season, having had practically no delay through wet ground. Prospects look much better in the Roxburgh and Miller's Flat district this season, having had up to the present a fair share of moisture, but throughout all the districts heat is now wanted.

Old pastures are making very slow growth, but young pastures are looking well. In portions of the Crookston district pastures are badly grubbed, but the remainder of the district is fairly free. Roxburgh and Miller's Flat pastures are better than during past six years. What crops there are are looking well.—*J. McCulloch.*

BALCLUTHA.—The weather of October was the worst experienced for some years. The month started with frost to 6 degrees, and for the past three weeks we have had bad gales and hail-showers with a fairly good amount of rain, which have weakened the effects of the winds. However, all agricultural pursuits are looking well. Lambing was early this year, and having escaped the rough weather the results are very promising.

Pastures are looking well, and the appearance of the crops is very good.—*H. A. Munro.*

OWAKA.—The weather has been very stormy, with a good amount of rain: in fact, it has been showery pretty well every day. The weather has favoured agricultural pursuits, giving all crops that have been sown a real good start.

The grass has come away very well except on hill country. The weather has been suitable for green crops. Little grain is grown here, but the crops are looking well.—*T. D. Urquhart.*

GORE.—The month has been very rough and stormy. A good deal of rain has fallen, but has generally been followed y high winds. Farm-work has been somewhat delayed during the unfavourable weather, and the pastures have also received a check. During the earlier part of the month there was every prospect of a rapid growth, but owing to the high, drying winds of the past week there is still need of more rain. During the past month rain fell on eighteen days: total fall for month, 3·01 in.; highest fall, 0·60 in. on the 15th; mean average temperature, 49·5 degrees.—*A. A. Scott.*

On the more sheltered lands feed is plentiful, but in less favoured locations feed is still short. Green feed is looking well, and the small area planted to grain crops promises a satisfactory return.—*B. Grant.*

INVERCARGILL.—Rain fell on twenty days, total fall as recorded by Messrs. J. Lennie and Sons, Waikiwi, being 4·70 in.; but as the winter proved exceptionally fine the rainfall was required. Cold wind, hail, and sleet showers, however, retarded the growth of grass, cereals, &c. Only an odd warm day or two experienced throughout the month. Heat is now wanted.

Young grass is looking well, with the exception of portions attacked by the grub. Old pastures are bare on account of the unfavourable weather. Green feed, grown on a small scale, has done fairly well, but grain crops, also limited in area, are not making much headway.—*J. R. Whyborn.*

LUMSDEN.—October has been one of the wettest months of the year. Heavy rains and occasional slight falls of snow and hail, accompanied by severely cold winds, retarding all growth.

Pastures have benefited by recent rains. Green feed is none too plentiful. Oats are looking well.—*W. S. S. Cantrell.*

QUEENSTOWN.—During first fortnight in October the weather was fine; since then cold weather from the south with snow has been experienced over the whole of this district. In Upper Wakatipu runholders state that it has been the worst weather that they have had at this season for twenty years, and they anticipate a heavy loss in lambs.

Pastures are very backward, and green feed is scarce. Cropping is only done on a small scale, but the cereals planted are looking well.—*A. Clarke.*

PEMBROKE.—This season is fully a month later than usual, no doubt owing to the exceptionally cold winds and late frosts, grass and crops generally being in consequence not as far advanced at this time of the year as is usual. The heavy rains about the middle of the month (although cold and stormy) were just in time, and were welcomed by the farmers. The weather on the whole was more or less stormy—cold southerly winds. The mortality among young lambs was slighter than was anticipated; in general the lambing was good.

The grass has got a fair start. Farmers are trying lucerne on a small scale. Winter wheat, all sown in the autumn, is promising, as is the spring wheat. Barely enough oats are grown for local requirements.

Shearing has now commenced, and there are no idle men in the district. The general outlook is very promising all round.—*J. A. Griffith.*

AGRICULTURAL-SHOW DATES.

SPRING AND SUMMER FIXTURES.

Otago Metropolitan Agricultural and Pastoral Society, 29th and 30th November, Dunedin.

Palmerston and Waihemo Agricultural and Pastoral Association, 1st December, Palmerston.

Lake County Agricultural and Pastoral Association, 1st December, Arrowtown.

Clutha and Mataura Agricultural and Pastoral Society, 1st December, Balclutha.

Gore Agricultural and Pastoral Association, 5th and 6th December, Gore.

Southland Metropolitan Agricultural and Pastoral Association, 12th and 13th December, Invercargill.

Secretaries of rural show societies in general are requested to forward the dates of the shows of their organizations as soon as available, for notification in this *Journal.*

SOFT-CHEESE MANUFACTURE.

MISS G. Nest Davies, N.D.D. (National Diploma in Dairying), who holds high credentials from British institutions, has been appointed instructress in soft-cheese making to the Department. Applications for instruction on this subject are invited.

THE HEMP INDUSTRY.

W. H. Ferris.

While the hemp reaching the ports of Wellington and Foxton is showing an increase on the quantity handled at this time last year, the quality is also showing an improvement. In several cases millers are being compelled to deal with unsatisfactory leaf, suffering considerably from the effects of disease, and "fair" is the best grade they can reach. However, the extent of diseased leaf is not so great as it was last season. Some fibre was damaged to a slight extent by the wet weather. The general improvement noticeable is in stripping and colour. The chief weakness—and it is as pronounced as it was last season—is in scutching. Very few millers are adopting the excellent idea, illustrated in the September issue of the *Journal*, of cutting out the tail ends in the paddock, thus leaving the objectionable tow-balls.

Mill Improvements.

On a recent visit of inspection to the mills of the Manawatu I was greatly struck with the indications of progress taking place in the work of milling. Plants are being brought more up to date, while the capacity of a number has been increased. The patent Suttie catcher and washer is being generally installed; while a feature of the extension being made on the plants is the conversion of single-stripper mills into mills operating two and three strippers, thus doubling and trebling the capacity. The swamps are being more carefully managed, the necessity of clearing rubbish as the cutting proceeds being now more generally recognized. Unfortunately, in some of the swamps the leaf is being cut too far into the butt, with the result that the trade is being supplied with a badly stained hemp. It may be well to remind millers that staining from the butt is especially prejudicial to high-grade quality. Manufacturers demand an absolutely clean and even colour in the best quality of fibre.

At present market values mills in the Auckland and Southland districts are not likely to mill to any extent, owing to the raw material being in scattered locations and the cost of transit of the milled fibre, while few of the mills in these districts have the up-to-date plants general in the Manawatu.

A slight improvement in the value of hemp took place last month, which created an improved demand. Good prices are being paid for tow. With the present big output of Manila it is not probable that any decided advance will take place in the value of phormium-fibre in the near future.

THE APIARY.

NOTES FOR DECEMBER.

I. Hopkins.

When the notes for last month were being written the outlook for a decent crop of white-clover blossoms—owing to the continued dry weather—was anything but encouraging. Thanks, however, to the abundant rains we have had since, and which came just in time, the clover has come on splendidly, and present prospects in most parts of the Dominion for a fair crop of clover honey are promising.

Queen-rearing.

The sudden changes in the weather and temperature during a great part of October delayed queen-rearing—in fact, we found at the Government queen-rearing apiary our work abortive on two or three occasions. Several batches of queen-cells were destroyed, and one lot of young queens that emerged from cells given to nucleus colonies failed to return after their "wedding flight." The successful rearing of queens depends entirely upon having fine settled weather. It is impossible to succeed even after a favourable start if the weather and temperature should become unsettled before the young queens are mated. Beginners, as I suggested in the September number, will be well advised to delay making a first start at queen-rearing until well into November.

It may be well to mention to new subscribers that the first part of these notes on queen-rearing appeared in the September number of the *Journal*.

Making Nucleus Colonies and disposing of Queen-cells.

I stated last month that I would go into this, the final stage of queen-rearing, in this month's notes. A nucleus colony is, as its name indicates, a small but complete colony of bees capable of building itself up under ordinary circumstances into a colony of full strength. In queen-rearing we usually make several from one strong colony, or by taking a frame or two of bees from each of several colonies. We can make as many as are required in that way. I prefer to break up one or more strong colonies.

I recommend the use of nucleus hives of a size to take three of the ordinary frames used in the apiary. Such hives can readily be made by beekeepers out of $\frac{5}{8}$ in. timber. They should be at least $\frac{1}{2}$ in. wider inside

than will take three frames, so that an introducing-cage may be inserted between them with ease. The bottoms of these hives are best nailed on, projecting in front from 2 in. to 3 in., the entrance being cut out of the front 2½ in. long by ½ in. deep. Nail two battens, 2 in. deep, across the bottom, to keep the latter off the ground. Flat covers are best.

A strong two-story colony will make five nucleus colonies, and, if very strong, six may be made. As the bees are to be confined in the nucleus hives for over a day, ventilation should be arranged by tacking a piece of queen-cage wire cloth over the entrance. It is a good plan to bore a 1½ in. hole through the bottom, and to cover this with wire cloth also.

Forming Nuclei and inserting Queen-cells.

When the queen-cells are thirteen days old from the egg they are ready to be given to nuclei. If there is any doubt about their age it is better to deal with them, say, on what is believed to be the twelfth day, or, if absolutely certain of their age, they may be left until the fourteenth day. Be careful when handling the cells that they are not roughly used, and that they be kept warm in a small box on cotton wool.

The cells and hives being in readiness at the colony intended to be broken up, blow a few puffs of smoke in, lift off the upper box, and, without looking for the old queen, proceed to place in each nucleus hive, finishing one at a time, one frame of brood (as much sealed brood as possible) with adhering bees, one containing honey and a little brood, with bees, and an empty comb. There should be a good many bees, without the hive being overcrowded. See that there is food enough. On the centre comb in each nucleus place a queen-cell confined in West cell-protector (obtainable from hive-makers), and close the hive. When all are done put them in meantime in a cool dark place till the evening of the following day, when they may be set out just before dark and the bees be liberated. Set them a good distance apart from each other, and away from the main part of the apiary.

A nucleus colony should, of course, be left on the stand. This need not be closed. The old hive can remain, but it should be contracted in size by two division boards, to suit the size of the colony. This hive will catch all the returning bees.

Caution in making Nucleus Colonies.

A mistake, resulting in failure in making nuclei, is frequently made by beginners by not confining the bees for a while. If the nucleus colonies are placed out at once all the field bees are bound to return to the old hive after their first flight. Thus the brood and queen cell are deserted, and they perish. When confined, as I have advised, though some of the bees may return, it does not affect the welfare of the colony.

Mating of Young Queens.

Supposing the queen-cells have been inserted on the fourteenth day, in two days more the young queens will emerge, and when about five days old, if the weather be favourable, they will take their "wedding flight," and in about four days after meeting the drone will commence to lay, when they may be made use of, though they should be allowed to fill the combs with eggs before removal.

Preparing for Surplus Honey.

In an average season the main honey-flow is well on at the beginning of this month, and plenty of working-room should be provided from now forward. As a rule the extracting season in the northern part of the Dominion does not commence earlier than about the 12th, and later further south. In any case, do not let the hives be overcrowded before giving more working-room by extracting, and if working for comb honey remove the section boxes as soon as finished, but not before all cells are sealed.

Comb *v.* Extracted Honey.

For the sake of economy I always advise beginners to start raising comb honey in sections. There is no honey-extractor or tank needed then; but as soon as it is decided to go into beekeeping for commercial purposes in a clover district, then by all means get the necessary appliances and go in for extracted honey. Larger crops can be raised with less trouble and expense, a readier sale and better prices can be obtained for the latter than for comb honey, and it will carry to distant markets better.

Keep down Swarming.

Make every effort from now forward to keep down swarming in the manner suggested in previous notes. Remember that the more swarming the smaller will the honey crop be. Plenty of working-room in advance of requirements is the best way of preventing swarming. When placing on an extra surplus box always put the new and empty one next the brood-chamber and under the others.

Keep all weeds and grass down around the hives, and always have the apiary tidy.

The Garden Island Honey Company, of Honolulu, is planning to establish a breeding-station for the improvement of Italian bees on an isolated island of the group, as soon as necessary arrangements can be made. The company hopes not only to improve the bees, but also to furnish an early supply of queens to beekeepers in the United States.

ORCHARD WORK FOR DECEMBER.

W. A. Boucher.

Cultivation.

It is most important that the soil of the orchard or garden should receive proper attention. This applies equally to districts where December is usually dry and to others where there is generally more or less rain. Thorough working of the soil is essential; in the former case to destroy such growth of weeds and grass as may have followed the last cultivation, with a view to the conservation of as much moisture as possible, and in the case of the latter to prevent the growth becoming so rank that the ordinary light orchard cultivator would prove valueless for its removal and render the use of the plough necessary.

Codlin-moth, Leaf-roller Caterpillar, Apple and Pear Scab.

Spraying for the control of codlin-moth will require the careful attention of all growers in districts infested with this pest, as, with warmer weather setting in, the moth will be on the wing in increasing numbers. The first spraying of the season always presents some difficulties on account of the irregularity with which different varieties come into bloom, necessitating the spraying of some and passing-over of others for the time being. This difficulty should be obviated at the second spraying, for, the blossoming period being over and all fruit set, it should be possible to spray all apples and pears without distinction.

Growers may again be reminded that careful and thorough work is essential for the control of the pest. The underlying principle upon which successful spraying with arsenate of lead for the control of the moth depends should not be lost sight of. Arsenate of lead will not prevent the laying of the eggs by the moth or the hatching of the young grubs, so that prevention of infection can only lie in depositing a thin coating of poison on every part of every fruit, in order that the newly hatched grubs may find it impossible to penetrate the skin without taking sufficient of the arsenate to cause instant death. Complaints are occasionally received that the use of brands of arsenate of lead known to be of standard quality and thoroughly reliable has not prevented infection. In such instances there can be no doubt that failure has been due to the method of application and not to any defect in the material used; in fact, in some cases this

has been actually demonstrated by altering the method of application but making no change in the material. In many districts of the Dominion showery weather frequently prevails during this month. Frequent showers and a humid atmosphere produce conditions especially favourable to the development of apple and pear scab, so that, in addition to previous steps that may have been taken to prevent infection, varieties known to be particularly subject should be kept under observation and sprayed with the Bordeaux mixture, 4-5-50 formula, if either of these fungi threatens to become troublesome. As mentioned in the October issue of the *Journal*, 1½ lb. of arsenate of lead should be added to the Bordeaux mixture in districts where codlin-moth exists, in order to save the trouble and expense of spraying for pest and fungus separately.

Bronze-beetle.

In some districts growers have found it difficult to keep bronze-beetle under satisfactory control, in spite of spraying freely with arsenate of lead. It will be found that the addition of a small quantity of resin-solution will much increase the effectiveness of the arsenate of lead in preventing serious blemish to fruit through attack by this pest.

Resin-solution.

Proportions: 1½ lb. resin, 1 lb. washing-soda, 2 gallons water. Preparation: Boil the water, dissolve the soda, add the resin, and continue boiling until the resin has thoroughly dissolved. Add about 3 quarts to each 50 gallons of arsenate-of-lead spray.

It is possible that in many instances the necessary treatment for the control of leech, mussel scale, red spider, scale on citrus trees, and pear-mite may not have been carried out, or perhaps proved ineffective, owing to faulty methods of applying or preparing the spraying-compounds. In such cases it is not yet too late to adopt the lines of treatment suggested in the October issue of this *Journal*.

Irish Blight of Potatoes.

It has often been the case that a main crop of potatoes has been suddenly attacked and destroyed by the Irish blight during the month of December, owing to climatic conditions prevailing which have proved exceptionally favourable to the rapid increase and spread of the fungus. Such conditions may recur during any season, so that to prevent possible serious loss precaution against infection should be taken by spraying with the Bordeaux mixture, 4-4-40 formula.

Tomatoes.

In some districts tomato crops will now be well developed and subject to attack by both fungus and caterpillar. An effective combined pre-

ventive of injury by either will be found in the Bordeaux mixture, 4-5-50 formula, to which 1½ lb. arsenate of lead will be added. Spray at intervals of about three weeks.

Black-spot and Mildew of the Grape.

Conditions that are favourable to the rapid reproduction and distribution of parasitic fungi occur frequently during December in many localities. Constant care at this season is therefore necessary to prevent attack involving injury to canes, foliage, and crop. Consistent spraying at regular intervals with the Bordeaux mixture, 4-5-50 formula, may be regarded as the only safeguard.

APRICOT-DISEASE.

An obscure disease, that has so far baffled investigation as to its origin and cause, appeared some time ago in the apricot-trees at the Waerenga Farm. I have noticed trees affected in a similar manner in fruit-growing districts throughout the Dominion. The first indication of attack by this disease is an unhealthy appearance of the bark at the branch crown—that is, the point where the main limbs branch out from the stem. Cracking of the bark follows, together with distortion of the wood on the limbs above and the stem below the crown. Later the disease travels up the main limbs, attacking by degrees the growth of each successive season. In one large apricot-orchard a considerable number of young trees died as the result of attack by this disease. Apparently caused by fungus, the usual methods of control were adopted, spraying especially with the winter formula of the Bordeaux mixture being carefully and thoroughly carried out. The result was quite unsatisfactory, for the disease remained unchecked. Experiments in soil-treatment were then attempted with the object of endeavouring to control the trouble through the action of the sap. The trees being fairly large, a soil-dressing of 3 lb. of common salt and 10 lb. of lime was given to each, the method of application being to spread over the surface away from the trunk, and above the feeding-roots, and lightly work in with spade or fork. The result appears to have been entirely satisfactory, for a number of trees so treated seem to have thrown off the disease and recovered their vigour. It is important to note that this and other soil-dressings, such as for the control of silver-blight, &c., should be made in early spring, just before or about the time that the buds begin to swell, so that the spring rainfall may incorporate the dressing or a portion of it with the soil about the feeding-roots. If applied later and dry weather sets in, the dressing remains inert throughout the season.

THE FARM GARDEN.

W. H. Taylor.

Rhubarb is frequently a much ill-used crop; its chief value is when it is available for use early in spring—the period preceding gooseberries. It is only by correct management that it can be had at that time. Some places are not suitable for the growth of the plant. It is important that there should be sufficient moisture at the roots in dry weather to support the succulent growth, a deeply cultivated soil, and plenty of humus. There must be sufficient drainage to prevent the roots becoming waterlogged in winter, or the crowns will suffer. The lines of treatment to follow are: there should be nothing pulled the first season after planting; the plants should be left entire, in order that they may be well established. The second season, if all goes well, strong stalks should be ready in the spring; then, when pulling, each clump should be stripped as wanted. The second growth is quickly made, and a second crop can be usually secured. Pulling must cease by the end of January, as the last crop should be left to mature, its function being to build up a crown, in order to ensure an early crop in the following season. Each plantation should give good stalks during two years pulling—that is to say, the life of a bed is three years from planting. The following winter the clumps should be taken up and divided, pieces with one, two, or three crowns being taken for re-planting. It will be necessary to have two beds planted in different years to keep up an unbroken supply. It is not uncommon for the autumn crop to be used for making jam or wine. Where this is done, however, there is never any spring rhubarb, for though the crowns may survive the winter, they are too weak to give good stalks—they must then perform in spring the building-up process that should have been done in autumn. Consequently, it will be mid-summer before usable stalks will appear. The only time when the late crop should be used is the last season of pulling before transplanting. Only a portion of the crowns will be required for dividing. Unless there is to be extension of the bed the area it is calculated will not be required may be pulled from as long as there is anything on it.

Tomato-plants should be established by now. The only attention they will require for a time is to remove side shoots. Determine the mode of training to be adopted—whether one, two, or three main stems. Pinch off all others as soon as they show, care being taken, however, not

to pinch off flower-stems or the large leaves on the main stems. Watering the plants to encourage growth should not be resorted to unless necessary. In many districts the plants usually grow all too strong without watering.

Cabbage-plants may be put out unless sufficient were planted previously. If that has been done it is not wise to plant now for succession, a procedure quite unnecessary, as previously explained.

Cauliflower-plants, from seed sown in September, should now be of some size. These should receive proper attention, for if they survive the so-called fly they come into use at Easter, a period when they are specially valuable, for at that time both peas and French beans are all but past, while broccoli is not yet in use. Cauliflowers are touchy subjects in summer; any check is liable to cause them to prematurely button, when they are of course quite useless. The young plants should be pricked off into beds of light rich soil, with sufficient room to grow without crowding until they are large enough to plant out. By this means they are kept growing without danger of starving each other, as they are liable to do in the seed-bed, and the fine stock of roots they have when put out finally enable them to go ahead with scarcely any check.

The summer supply of vegetables is not usually a matter of difficulty. Provided the soil is good enough, and there is sufficient moisture, it is easily provided for. Peas and beans usually come all right, and the fly does not do much harm till towards the end of summer, when it will have had time to raise a few more generations, so that cabbages are generally safe till then. For the winter supply, however, things are not so easy. Root crops fortunately, are reliable—parsnips, carrots, and artichokes; while the gourd family—marrows and pumpkins—are always safe. But the green crops and turnips are quite problematical. The fly having been very bad last season, is almost sure to be worse still this season if the weather should prove to be dry. As a small crop in a private garden it is possible to save cabbages, &c., from the fly if—and the "if" is very important—there is water available to keep the plants growing. No amount of spraying will avail unless you can keep the plants growing. This shows the wisdom of not relying entirely on the Brassica family to supply green vegetables. Both spinach and silver-beet are immune from the fly, and they never fail. Silver-beet affords two distinct dishes—the green matter stripped from the midrib, as it always should be, and the midribs; these, when stewed and served with thickened sauce, make an excellent dish. The beet may be sown now if desired; it will continue to produce all summer and winter. Or, if more convenient, the seed may be kept till January: there is then time to get it fit for winter use.

Spinach sown during summer is a very short-lived crop. It bolts to seed very quickly. Therefore, if wanted in summer, sow little and often. For winter use the seed should be sown in the third week of February. It

will stand all winter, and will go to seed in the spring. New Zealand spinach is a holding crop, and sown now would remain in use till next spring or early summer. It is very productive, being similar to ordinary spinach, but with smaller leaves. It has a branching habit, hence its productiveness. Some think the variety known as prickly, or winter, spinach is the New Zealand variety. This is wrong. Round spinach is the best variety.

Artichokes that are well above ground should be moulded up, like potatoes.

All the gourd family, pumpkins, &c., should be in the ground before now, if not, sowing should not be delayed.

Rotation work includes sowing peas, French beans, radish, lettuce, turnips, but in small quantities as regards the two last named.

Golden cress is very useful as a salad of the cut-and-come-again type. It looks very pretty if sown along the edge of a path.

Asparagus planted this season should not be cut from even if strong enough, and very little should be cut from beds planted last season; none at all is best. From older beds all the stems, large and small, should be cut. The thin heads are nice in soup. Cutting should cease as soon as the early peas are fit for use.

PRUNING AND SPRAYING.

Department to Grant Certificates.

Many owners of small domestic orchards are desirous of obtaining the services of men to prune and spray their fruit-trees. They have complained to Orchard Instructors that some men undertaking this work are not qualified.

With a view to assisting both the competent workman and the small grower, the Minister of Agriculture, the Hon. Mr. T. Mackenzie, has authorized the Director of Orchards to arrange for examinations and issue certificates to those who can prove their competency.

Following are the conditions under which the Department is prepared to conduct examinations, and issue certificates of competency:—

A. (1.) Identifying insect and fungus pests. (2.) Written or oral examination in the life-history of pests and diseases, and the correct time at which to apply treatment. (3.) Each candidate will be required to give practical demonstrations of the preparation and application of sprays, &c.

B. At the proper season examinations will be conducted in the theory and practice of pruning.

Intending candidates should make application to the Director of Orchards, Gardens, and Apiaries, Customhouse, Wellington, who will fix the dates on which the examinations are to be held.

THE POULTRY INDUSTRY.

F. C. Brown.

Disease.

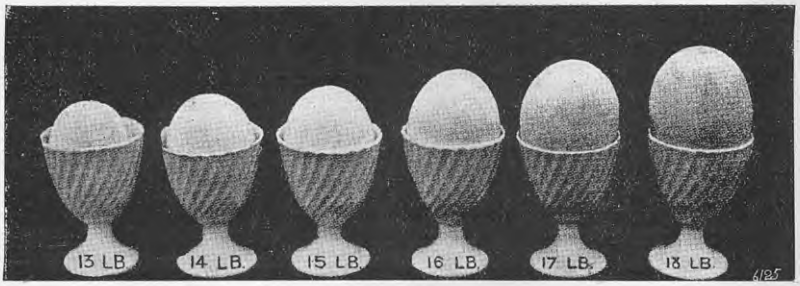
Dairy-farmers should be careful not to feed skim-milk which has not been pasteurized to their poultry. Just as tuberculosis can be passed on to pigs through the pooled skim-milk of the factory, so it can be transmitted to poultry. There is no curing of this dread trouble. The only way to fight it is to prevent it. Once it gains a foothold in the flock the best course is to kill the birds off, and do not put fresh stock into the houses and yards until these have been thoroughly disinfected. The houses should be well sprayed with a strong solution of sheep-dip, the floor dug up and limed, while the runs should also be turned up and heavily limed.

Tuberculosis can also be passed on to poultry through the excrement of affected cattle, a strong reason why poultry on the farm should be confined in proper quarters. Too often farm poultry are allowed to roam at will and pick up their food as best they may. This system is inimical to the best results. More so than in other branches of farming, rule-of-thumb methods must give way to systematic procedure, based on the most approved principles. There is no art or special skill required in managing poultry to advantage. The first essential is cleanliness, for prevention of dirt-accumulation and the appearance of vermin are the only means of preventing disease making its appearance, and if this be contagious there is no curing it. Clean quarters and surroundings must go hand in hand with good feeding—a plentiful supply of plain nourishing food. Fresh air in the sleeping-quarters is also important if disease is to be warded off, and in this connection the fact should be emphasized that airy sleeping-quarters does not imply a draughty building: as a matter of fact, the latter is the most undesirable feature in the old order of things. Better far to allow the birds to roost in trees than permit them to shelter in a so-called fowlhouse with the wind whistling through innumerable chinks. The evil is all the greater when the building is constructed on the old wretched principle, when it was considered that no ventilation at all was required in the sleeping-quarters of fowls. Windows would cost too much, and the only opening was the trap-door through which the fowls gained an entrance. With the fœtid air in such quarters, perches constructed on the old step-ladder fashion, and the manure being allowed

to accumulate for weeks, the wonder is that fowls kept under such conditions are as free from disease as they are. In my experience it is not on the properly managed poultry plant where disease makes its unwelcome appearance, even though there are hundreds of birds to the same acre of ground from season to season. The trouble comes where the birds have freer range, but are housed in unsanitary buildings and are not fed well and systematically, or attended to as they should be.

Size of Eggs.

The only argument against high-type layers with anything in it is that their eggs are often on the small side. Of course, there are exceptional cases where heavy producers lay eggs of a decent weight, but unfortunately the tendency is in the other direction. It is only natural to suppose that if the number of eggs is the sole aim of the breeder that the eggs produced will decline in size. To win a competition where the objective is the largest number of eggs laid in twelve months, competitors



Standardization of Eggs.

are naturally only concerned in the number produced, providing, of course, the eggs are not below 1½ oz.—a weight, however, which means such a small size that the stipulation need not be considered. This means that breeders in general are aiming at the one objective in their work of selection, and are thereby failing to counteract a tendency which must in the near future have a very harmful effect on many strains of utility poultry. The remedy is simple. Just as heavy laying quality may be maintained and advanced by judicious mating, so the size of the egg may be maintained or increased by the same process. A hen, however good a layer, should not be put in a breeding-pen if it lays a very small egg. The birds laying the best eggs should be chosen, providing, of course, their laying-capacity is satisfactory, and they exhibit the desired constitution. The Australians are giving us a lead in this matter. In several of their competitions prizes are offered for the highest weight of eggs produced, and in visiting many of the leading Commonwealth breeders pens of birds were

pointed out to me as the best on the plants, the weight of eggs from which were quoted as much as the number laid in the year.

The question of weight of eggs is receiving considerable attention in England. The honorary secretary of the National Poultry Organization Society of England, Edward Brown, F.L.S., has initiated a campaign in favour of a standardization of eggs. In a very convincing little leaflet he has issued on the subject Mr. Brown says: "It is only the best eggs that realize the best prices. The more we can burn these facts into producers minds the sooner will they adapt their methods accordingly. Until they do so they cannot hope to realize the highest returns. . . . An absolutely new-laid egg, perfect in every sense internally, but with a mis-shapen or dirty shell, is lacking in one essential point which vitiates the whole and brings it at once to a lower grade." The accompanying illustration is published with Mr. Brown's leaflet. The weights given are for 120 eggs.

Leg-weakness.

Look out for leg-weakness in young cockerels. The invariable cause is insufficient exercise after leaving the heated brooder, and the overfeeding of animal food. In growing stock it is imperative that the bone must be built up, and this can best be done by appropriate feed, such as ground oats. Ample space is also necessary, in order that they may be encouraged to take the requisite exercise. Forcing food at such a stage is a mistake. It is easy to understand that the feeding of such foods to birds confined in small runs encourages size of body rather than sound development of the frame required to carry it. Of course, where birds are to be marketed young and in a prime condition, this forcing and confinement system is just what is required; but a young highly forced bird is not one that may be regarded as being developed on sound principles, and the earliest and most common proof of this is a weakness in the legs.

Height of Perches.

It is sometimes difficult to make people understand that it is a mistake to have perches too high. They argue that in a state of nature a bird will fly into trees and come down again without injuring its feet. The fact is overlooked that out in the open a bird can spread herself in a natural manner, and is therefore able to land gently on the ground, running as it alights to break the force of the landing. In a fowlhouse, on the other hand, the bird loses all the advantage of its wings in its descent, and thereby jumps to the ground, the whole weight of the body having to be borne by the legs. I remember an interesting demonstration in this connection, provided by a patient in an asylum, who on this point was eminently sane. He had the supervision of a fowlhouse, 20 ft. in length. At either end of the house, just below and in front of the dropping-board, he

made mounds of loose earth, on top of which he placed pieces of sacking to keep the mounds intact. This, of course, was to provide a soft landing-place for the fowls. That this little attention was appreciated was proved by the fact that every bird would walk to either end of the house in order to alight on the mounds.

The hard landing of birds compelled to jump down from a perch is the cause of most disorders of the feet, especially corns, and is obviously not to the advantage of a high-type layer in the flush of her laying period. A breeding-pen rooster that has once contracted corns is generally of little or no use.

Ducklings.

All hatching-operations should have now ceased, except in the case of ducklings, which by reason of their early maturity can be hatched even up to the end of this month for eggs, and even later where table-poultry is the objective. At this period shade is imperative, for with ducklings hatched in hot weather sunstroke is a common source of loss.

Several correspondents have had trouble in hatching. The cause is an old one. They have failed to provide sufficient moisture, and the membrane next to the shell has in consequence been too tough for the bird to pierce in its effort to reach the world. It is only of late years that the necessity of extra moisture for duck-eggs has been realized. After the fourteenth day the eggs should be sprayed with water at a temperature of 103 degrees. Do this after the eggs have been turned, and immediately place the eggs back in the machine. They should not be cooled after the spraying. The cooling should be done at night and the spraying in the morning. This process should be repeated daily after the fourteenth day until pipping-time, when, if the temperature has been maintained at the right degree throughout, the hatching-process should proceed satisfactorily. Where, however, the eggs hang fire it will generally be found—in fact, it is quite safe to assume this is the case—that more moisture is demanded. The most effective method of providing this is to take a piece of thin flannel the size of the egg-tray—dipped in hot water and wrung lightly—and place this lightly over the eggs. The flannel may be left on for, say, an hour. If not too thick the birds will have no difficulty in hatching under it. During the final stages it may be rolled up and left in the end of the machine next to the heater. This will assist in maintaining the desired moisture in the machine, necessary at this crucial stage.

Disastrous losses in the brooder have been reported to me this season. Generally the trouble has been with ducklings from five to ten days old. The main cause has been incorrect and irregular temperature, as well as insufficient ventilation. In the work of brooding in general artificial heat is necessary to the best results under varying conditions; but it must be a healthy heat, a heat which, while providing the desired temperature, does not force the delicate duckling or chick to breathe a vitiated atmo-

sphere. In these days of advanced thought on poultry-culture it is recognized that one of the most important truths evolved is the necessity of fresh air in poultry-houses, but the necessity is just as great at every stage of a bird's life.

While a low temperature, which encourages huddling, and subsequent chilling, is a prolific cause of trouble, the chief reason for the failures recorded has been the provision of too great a heat in the brooder-box. In many cases failure to brood successfully has resulted from bad advice —either in regard to placing the pipes in the wrong position; closing in the box too much, in order to secure the desired heat by confining the air (instead of increasing the heat by means of more stove or lamp capacity); or placing the pipes too near the floor. The pipes should be at the back of the box, the front of the box should be absolutely open, and the pipes should be at least 7 in. above the floor, with a gradually increasing elevation to the end farthest from the source of heat. The most important improvements of recent days in regard to brooder-construction have been this location of the pipes at the back of the box, and permitting the front to be quite open.

I came across a case the other day where hundreds of ducklings were falling over like ninepins, being affected much the same as though they had sunstroke. The bad position of the pipes was palpably the trouble. These were in the centre of the box, and nearly on the ducklings' backs, and in getting away from the excessive heat the young ones too often ran to the back of the box and in this confined and heated space were in such an unhealthy condition that disorder was rapidly set up. Had the pipes been at the back of the box the ducklings would probably have been unaffected by the pipes being too close to the ground, as they would then have only been able to move to the front, and thereby have been in a safe position, having sufficient heat with the desirable fresh air.

Ducklings do not as a rule require artificial heat as long as chickens; but when taken from the incubator they require just as much heat and attention as chickens. After the first week they can do with less heat, which can be reduced and cut off altogether when the ducklings are three weeks old. Of course, much depends on the climatic conditions prevailing. Obviously heat should not be reduced during a cold snap, when every precaution is necessary in order to prevent the birds becoming chilled.

Marking Ducklings.

Disappointment will result from using the ordinary chicken-marker for ducklings. The holes will invariably grow out, though apparently obliterated marks may often be distinguished by holding the duck's foot in the line of light. The best way of placing a distinguishing-mark on the duck's foot for the determination of age, strain, &c., is to take a V-shaped piece out of the edge of the web of the foot. This should be

done with a very sharp penknife, the foot of the duckling being held on a piece of solid board during the operation.

Drinking-vessels.

For ducklings all drinking-vessels should be deep, in order that the nostrils may be cleansed. If the nostrils are allowed to become clogged the eyes become plastered, and trouble ensues.

Accommodation.

One of the most common mistakes made in poultry-keeping—it is always with us—is the incubating of a larger number of chickens than the plant will carry. I do not mean the amateur who buys an incubator and a few sittings of eggs and thinks he is ready to start poultry-keeping; but I am referring to those in a fairly big way who do not make sufficient preparation in the way of brooder accommodation, colony houses, and fowl-houses in preparing for a season's operations. They hatch all they can, and then trust to providence for the subsequent housing. Naturally their losses and disappointments as the season progresses are heavy, as there is no greater weakness in poultry-management than in crowding the stock. Even where endeavour has been made to provide sufficient brooder-capacity, the poultryman often makes a false step in thinking that a certain box brooder advertised to accommodate a given number of chickens is sufficient for his purpose. It may be all right for a few days, but as the chickens develop it will be found that instead of there being sufficient space for a hundred chickens the brooder will only take about fifty with safety. I have seen this crowding carried to such an excess that endeavour has been made to rear the last batch of chickens in the incubator. The result, of course, has proved disastrous. Many who have commenced operations with the imported outdoor brooders have found it would have been cheaper and more satisfactory in the end to have built a small brooder-house with a pipe system and a Perfection kerosene-stove. The imported brooders are unnecessarily expensive, and are, after all, only a substitute.

Rearing Young Turkeys.

The rearing of turkeys is frequently a very difficult matter, except where the peculiar environment necessary is available. It is difficult to do any good with them in confinement, especially in this country, where the breeding-stock procurable is so much inbred. Success is generally achieved only where the birds have a free range, and where the stamina has been maintained by the use of the best unrelated blood. Nature should be followed as closely as possible. The hen should be allowed to bring out her own chicks, but care should be taken to confine her and the chickens for the first few days. It is a mistake to allow the young ones too much liberty, especially where there is long grass which may be heavily

laden with dew in the morning. When the hen is confined in the coop the chickens can be allowed their liberty. They will thus be encouraged to take exercise.

When the chickens have been out of the shell for thirty-six hours give them stale bread soaked in milk and squeezed dry, occasionally providing them with rice that has been boiled in milk. Oatmeal, broken wheat, barley-meal, and maize-meal may also be given. The food must be mixed to a dry consistency. It is a mistake to force the young ones to eat. The hen knows better than you in this matter. Food should be supplied frequently, but in small quantities, during the first few days. When the chicks are four weeks old feed three times a day with broken grains. At this stage the birds will commence to wander if they have free range, and will generally only come home to the morning and evening meals. Clean water or milk should be given from the start, while an ample supply of grit is essential for both old and young stock. The young ones, as indeed the old, apparently find the green stuff they require better than can be supplied in an artificial manner. The less coddling turkeys receive the better —free range is imperative. When the red head is beginning to show the birds should be fed away from the homestead—this in order to induce them to take as much exercise as possible. Turkeys do not require houses to sleep in, low broad roosts outside, preferably in the shelter of trees, being all that is necessary.

Poultry in New Zealand.

By the courtesy of the Government Statistician, Mr. M. Fraser, the figures giving the number of poultry in the Dominion obtained at the late census are published herewith in advance of the public issue of the complete figures by the Registrar-General. The figures show that the poultry of the Dominion have increased during the past five years by over half a million head :—

Provincial District.	Geese.	Ducks.	Fowls.	Turkeys.	Other Poultry.	Total Poultry.
Auckland	5,044	107,177	783,363	40,103	2,295	937,982
Taranaki	3,014	21,332	158,450	6,750	429	189,975
Hawke's Bay	2,157	18,760	171,009	7,798	707	200,431
Wellington	10,406	65,684	504,090	17,025	690	597,895
Marlborough	1,941	5,583	64,846	2,413	58	74,841
Nelson	2,971	15,431	184,636	3,053	326	206,417
Westland	990	4,369	36,186	84	25	41,654
Canterbury	8,529	48,957	679,835	9,719	793	747,833
Otago—						
Otago portion ..	6,210	25,698	428,899	9,289	218	470,314
Southland portion ..	4,049	16,172	202,731	1,650	13	224,615
Totals, 1911 ..	45,311	329,163	3,214,045	97,884	5,554	3,691,957
Totals, 1906 ..	44,300	281,999	2,784,269	77,101	3,935	3,191,604

Dry *versus* Wet Mash.

In connection with the egg-laying competition at Hawkesbury College, New South Wales, last year, a test was conducted to endeavour to prove the relative value of the wet and dry mash systems of feeding. The system adopted was that certain competitors entered two pens of equal-quality birds, one to be fed on wet and the other on dry mash. Below are given the summarized results. It should be pointed out that the men who favour dry-mash feeding in this country provide the meat separately, whereas at Hawkesbury meat scrap was mixed with the dry mash.

Dry and Wet Mash Test.

Name of Competitor.	Breed of Hen.	Number of Eggs.			Value.			
		Dry.	Wet.	Difference in Favour of Wet.	Dry.	Wet.	Difference in Favour of	
							Wet.	Dry.
					s. d.	s. d.	s. d.	s.
Hillcrest, P. F.	White Leghorns	1,131	1,262	131	109/6	131/2	21/8	..
Kenway, D. ..	Black Orpingtons	1,008	1,119	111	104/3	118/8	14/5	..
Kennel, C. C...	White Leghorns	990	1,128	138	96/8	116/2	19/6	..
Cox, Mrs. J. W.	Langshans ..	954	973	19	96/8	87/8	..	9/-
McKenna, J. J.	White Leghorns	920	1,171	251	93/7	110/6	16/11	..
Ellis, S. ..	White Leghorns	870	1,117	247	87/5	110/9	23/4	..
Brierley, F. J.	White Leghorns	856	1,268	412	84/7	128/9	44/2	..
Stuart, R. J. ..	White Leghorns	830	1,052	222	77/1	101/5	24/4	..
Waldron, E. ..	Black Orpingtons	734	950	216	70/5	86/5	16/0	..
Ramsay, L. L.	Black Orpingtons	511	774	263	50/3	68/2	17/11	..
		8,804	10,814	2,010	870/5	1,059/8	198/3	9/-

	Dry Mash.	Wet Mash.
Total eggs laid	8,804	10,814
Average per hen	146·7	180·2
Market value per hen	14s. 6d.	17s. 7½d.
Profit over feed per hen ..	7s. 0½d.	11s. 2d.

British Progression.

As a result of the awakening of the Home Government to the necessity of stimulating agriculture, a national poultry experimental station is to be established in England, a feature of which will be research-work. The British Board of Agriculture is evidently realizing, as Lord Blyth has well put it, that poultry-keeping is no longer a means of providing farmers' wives and daughters with pin-money; it is a serious business for men and women. A sum of £20,000 is talked of for foundation purposes, and an annual grant of £4,000 for maintenance.

Things to remember.

Fowls, to be useful, must be well and regularly fed.

It is not the size or the weight of a bird that indicates its value when egg-production is the objective.

A dry sheltered location should be the first consideration in determining on the site of a poultry plant.

The good layer is never overfat. The drones may be, not being concerned in heavy egg-production.

Taking chickens direct from the yards to the market without being primed off is poor economy.

The active bird is invariably the best layer; not activity from insufficient food, but the activity resulting from a vigorous condition.

Clean, fresh water is indispensable. It should be in reach of the birds all the time.

Kill off all chickens that are hatched with a weak constitution: they are never satisfactory.

Don't breed from an effeminate or coward looking male. The sire should exhibit before everything else a strong masculine character.

Too often a good-looking male comes from a bad strain. He will probably therefore prove a chance breeder.

Various theories have been advanced to produce sex at will, but so far as I can learn they have all failed in actual practice.

Nothing is better for growing chickens than a well-shaded good grass run where fowls have not been kept the previous year.

Don't send lean chickens to market. It is not only unprofitable, but weakens the demand for table-poultry.

There is always a market and good prices for prime poultry, while poor-quality birds go at begging prices.

The best time to market chickens is when they are about four months old.

Stick fast to your line—eggs, not meat, being the chief source of profit. Aim at encouraging egg-production. If you strive for meat as well as eggs you will probably fall below the average of either.

It is not desirable to have the faculty for egg-production and flesh-formation combined in the one bird. One character can only be developed at the expense of the other.

It is useless trying to fatten chickens unless they are free from vermin. Dust frequently with flour of sulphur and carbolic powder in order to keep the lice in check.

A frequent inquiry is, What is the best breed of fowls? There is no best breed. It is a matter of strain rather than breed. There is often as much difference between strains of the same breed as there is between the breeds themselves. Of course, I am speaking of the accepted utility breeds of poultry.

ANSWERS TO CORRESPONDENTS.

A Grass Mixture.

"Inquirer," Tinui, asks,—

Would you through your correspondence columns give me a suitable grass mixture for sowing down tawa-bush country on papa formation, and also for manuka and five-finger-scrub country.

The Director of the Fields and Experimental Farms Division replies,—

The native vegetation indicates a fertile soil. Rye, cocksfoot, and clover are, of introduced plants, the most prominent on the surface-sown pastures of such lands. A mixture generally availed of is—rye-grass two-thirds, cocksfoot one-third, and 2 lb. to 4 lb. of white clover. If, after burning-off the land, the soil is in good condition, 1 lb. of rape and 1 lb. of turnip-seed are often added. The other grasses, as meadow foxtail, timothy, &c., are useful, and are included as individual inclinations dictate. The quantity of grasses and clover sown per acre is estimated at 20 lb. to 25 lb. The present high price of grass-seed precludes lavish sowing. At one time, where large areas were sown, 15 lb. was the quantity estimated to be used. In poorer country a smaller quantity of rye should be used. The mixture would then include crested dogstail, fiorin, red-top, and even danthonia. The rape and turnip seed would not be included.

Tutu.

Mr. Geo. Kenah, Okoke, Urenui, writes,—

Would you please inform me what antidote to use and what treatment is required in the cure of a beast that is poisoned by eating tutu. I should be glad if you would also let me know what poison is contained in tutu.

The Director of the Live-stock and Meat Division replies,—

It is often a very difficult matter to apply medicinal treatment to animals suffering from tutu poisoning, seeing that the trouble causes more or less severe brain symptoms, which render the animal intractable and difficult to handle. Very useful treatment for this trouble, when it can be applied, is the internal administration of liquid ammonia, or carbonate of ammonia mixed with milk or thin gruel if possible; in addition a large dose of linseed-oil, not less than 2 pints, should be given. The dose of liquid ammonia in cases such as this should be 1 oz. in a quart of milk or thin gruel. If neither of these be available it should be mixed with the 2 pints of linseed-oil which is recommended above. Liquid ammonia is irritating to the membrane of the mouth and throat, hence the necessity for diluting it with a quantity of some demulcent fluid. It should be borne in mind that there are two liquid preparations of ammonia—one a very strong preparation, known as liquor ammonia fort.; the other the ordinary liquid ammonia, which is here recommended. If carbonate of ammonia be used in cases of tutu poisoning the dose is 1½ oz.

If the rumen (first stomach) is greatly distended with gas, relief can be afforded by puncturing it at a spot midway between the haunch-bone and the last rib. This should be done on the left side of the animal. Really the best instrument for so puncturing is that known as a trocar, fitted into a canula. This is a round, sharp-pointed instrument with a metal tube (the canula) fitting tightly over it. After making the puncture the instrument is withdrawn, and the tube left in, thus allowing the continued escape of gas. It is unlikely however, that the farmer will have this instrument at hand, and in an emergency a sharp-pointed knife, with a long but thin blade, can be used. In this case, however, it must not be simply plunged in and withdrawn, but must be held in position after making the puncture, the blade being twisted slightly sideways, thus maintaining an opening through which the gas can escape from the rumen. Owing to the usually excited condition of

affected animals, however, it is often very difficult to do this. It is usually travelling stock which become the victims of tutu poisoning; and feeding on the plant undoubtedly causes much more trouble when taken on a more or less empty stomach.

The poison contained in the tutu-plant is an alkaloid known as tutin, this being the active principle of the plant. Full particulars concerning this aspect of the question can be obtained from the Annual Report for the year 1908, in which a description of tutin is given by Mr. Aston, Agricultural Chemist.

Burning Charcoal.

Mr. H. S. Langridge, Warkworth, writes,—

Is it in your province to give instructions through the *Journal* in burning charcoal? I would like to know how to go about it.

The Director of Orchards, Gardens, and Apiaries Division replies,—

The usual method, though simple, requires great care. Wood is cut into billets 2 ft. to 4 ft. long, and well dried by exposure to the air. When sufficiently dried it is closely stacked in conical mounds from 6 ft. to 12 ft. high and from 10 ft. to 40 ft. in diameter at the base. Before building the mound the ground is levelled, and a small framework is fixed in the centre of this space to form as it were a chimney or flue; the billets are compactly stacked round this on their ends until the desired area is covered. All the billets slope. The stack is then completed to the desired height by billets arranged horizontally, and the whole covered with a layer of earth. The heap is kindled through the opening left at the top, and others made near the base; after burning for three or four days these are closed, and others opened about half-way up. The holes must be closed whenever it is seen that combustion is too rapid. When smoke ceases to be given off all the holes should be closely stopped and the heaps allowed to cool for three or four days. The earth is then removed, and any charcoal still burning is extinguished by water.

Bottling Green Peas.

Mr. F. Firth, Oratia, inquires,—

Could you through your *Journal* furnish me with a reliable method of bottling green peas for home use. I understand that Mr. Jaques while in the Government employ bottled fruits and vegetables. We have tried for three years to bottle peas, but, although very successful with everything else we have tried, cannot manage peas.

The Director of Orchards, Gardens, and Apiaries replies,—

(1.) The peas must be young—*i.e.*, not starting to make growth. (2.) Scald and partly cook the peas in a sieve, wire basket, or colander. (3.) Wash thoroughly in cold water, two or three changes. (4.) Fill the bottles, and complete the filling with very light brine (just to taste the salt only). (5.) Preserve as fruit, but count the time from when the water reaches 180° Fahr.; bring up to 200°–205° Fahr., and preserve for fifteen minutes or longer if the peas will stand the process, which they should do if correct in variety and condition; twenty-five minutes and upwards is preferable. (6.) Screw down, and allow to cool as usual.

A Pig and Poultry Trouble.

Mr. A. D. Bauckham, Ashhurst, writes,—

I have had two or three hens, a duck, and a pig affected within the past month. The vent seems to turn inside out. The duck's I put back, and it got better. I tried the same with a fowl, but it came out again, so I killed the fowl. I also killed the pig, and killed a hen yesterday. Now, to-day (19th October) I notice another hen like it. I also have heard of three or four others lately that have had the same trouble. Could you tell me if there is anything to prevent it, or any cure? Kindly let we know what you think about it.

The Live-stock and Meat Division replies,—

Regarding the prolapse of the anus in the pig, this is by no means an uncommon occurrence in young pigs. Usually it is simply an extrusion of the mucous membrane of the bowel only; in other cases the whole of the bowel itself may be prolapsed. The cause is generally due to some error in dieting. Thus, constipation, or the

opposite condition—diarrhœa—may, by causing straining, bring about the accident. Inbreeding, and consequent weakness, and neglect to provide the young animals with a suitable run so that they can get exercise, may also be classed as an exciting cause. Treatment would be to put the animals under healthy conditions generally, and endeavour to find out what is causing the straining, and remedy it. As a rule local treatment of individual cases is not of much use.

The trouble with the fowls is probably what is usually known as the passing of the oviduct. Apparently the poultry are being fed too large a proportion of forcing feed—the common cause. If this should be the case the food should be reduced to a plain character, excluding all animal food, even milk where this is given. A weak constitution is also a predisposing cause. The condition is also brought about when a bird has vent-gleet. In the latter case a very offensive smell can be noted. If this is found to be the cause the best thing to do is to kill off all affected birds. Curing is hardly worth while unless the trouble is taken at an early stage. If passing of the oviduct is the weakness, this can be cured by careful treatment. The affected parts should be well oiled and gently returned, the bird being then placed in a kerosene-case with the legs tied and fastened loosely to near the top of the box, so that the breast will be resting on the bottom of the box, and the vent be in an elevated position. The bird, of course, should be kept as quiet as possible, and the feeding greatly reduced, in order to discourage laying.

Poa Brownii.

Mr. Walter H. Dunnage, Te Mania, Bay of Plenty, writes,—

Could you please tell me what feeding-value as a grass *Poa Brownii* has ? Is it as good a grass as Chewing's fescue for sheep ?

The Director of Fields and Experimental Farms replies,—

Poa Brownii is used more generally in the Auckland Province, where it is known as "bay-grass," than in any other portion of New Zealand. Its feeding-value is very small, and it is by no means as good as Chewing's fescue for sheep.

Onions.

Mr. P. Last, Kumeroa, Woodville, asks,—

Could you please tell me if it is safe to transplant onions that are only six weeks old. They were sown in August and are a fair size. Would they live if I transplanted them now, or would it be better to leave them until they are a little bigger, and will they do any good if they are transplanted ?

The Director of Orchards, Gardens, and Apiaries replies,—

If these plants are well grown they may be transplanted at any convenient time now.

A Calving Trouble.

Mr. Sydney Reynish, Pigeon Bay, Banks Peninsula, writes,—

Would you kindly give me advice about a cow that calved three weeks ago. The cow became uneasy on 21st September, and three days later the calf was taken away from her, being dead, and ever since there are pieces of yellow matter coming from her with continual straining. As soon as the calf was taken away she was drenched with 1 lb. salts and ¼ lb. ginger. A week later I gave her one packet Sykes's drench. She got no better, so I syringed her with Jeyes' fluid. She gives about 1 gallon of milk each milking, which smells very strong. I fail to know what is the next best thing to do.

The Live-stock and Meat Division replies,—

The persistent discharge indicates one of two conditions: either the "afterbirth" was not got rid of at the proper time, and is gradually rotting away, or that there was some injury to the uterus or vagina during the act of parturition. In all probability the retention of the afterbirth is the cause. You appear to be treating her on right lines. A 1 per cent. solution of lysol is, however, to be preferred to Jeyes' fluid, and the uterus irrigated every other day, using the india-rubber tubing and funnel. As much of the solution as possible should be used,

the temperature of which should be about blood heat. With regard to medicine, give her 1 oz. doses of hyposulphite of soda, dissolved in a pint of cold water, once daily. I note that one of the drenches you gave the cow contained ¼ lb. of ginger. This is too much, the dose for a cow being 1 to 2 oz.

Small-birds Pest.

Mr. R. D. Fell, Maori Bay, Pelorus Sound, writes,—

Ring-eyes (or silver-eyes) and chaffinches have been doing much damage to the buds of fruit-trees here this year. Nectarine and peach buds have been taken wholesale, some large trees being absolutely stripped of their blossom buds; and even where the blossom escaped the set peaches have been nipped in half. The same birds have also destroyed the blossoms of apples and pears, and are now busy with the cherries and gooseberries. I have tried various sprays—lime sulphur and salt, Bordeaux, arsenate of lead, quassia and soft-soap, and Paris green—without effect. Can you give me a recipe for making birdlime to smear on the twigs of some of the trees, or suggest any other mode of getting rid of the pests? Too free a use of the shot-gun damages the trees too much.

The Director of the Orchards, Gardens, and Apiaries Division replies,—

Spraying, though excellent for controlling insect and fungus pests, is not much use as a deterrent of small-bird attacks. One of the best and cheapest contrivances for frightening birds is the "Demon Automatic Bird-scarer." The instrument costs about £1 5s., and will last for years. Reports can be regulated at any desired intervals. The crackers and fuse cost about 1d. for four reports. It may be bought from most dealers in horticultural supplies.

Small-birds Pest.

Mr. W. Wilkinson, Chertsey, Ashburton, writes,—

In reference to what is in this county (Ashburton) ordinarily called the "small-birds pest," and which is of great interest to the writer, and probably to all the readers of your valuable *Journal* in this locality, would you please inform us in what light this question is looked upon in other and older countries—say, rural districts in England, France, or Germany. That is, are these "small birds" (sparrows, linnets, yellowhammers, &c.) looked upon as a nuisance to be got rid of by poison or any other way, or are they looked upon as a help to agriculturists in destroying insect-life and therefore to be preserved?

The Director of Fields and Experimental Farms Division replies,—

In Europe the small bird generally, and very specially the sparrow, is considered a nuisance. At the same time the Director of Agriculture of France and some authorities on rural subjects agree that the small bird is of very appreciable assistance in the control of insect pests. They deprecate unrestrained destruction. There is, however, a very material difference applying to the bird population in Europe and in New Zealand. There the winter is one of severity, and is accompanied with enormous mortality to the bird; in years of exceptional rigour the small bird is almost obliterated. Such seasons are unknown here. This implies greater recognition of the nuisance and the greater importance of control.

A Cow Trouble.

Mr. E. Keig, Staveley, Ashburton, writes,—

Can you tell what is wrong with a cow that is attacked with the following symptoms: Shaking all over as with paralysis, throwing her head in the air and trying to raise it very high? As there is no tutu on the farm where the beast was attacked, the owner was puzzled as to the cause of death, and wished out of curiosity to know. I promised to find out if possible.

The Director of the Live-stock and Meat Division replies,—

Your brief description of the case does not enable me to accurately diagnose the cause of death. You should advise the owner to at once communicate with the Veterinary Supervisor, Department of Agriculture, Christchurch, in the event of any further similar cases occurring. An investigation can then be made on the spot, and the best advice and assistance given.

SHIPMENTS OF UNDERMENTIONED PRODUCE FROM NEW ZEALAND TO UNITED KINGDOM.

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

Month.		Mutton, Carcases.	Lamb, Carcases.	Beef, Quarters.	Butter, Boxes.	Cheese, Crates.	Wool, Bales.	Wheat, Sacks.	Oats, Sacks.	Rabbits, Crates.	Hemp, Bales.	Tow, Bales.	Kauri-gum, Cases.	Sundry.
October,	1911	9,417	2,043	100	49,626	11,501	2,182	..	..	32,094	4,514	754	2,982	..
"	*1910*	*49,010*	*800*	*10,531*	*60,014*	*9,159*	*3,189*	*94,815*	*23,330*	*36,947*	*3,632*	*1,232*	*3,089*	*56 carcases pork.*
November,	1910	62,926	29,877	5,554	105,759	27,749	55,551	76,594	331	28,646	6,850	2,300	4,339	911 carcases pork.
"	*1909*	*56,467*	*40,973*	*11,073*	*99,951*	*33,019*	*49,480*	..	*21,955*	*26,448*	*4,151*	*734*	*4,383*	..
December,	1910	82,405	157,172	13,155	182,051	67,162	59,080	..	..	9,716	4,524	109	5,363	686 carcases pork.
"	*1909*	*90,245*	*86,345*	*23,199*	*164,314*	*68,867*	*72,056*	..	*2,613*	*2,128*	*7,389*	*1,618*	*8,742*	..
January,	1911	175,337	287,120	13,568	90,405	46,375	127,199	..	16	399	15,234	3,302	7,094	590 carcases pork.
"	*1910*	*86,491*	*252,193*	*22,527*	*87,934*	*39,717*	*122,399*	*2,391*	*15,839*	*1,634*	*11,305*	*4,704*	*5,682*	..
February,	1911	242,090	450,406	24,924	86,368	46,667	70,030	23,694	200	..	4,428	1,302	2,113	1,369 carcases pork.
"	*1910*	*196,093*	*414,408*	*23,798*	*97,766*	*62,192*	*102,182*	*4,724*	*8,600*	..	*4,223*	*2,314*	*4,827*	*1,719* "
March,	1911	264,297	665,822	26,657	45,912	40,668	58,362	40,276	..	..	3,650	1,583	8,982	2,408 carcases pork.
"	*1910*	*222,058*	*413,179*	*22,134*	*77,319*	*42,029*	*64,266*	*2,899*	*3,636*	..	*9,152*	*2,490*	*2,959*	*798* "
April,	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.
"	*1910*	*209,130*	*559,166*	*29,355*	*46,524*	*44,032*	*32,920*	*21,855*	*1,934*	*12*	*10,179*	*2,951*	*4,250*	*627* "
May,	1911	204,390	377,105	20,173	995	20,732	33,033	93,854	..	..	7,443	1,210	7,720	1,087 carcases pork.
"	*1910*	*310,196*	*622,232*	*38,276*	*9,588*	*28,384*	*25,123*	*81,052*	..	*3,010*	*10,017*	*2,346*	*3,150*	*1,293* "
June,	1911	214,079	448,432	15,789	..	6,323	19,568	39,422	..	14,128	4,763	525	5,528	2,434 carcases pork.
"	*1910*	*299,596*	*555,777*	*60,286*	*485*	*17,963*	*21,260*	*13,707*	..	*8,988*	*6,180*	*2,684*	*7,104*	*658* "
July,	1911	206,869	260,761	14,296	..	276	14,100	29,452	..	10,334	6,022	1,073	2,786	175 carcases pork.
"	*1910*	*249,906*	*334,753*	*71,160*	..	*595*	*12,816*	*20,604*	*1,106*	*8,649*	*6,695*	*1,437*	*8,272*	*2,448* "
August,	1911	66,608	110,054	3,653	..	..	5,260	31,976	..	18,231	3,443	303	3,475	203 carcases pork.
"	*1910*	*94,468*	*97,899*	*16,440*	*634*	..	*5,381*	*33,970*	*273*	*22,629*	*1,378*	*720*	*6,793*	*362* "
September,	1911	102,081	40,057	6,059	6,404	..	7,390	38,151	..	33,059	5,604	393	7,672	220 carcases pork.
"	*1910*	*104,925*	*26,416*	*8,420*	*22,644*	*41*	*6,539*	*40,876*	*3,863*	*7,721*	*2,680*	*597*	*1,682*	*255* "

HEMP AND TOW GRADING RETURNS.

OCTOBER, 1911.

Hemp.—The total number of bales graded was 7,349, as compared with 8,870 for the corresponding month of last year, a decrease of 1,521 bales. For the twelve months ending 31st October the number graded was 96,806, as compared with 127,589 for the previous twelve months, a decrease of 30,783 bales.

Tow.—During the month 1,985 bales were dealt with, as compared with 2,772 for the corresponding month of last year, a decrease of 78 bales.

HEMP AND TOW GRADED THROUGHOUT THE DOMINION DURING THE MONTH OF OCTOBER, 1911.

Hemp.

Port.	Superior.	Fine.	Good-fair.	Fair.	Common.	Rejected.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	..	..	81	562	7	..	..	650
Napier ..	..	..	..	..	..	..	..	..
Foxton ..	..	100	1,826	1,329	67	11	..	3,333
Wellington ..	..	36	1,622	1,373	11	6	1	3,049
Blenheim ..	..	..	..	..	..	..	..	..
Picton ..	..	..	..	..	..	..	..	..
Lyttelton ..	..	84	..	..	..	..	..	84
Dunedin ..	..	..	..	15	..	..	..	15
Bluff ..	..	..	58	158	2	..	..	218
Totals ..	..	220	3,587	3,437	87	17	1	7,349
Percentages of total	..	3	48·82	46·73	1·19	0·24	·02	100

Tow.

Port.	First Grade.	Second Grade.	Third Grade.	Condemned.	Total.
	Bales.	Bales.	Bales.	Bales.	Bales.
Auckland ..	..	..	..	..	..
Napier ..	..	..	..	..	..
Foxton ..	515	345	41	..	901
Wellington ..	482	302	64	57	905
Blenheim ..	..	..	..	..	..
Picton ..	..	..	..	..	..
Lyttelton ..	90	45	..	..	135
Dunedin ..	..	..	3	..	3
Bluff ..	..	40	..	1	41
Totals ..	1,087	732	108	58	1,985

STOCK EXPORTED.

October, 1911.

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 Australia.	To Pacific Islands.	To South America.	To Australia.	To Pacific Islands.	To South America.	To India.	To Pacific Islands.
Auckland ..	41	15	..	37	..	..	206	..	..	58
Gisborne ..	..	..	..	..	..	..	..	..	..	..
Napier ..	..	..	..	..	..	..	..	..	..	..
Wellington ..	163	..	..	..	..	10	..	30	..	..
Lyttelton ..	86	..	..	..	..	11	..	..	..	..
Dunedin ..	5	..	..	..	..	..	..	10	..	..
Bluff ..	..	..	..	..	..	..	..	..	..	..
Totals ..	295	15	..	37	..	21	206	40	..	58

The following are particulars of the horses shipped: 179 draughts (3 stallions, 122 mares, 50 geldings, 1 colt, 3 fillies), 28 medium draughts (9 stallions, 19 mares), 70 mixed draughts (40 mares, 30 geldings), 1 thoroughbred stallion, 5 hackneys (4 mares, 1 gelding), 5 light horses (4 stallions, 1 gelding), 1 pony mare, 1 trotting-stallion, 1 trotting-mare, 2 troop-horses, 2 polo-pony mares.

PRODUCE IMPORTED.

The following return, compiled by the Customs Department, shows the total importations into New Zealand during the quarter ending 30th September, 1911, of agricultural and farm products :—

	Weight.	Value. £
Bran	..	..
Butter	967 cwt.	5,850
Cheese	2 cwt.	7
Foods, animal, viz.: Chaff ..	2,416 tons	18,781
Fruits, fresh	6,793,195 lb.	53,998
Grain, viz.—		
Barley	2 centals	8
Oats	30,790 centals	9,682
Wheat	4,978 centals	1,465
Onions	22,529 cwt.	4,672
Pollard	..	..
Potatoes	4 tons	35
Total value of imports ..		£94,498

STOCK IN QUARANTINE.

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

No.	Breed.	Sex.	Port of Origin.	Owner or Agent.	Address.
			MOTUIHI ISLAND (AUCKLAND).		
2	Holstein bulls	Male ..	Sydney ..	G. Niccol ..	Auckland.
17	Holstein heifers	Female ..	" ..	" ..	"
1	Holstein heifer	" ..	" ..	" ..	"
1	Holstein bull	Male ..	" ..	" ..	"
1	Bedlington terrier	" ..	Vancouver	J. R. Robson ..	Christchurch.
1	Spaniel ..	" ..	Malden Is.	C. Karlson ..	Auckland.
			SOMES ISLAND (WELLINGTON).		
2	Devon cow and heifer	Female ..	London ..	W. J. Birch ..	Marton.
1	Devon bull ..	Male ..	" ..	" ..	"
1	Shorthorn bull	" ..	" ..	W. T. Williams ..	Pukehou, H.B.
2	Jersey bulls..	" ..	" ..	E. E. Eagle ..	Carterton.
6	Romney rams	" ..	" ..	J. R. Mackenzie: agent, Wright Stephenson	..
10	Romney ewes	Female ..	" ..	Ditto	..
1	Romney ram	Male ..	" ..	J. Harding ..	Mount Vernon, Waipukurau.
1	Southdown ram	" ..	" ..	A. J. Stonewigg ..	Opaki.
1	Romney ram	" ..	" ..	E. Short	Feilding.
			QUAIL ISLAND (LYTTELTON).		
14	Siberian dogs	Male ..	..	Captain Scott, Antarctic Expedition.	..

FROZEN-PORK PROSPECTS.

THE following cablegram has been received by the Department from the High Commissioner in London :—

"In reply to your cablegram of the 16th, frozen-pork prospects are rather less encouraging than last year. Home supplies will be large, and Chinese and Siberian supplies are likely to increase."

THE BRITISH PRODUCE-MARKET.

HIGH COMMISSIONER'S CABLED REPORTS.

THE Department of Agriculture, Commerce, and Tourists has received the following cablegrams from the High Commissioner for New Zealand. (NOTE.—Quotations, unless otherwise specified, are average market prices on spot.)

London, 7th October, 1911.

Mutton.—The market is quiet but steady. Stocks of New Zealand mutton on hand are light. Canterbury 4⅛d., North Island 3¾d., per lb.

Lamb.—The market is slightly weaker, with less demand. Canterbury 5⅛d., other than Canterbury 5d., per lb.

Beef.—The market is dull. New Zealand hinds 3⅝d., New Zealand fores 2½d. per lb.

Butter.—The market is firm, with an upward tendency. There is a general and active demand. Danish 148s., Siberian 128s., Australian 134s., per cwt.

Cheese.—The market is quiet but firm. Canadian 70s. 6d. per cwt.

Hemp.—The market is somewhat steadier, and there is more demand. New Zealand good-fair, spot £19 15s., New Zealand fair grade £18 15s., fair current Manila £20 per ton. October–December shipment: New Zealand good-fair £20, fair grade £19, fair current Manila £20 5s. per ton. The output from Manila for the week was 19,000 bales.

Cocksfoot-seed.—The market is very firm. There are light stocks of cocksfoot-seed on hand. It is impossible to give any quotation.

Wheat.—The market is somewhat steadier. New Zealand long-berried wheat, spot, ex granary 35s., short-berried 34s., per quarter of 496 lb.

Oats.—There is a general and active demand, and a large supply. New Zealand oats, short sparrowbills, ex granary, spot, per quarter of 384 lb., 22s.; Danish, per quarter of 320 lb., 19s. 6d.

Beans.—The market is firm, with an improved demand. New Zealand beans, f.a.q. (new crop), 34s. 6d. per 504 lb.

Peas.—The market is steady, with a very good demand. New Zealand peas (partridge), 40s. per 504 lb.

Wool.—A firm market for merinos. The market is a shade weaker for crossbreds.

Mutton and Lamb.—River Plate shipments received during September, 1911:—

	Mutton. Carcases.	Lamb. Carcases.
London	30,619	6,714
Liverpool	181,098	83,631
Southampton	18,955	6,735
Cardiff	17,584	2,528
Hull	2,075	144
Plymouth	764	489
Newcastle	2,897	..
Bristol	7,886	..
	261,878	100,241
September, 1910	152,401	14,474

London, 14th October, 1911.

Mutton.—The market is quiet. There is a dull sale for all qualities, but holders are firm. Canterbury 4⅛d., North Island 3¾d., per lb.

Lamb.—The market is weak on account of supplies of home-grown lambs being heavy, and lowering prices of New Zealand lambs. Canterbury 5⅛d., other than Canterbury 5d., Scotch Hill 4¾d., per lb.

Beef.—The market is dull. There is little demand, and supplies are large. New Zealand hinds 3½d., New Zealand fores 2½d., per lb.

Butter.—The market is rather quiet, on account of the high prices. Buyers of butter are holding back, expecting prices to go lower. Danish 146s., Siberian 127s., Australian 132s., per cwt.

Cheese.—The market is quiet, and prices slightly weaker. Forward transactions in cheese are very limited at present quotations, but future prospects are good. Canadian 69s. 6d., English Cheddar 86s., per cwt.

Hemp.—The market is quiet, but moderate business doing. New Zealand is firm at last quotations. Stock of New Zealand hemp, 956 tons. The market for Manila has advanced 20s. The output from Manila for the week was 20,000 bales. Hemp quotations last week: New Zealand good-fair on spot £19 15s., New Zealand fair grade £18 15s., fair current Manila £20 per ton. Forward shipment: New Zealand good-fair £20, New Zealand fair grade £19, fair current Manila £20 5s., per ton.

London, 21st October, 1911.

Mutton.—The market is quiet, but holders are firm, as stocks on hand are light and are firmly held in few hands. Canterbury 4⅛d., North Island 3¾d., per lb.

Lamb.—The market is quiet; there is less demand. Canterbury 5d., other than Canterbury 4⅝d., per lb.

Beef.—The market is very dull; the supply exceeds the demand. New Zealand hinds 3½d., fores 2⅜d., per lb.

Butter.—The market is lifeless. Transactions are very limited, and buyers are not inclined to make forward purchases at present prices. Danish 140s., Siberian 123s., Australian 129s., per cwt.

Cheese.—There has been no alteration in the market since last week. Canadian 69s. 6d. per cwt.

Hemp.—The market is a shade weaker. New Zealand good-fair, spot, £20, fair grade £19, fair current Manila £20 5s., per ton. October–December shipment: New Zealand good-fair £20 10s., fair grade £19 10s., fair current Manila £20 10s., per ton. The output from Manila for the week was 27,000 bales.

Cocksfoot-seed.—The market is firm. There are light stocks on hand.

Wool.—The market is weaker, and slightly lower. Current quotations for Bradford tops: 36's low crossbreds 1s. 1d., 40's low crossbreds 1s. 1¼d., 44's medium crossbreds 1s. 1½d., 50's half-breds 1s. 5¼d., 56's quarter-breds 1s. 8d., 60's merinos 2s. 1d.

London, 28th October, 1911.

Mutton.—The market is quiet but steady; a poor demand continues, but stock is moderate. Medium and heavy weights are getting very scarce. Canterbury 4⅛d., North Island 3⅞d., ewes 3⅛d., per lb.

Lamb.—The market is dull, and there is very little business doing, at about quotations already given. (Last week's quotation: Canterbury 5d., other than Canterbury 4⅝d. per lb.). Stocks of lamb on hand are light. New season's River Plate are selling at 4¾d. per lb.

Beef.—The market remains very flat. Chilled supplies of River Plate beef are heavy. Nominal quotations: New Zealand hinds 3½d., fores 2⅜d., per lb. Chilled hinds 3½d., fores 2⅛d., per lb.

Butter.—The market is quiet, but steady after the decline. Danish 137s., Siberian 119s., Australian 127s., per cwt.

Cheese.—The market is quiet. The demand is improving, but prices are unchanged. Canadian 69s. to 70s. per cwt.

Hemp.—The market is quiet, with small business doing. Holders are firm. New Zealand good-fair on spot £20 5s., fair grade £19 5s., fair current Manila £20 5s., per ton. October to December shipments: Good-fair £20 12s. 6d., fair grade £19 12s. 6d. fair current Manila £20 5s. per ton. The output from Manila for the week was 24,000 bales.

Cocksfoot-seed.—The market is firm owing to the recent drought; an increasing demand is anticipated during the coming season. Danish is quoted at 75s. per cwt.

Kauri-gum.—The market is quiet but steady. 320 packages offered and 50 sold at Thursday's sale. Dark-brown selected rescraped £6 to £8 7s. 6d., dark-brown three-quarter scraped £4 to £4 12s. 6d., dark-brown chips, drossy, £1 15s. to £2 5s., rescraped pale amber £11 to £15, three-quarter pale scraped £8 to £9, diggers' chips, good, £2 to £2 10s.

Wool.—The market is somewhat steadier.

EGGS, POULTRY, AND BY-PRODUCTS.

London, 12th October, 1911.

Eggs.—The market is quiet. Home 11s. 6d. to 14s., Russian 7s. 6d. to 9s. 3d., Italian 11s. to 12s. 6d., Danish 11s. 6d. to 12s. 6d., Australian 7s. 3d. to 9s. 9d., per 120.

Poultry.—The market is rather quiet. A large supply. Chickens: American 7d. to 8d., Russian 7d. to 8d., Home 7½d. to 10d., per lb. Ducklings: Home 7d. to 9½d., Russian 5d. to 6d., per lb. Turkeys: Russian 7½d. to 8½d., Home 9½d. to 10d., per lb.

Bacon.—The market is dull, and prices irregular. Sides: Irish 60s. to 71s., Continental 52s. to 66s., American 52s. to 56s., Canadian 54s. to 58s., per cwt.

Hams.—The market is dull, and prices irregular. Irish 96s. to 112s., English 84s., Canadian 56s. to 64s., American 54s. to 68s., per cwt.

4th November, 1911.

Mutton.—The market is steady, and prices are well maintained. Canterbury 4⅛d., North Island 3⅞d., per lb.

Lamb.—The market is quiet, but holders are firm. Canterbury 5d., other than Canterbury 4⅝d., per lb.

Beef.—The market is dull. New Zealand hinds 3½d., fores 2⅜d., per lb.

Butter.—The market is slightly weaker, with less demand, on account of the high prices. Danish 135s., Siberian 118s., Australian 126s., per cwt.

Cheese.—The market is quiet but steady—no change in prices. Canadian 69s. to 70s. per cwt.

Hemp.—The market is quiet, with tendency in favour of buyers. New Zealand good-fair, spot, £19 15s., fair grade £18 15s., fair current Manila £19 10s., per ton. Forward shipment: New Zealand good-fair £20, fair grade £19, fair current Manila £20 10s., per ton. The output from Manila for the week was 24,000 bales. Stock of New Zealand hemp, 810 tons.

Mutton and Lamb.—River Plate shipments received during October, 1911:—

	Mutton. Carcases.	Lamb. Carcases.
London	88,157	18,879
Liverpool	120,924	25,890
Hull	6,108	300
Southampton	13,583	11,000
Cardiff	6,698	650
Newcastle	10,000	..
Ireland	850	..
	246,320	56,719
October, 1910	216,791	19,354

COMMONWEALTH EXPORTS.

The following shipments of produce were despatched from the Commonwealth to the United Kingdom during the month of September, 1911:—

Mutton (carcases)	95,567
Lamb „	45,552
Beef (cwt.)	67,647
Beef (quarters)	887
Beef (buttocks)	1,074
Butter (cwt.)	67,632
Cheese	..

ARGENTINE TRADE WITH BRITAIN.

The Department has received the following cablegram from Buenos Aires, dated 7th November, 1911:—

"The following shipments of produce were despatched from the Argentine to the United Kingdom ports during October, 1911 (compared with October, 1910):—

	1911.	1910.
Frozen beef (quarters)	125,000	95,766
Chilled beef (quarters)	189,000	153,771
Frozen mutton (carcases)	184,000	260,874
Frozen lamb (carcases)	40,000	19,116
Butter (cwt.)	1,840	Nil "